Scientific Program

of the Seventh International Conference on

Solidification and Gravity

Sept 3-6, 2018 Miskolc-Lillafüred

Organized by:

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Materials Science Research Group
Miskolc Committee of Hungarian Academy of Sciences

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2 September, Sunday

14:00 - 22:00	**Conference Office Open**
18:00 - 22:00	**Dinner, Happy hour**

3 September, Monday

10:00 - 10:20	**Opening ceremony** Chairman: A. Roósz
10:20 - 10:50	**Plenary lecture** **Wim Sillekens**: Space for science: ESA's microgravity research programme on materials science
10:50 - 11:20	**Plenary lecture** **Martin Glicksman**: Melting in Microgravity: How crystallite shape changes led to new insights about interface dynamics
11:20 - 11:50	**Plenary lecture** **U. Hecht at al**: The ESA-MAP project „GRADECET" - An overview of the joint research on solidification of TiAl-based alloys under hypergravity and microgravity conditions
11:50 - 12:20	**Plenary lecture** **Laszlo Granasy:** Phase-field modeling of complex polycrystalline structures
12:20 - 14:00	**Lunch**

14:00 - 14:30	**Plenary lecture** Chairman**:** Hideyuki Yasuda **Silvere Akamatsu**: Real-time dynamics of rod-like eutectic growth patterns on board the Iss: first results from TRANSPARENT ALLOYS
14:30 - 14:40	**Break**

	Session A **In situ observation I** Chairman: Hideyuki Yasuda	**Session B** **Phase field modelling** Chairman: Martin Glicksman
14:40 - 15:00	**Turlough Hughes, Anthony Robinson, Shaun McFadden**: In-situ observation of the effects of gravity direction on directional solidification of the transparent alloys NPG-35wt%-DC	**Peter C. Bollada, Peter K. Jimack, Andrew M. Mullis**: Free energy vs. Grand Potential Energy formulations in phase field modelling of alloy solidification
15:00 – 15:20	**Fatima Mota, Jorge Pereda, Younggil Song, Damien Tourret, Rohit Trivedi, Alain Karma, Nathalie Bergeon**: Interface dynamics and microstructure selection during directional solidification of transparent bulk alloy conducted on DECLIC-DSI	**Tadej Dobravec, Bostjan Mavric, Bozidar Sarler**: Meshless phase field modeling of dendritic growth
15:40- 16:00	**Laszlo Sturz, Martin Hammacher, Janine Eiken, Gerhard Zimmermann**: In-situ observation of growth and interaction of equiaxed dendrites in microgravity	**Ahmed Kaci Boukellal, Jean-Marc Debierre**: Equiaxed growth of Al-Cu denrites: 3D phase-field simulation
16:00 - 16:20	**Shaun McFadden, Robin Mooney:** The nucleation Progenitor Function (NPF) approach: An alternative approach to modelling equiaxed solidification	**Tamás Pusztai, Bálint Korbuly, Hervé Henry, Mathis Plapp, Markus Apel, László Gránásy**: Grain coarsening in two-dimension orientation field-based phase-field models
16:20 – 16:50	**Coffee break**	

	Session A Casting Chairman: Sonja Steinbach	Session B Dendritic Solidification I Chairman: Wim Sillekens
16:50 - 17:10	**Michael Bernhard, Cristian Bernhard, Peter Presoly, Dali You**: An Alternative approach for the experimental verification of microsegregation models using an in-situ hot tensile test during solidification of steel	**Bruno Jacques, Jacques Lacaze, Thierry Mazet, Michael Vynnicky, Olivier Dezellus**: Effect of temperature and heating rate on dissolution of a 3003 core by a 4004 clad during vacuum brazing
17:10 - 17:30	**Waldemar Wolczynski, Anna A. Ivanova, Piotr Kwapisinski, Krzysztof Sztwiertnia**: Effect of Pulling Rate on the Structural Zones Localization in the Continuously Cast Brass Ingot	**Juan Carlos Hernando, Attila Diószegi**: On the Primary Solidification of Fe-C Alloys: Morphological Evolution of Primary Austenite During Coarsening
17:30 – 17:50	**Lukasz Rogal, Boguslaw Baran, Lidia Litynska-Dobrzanska**: Fabrication and properties of magnesium matrix composite obtain using thixomolding technology	**Elif Yilmaz, Emine Acer Erol, Harun Erol, Mehmet Gündüz**: Directional Solidification of the Al-0.25 wt% Zr Overhead Line Conductor
17:50 - 18:10	**Attila Diószegi, Péter Svidró:** Pressure driven undercooling at solidification of hypoeutectic cast iron	**Peter Presoly, Michael Bernard, Dali You, Christian Bernhard:** High concentrations at the final solidification of advanced steel: Thermodynamic evaluation of replicated „segregation-samples" by means of DTA/DSC-measurements
18:10 - 18:30	**Akash Pakanati, Mohammed M'Hamdi, Hervé Combeau, Miha Zaloznik:** 3D modelling of the impact of inlet flow on microsegregation formation in DC casting of aluminium alloys accountintg for grain morphology and transport	
19:00 - 23:00	**Conference Dinner at Vigadó**	

4 September, Tuesday

Microgravity

Chairman: Ulrike Hecht

08:00 - 08:30 **Plenary lecture**
Gerhard Zimmermann at al: Columnar and equiaxed solidification within the framework of the ESA MAP project CETSOL

08:30 - 09:00 **Plenary lecture**
Yves du Terrail: Multy mesh modelling

09:00 – 09:30 **Plenary lecture**
Fan Zhongyun: Heterogeneous nucleation, grain initiation and grain refinement

09:30 – 10:00 **Plenary lecture**
Markus Rettenmayr at al: Solidification of Al-Ni melts under terrestrial and microgravity conditions

10:00 - 10:30 **Coffee break**

	Session A Modelling, simulation I Chairman: Menghuai Wu	Session B Grain refinement I Chairman: László Gránásy
10:30 – 10:50	**Martin Cisternas, Miha Zaloznik, Hervé Combeau**: Macroscopic modeling of solidifiation of TiAl alloys in hypergravity	**H. Men, Z. Fan**: Heterogeneous Nucleation by Structural Templating
10:50 – 11:10	**Mramor Katarina, Vertnik Robert, Sarler Bozidar**: Numerical modelling of the effect of electromagnetic stirring direction in continuous casting of steel billets	**C.M Fang and Z. Fan**: A first-principles study of chemical interaction between the substrate and the liquid on prenucleation

11:10 – 11:30	**Cs. Nagy, O. Budenkova, Y. du Terrail, A. Rónaföldi, A. Roósz:** Numerical simulation series for the investigation and validation of the Lorenz force field in bidirectional travelling magnetic field via thermal gradient shift effect	**F. Gao, Z. Fan**: grain initiation behavior during solidification
11:30 – 11:50	**Can Huang at al:** Gravity Dependent Columnar-to-Equiaxed Transition in TiAl alloys: Solidification of Ti-46Al-8Nb in hyper gravity and Multi-physics modelling	**Z. P. Que, Y. Wang, Z. Fan**: A novel grain refiner for effective grain refinement Al- alloys
11:50 – 12:10	**László Rátkai, Tamás Pusztai, László Gránásy:** Phase-field modeling of mobile dendrites in melt flow	**Shihao Wang, Yun Wang, Quentin Ramasse, Zhongyun Fan**: Segregation of Ca at the Mg/MgO interface and its effect on grain refinement
12:10 - 14:00	**Lunch**	
14:00 - 14:30	**Plenary lecture** Chairman: Henri Nguyen-Thi **Hideyuke Yasuda, Yuta Tomiyori, Takuya Kawarazaki, Yuichi Kato, Kohei Morishita**: Characterization of dendrite shape evolution in Fe-C system by using time-resolved X-ray tomography	
14:30 – 14:40	**Break**	

	Session A **Modelling, simulation II** Chairman: Peter Galenko	Session B **In situ observation II** Chairman: Henri Nguyen-Thi
14:40 - 15:00	**Tao Wang, Olga Budenkova, Yves Delonnoy, Yves Fautrelle, Engang Wang**: A 3-phase equiaxed solidification numerical model for binary alloy coupling macroscopic transport and grain growth	**Guillaume Reinhart, Hadjer Soltani, Lucas Julien, Mohamed Cherif Benoudia, Moussa Zahzouh, Henri Nguyen-Thi**: Analysis by in situ X-radiography of the impact of growth velocity and temperature gradient on the grain structure formation during solidification of refined Al-20wt.%Cu alloy
15:00 - 15:20	**Ayoub Aalilila, Elie Hachem, Charles-André Gandin**: Numerical simulation of chill cooling and solidification of a levitated steel droplet in microgravity	**Florian Kargl, Maike Becker, Joerg Drescher, Mareike Wegener, Cristoph Dressinacker**: Equiaxed dendrite growth in non-refined Al-base alloys in real time
15:20 – 15:40	**H. Tetlow, Z. Fan**: Monte Carlo Simulations of Chemical Segregation at the liquid/substrate interface	**Laszlo Sturz, Angelos Theofilatos**: Comparison of x-ray radiography of equiaxed alloy solidification in grain-refined Al-3.5wt-%Ni with dendrite needle network modelling
15:40 – 16:00	**Min Yang, Jun Zhang, Hua Wei, Lin Liu**: Phase field study on microstructure evolution and creep property in nickel-base superalloys	**Virkeshwar Kumar, Atul Srivastava, Shyamprasad Karagadde**: Real-time and full-field quantification of buoyant convection during multi-component solidification
16:00 – 16:30	**Coffee break**	
16:30 – 17:00	**Plenary lecture** **Chairman:** Gerhard Zimmermann **Damien Tourret ,Sabine Ziri, Laszlo Sturz, Alandre Viardin, Mihail Zaloznik,:** A quantitive benchmark of multiscale models for dendritic growth	
17:00 - 17:10	**Break**	

	Session A **Modelling, simulation III** Chairman: Markus Rettamayr	Session B **Dendritic solidification II** Chairman: Gerhard Zimmermann
17:10 - 17:30	**Hao Shi, Houfa Shen**: Numerical Simulation of Heat Transfer and Fluid Flow in Electroslag Remelting Process	**Hannes Engelhardt, Dorothea Mey, Markus Rettenmayr**: Tunable concentration gradients generated by controlled changes in the solidification regime
17:30 – 17:50	**Daniel Molnar, David Halapi, Marianna Bubenko**: The Simulation of Special Gravity Filling Conditions	**Rahul M R, Sumanta Samal, Gandham Phanikumar: Undercooling studies and growth velocity measurement on multi-component FeCuNi{X} alloys**
17:50 – 18:10	**Bostjan Mavric, Tadej Dobravec, Robert Vertnik, Bozidar Sarler**: Investigation of the effect of asymmetric thermal conditions on stresses during continuous casting of steel with the use of meshless travelling-slice model	**Stefanie Koch, Peter Galenko, Olga Shuleshova, Raphael Kobold, Markus Rettenmayr**: Solidification behavior and microstructure analysis of ternary Zr.Cu.(Al6Ni) alloys
18:10 - 19:30	**Dinner**	
19:30 - 23:00	**Social event: Cave Bath, Miskolc-Tapolca**	

5 September, Wednesday

Forced convection I

Chairman: Damien Tourret

08:00 - 08:30	**Plenary lecture** **Sonja Steinbach at al**: The effect of magnetically controlled fluid flow on microstructure evolution in cast technical Al- alloys: The MICAST project
08:30 - 09:00	**Plenary lecture** **Peter Galenko**: Effect of forced convection on dendritic growth: theoretical modeling and analysis of recent experimental results
09:00 - 09:20	**Natalia Shevchenko, Olga Keplinger, Sven Eckert**: Investigations of forced flow effects on dendritic solidification
09:20 - 09:40	**Haijie Zhang at al**: Numerical simulation of fluid flow in the mushy zone under rotation magnetic field: influence of permeability
09:40 - 10:00	**Alexandre Viardin at al**: Phase-field modeling of melt flow and directional solidification in Ti48Al alloy
10:00 - 10:30	**Coffee break**

Forced convection II

Chairman: Waldemar Wolczynski

10:30 - 11:00	**Plenary lecture** **Henri Nguyen-Thi at al**: In-situ analysis of thermoelectric magnetic effect by syncrotron X-radiography during directional solidification under static magnetic field
11:00 - 11:20	**Injes Oliveira at al:** The effect of electromagnetic stirring during solidification of Co-Cr alloys
11:20 - 11:40	**Dirk Räbiger, Bernd Willers, Sven Eckert**: Influence of Al-alloy composition on the potential of force convection to reduce grain size and prevent macrosegregation
11:40 – 12:00	**Yves Du Terrail Couvat, Olga Budenkova, Thiago Takamura Yanaguissava, Annie Gagnoud:** FEM Magneto-thermo-electric modeling around a solid grain during alloy solidification under uniform AC/DC magnetic field
12:00 - 14:00	**Lunch**

	Plenary lecture	
14:00 - 14:30	Chairman: Francisco Gracia-Moreno **Joshua Miller, Sonja Steinbach, Laszlo Sturz, Gerhard Zimmermann, Nils Warnken:** Large Scale 3D tomography analysis of dendritic arrays in Al-10wt%Cu solidified under changing withdrawal rates	
14:30 - 14:40	**Break**	
	Session A **Compound Solidification** Chairman: Francisco Gracia-Moreno	**Session B** **Grain refinement II** Chairman: Andrew Mullis
14:40 – 15:00	**Naved Hussain, Andrew M Mullis**: Microstructure Characterisation of Drop tube Processed SiGe Semiconductor alloy	**F. Gao, Z. Fan: Effect of agglomeration of potent nucleant particles on grain size in the as-cast microstructure**
15:00 - 15:20	**Gregorz Boczkal, Pawel Palka, Wojciech Spisak, Andrej Chiebicki**: Morphology of bizmuth precipitates in Zn-Bi single crystal for bactericidal applications	**Jian Gu, Yuanding Huang, Karl Ulrich Kainer, Norbert Hort**: Roles of Mn in refining the grains of magnesium alloys with SiC inoculations
15:20 – 15:40	**Dongmei Lui, Markus Rettemayr**: Applying directional solidification to Cu doped Bi2Te3 thermoelectric materials for enhanced performance	**Feng Wang, Zhongyun Fan**: Heterogeneous nucleation on oxide in Al alloys
15:40 – 16:00		**Z. Fan, H.-T. Li, J. B. Patel:** Grain refinement of light alloys without grain refiners
16:00 – 17:30	**Poster session**	
17:30 - 23:00	**Social event: Wine tour to Tokaj region**	

6 September, Thursday

Eutectic, peritectic, monotectic, foam I

Chairman: Silvere Akamatsu

09:00 - 09:30	**Plenary lecture** **Francisco Gracia-Moreno, Tillmann Robert Neu, Paul Hans Kamm, Felix Bülk, Stefan Hutzler, John Banhart**: Overview of the µg-Foam ESA MAP project
09:30 - 10:00	**Plenary lecture** **Andrew Mullis, Aluwatoyin Jegede and Robert F Cochrane**: Reduced Gravity Processing of Cu-Co Metastable Monotectic alloy
10:00 - 10:30	**Plenary lecture** **Menghuai Wu:** A numerical study on the role of fragmentation in the as-cast structure
10:30 - 11:00	**Coffee break**

Eutectic, peritectic, monotectic, foam II

Chairman: Zongyun Fan

11:00 - 11:20	**Rahul M R, Reliance Jian, Sumanta Samal, Gandham Phanikumar**: Microstructure evolution and mechanical properties of Co-Fe-Ni-Ti-V eutectic high entropy alloys
11:20 - 11:40	**Johann Peter Mogeritsch, Tanja Peifer, Andreas Ludwig**: Investigation on the Liquid Flow ahead of the Solidification Front During the Formation of Peritectic Layered Solidification Structures
11:40 - 12:00	**Dandan Zhao, Jiarong Gao, Dirk Holland-Moritz, Matthias Koble**: Liquid phase separation and rapid solidification in undercooled Ti60Y40 alloys
12:00 - 12:20	**Zsolt Veres, Arnold Rónaföldi, Kassab Al-Omari, András Roósz**: The effect of forced melt flow induced by rotating magnetic field on the structure of Al-Si eutectic
12:20 - 12:40	**Closing remarks**
12:40 - 14:00	**Lunch**
14:00 - 17:30	**MICAST Meeting**
14:00 - 17:30	**GRADECET Meeting**

Poster Session

(1) **Hadi Barati, Menghuai Wu, Abdellah Kharicha, Andreas Ludwig**: Discussion on possible solidification during SEN clogging in steel continuous casting

(2) **Antonia Betzou, Michael Auinger, Sridhar Seetharaman, Begona Santillana, Prakash Sriringam**: Thermophysical Properties of Electrical Steels under Microgravity conditions

(3) **Bogdan Borislavov Nenchev, Simon Gill**: Simulation of mechanical deformation during dendritic solidification

(4) **Dora Janovszky, Ferenc Kristaly, Tamas Miko, Adam Racz, Maria Sveda, Anna Sycheva, Tomasz Koziel**: Phase transformation and morphology evolution of Ti50Cu25Ni20Sn5 during mechanical milling at room temperature and -78 °C

(5) **M. Sveda, A. Sycheva, A. Ronafoldi, A. Roosz**: Effect of Travelling Magnetic Field on the Solidified Structure of Peritectic Sn–Cd Alloy

(6) **Daniel Molnar, Adam Kiss, Csaba Majoros**: Simulation of the High Pressure Die Casting Process

(7) **Gábor Gyarmati, György Fegyverneki, Tamás Mende, Monika Tokár**: The Melt Cleaning Efficiency of Fluxes with Different Physical and Chemical Properties

(8) **Zoltán Kéri, György Kaptay**: Removal of oxide skin from molten aluminum surface

(9) **Arnold Rónaföldi, András Roósz**: Effect of grain refinement and the solid/liquid interface velocity on the microstructure of Al-20wt% Cu alloy

(10) **Jenő Kovács, Arnold Rónaföldi, Árpád Kovács, András Roósz**: The effect of strong melt flow induced by the rotating magnetic field on the structure of Al6Si4Cu alloy

(11) **Boštjan Mavrič, Tadej Dobravec, Robert Vertnik, Božidar Šarler**: Investigation of the effect of asymmetric thermal conditions on stresses during continuous casting of steel with the use of meshless travelling-slice model

(12) **Johann P. Mogeritsch, Andreas Ludwig**: Investigation on the Binary Organic Components TRIS-NPG as Suitable Model Substances for Metal-Like Peritectic Solidification

(13) **Johann P. Mogeritsch, T. Pfeiler, A. Ludwig**: Metastable Solidification of Composites: Novel Peritectic Structures and In-Situ Composites (METCOMP)

(14) **P.K. Galenko, D.V. Alexandrov, D.A. Danilov, K. Reuther, M. Rettenmayr, D.M. Herlach**: Modeling of dendritic growth under earthly and reduced gravity conditions

(15) **Markus Rettenmayr**: Solidification of Al-Ni melts under microgravity conditions

(16) **Natalia Shevchenko, Joerg Grenzer, Olga Keplinger, Hieram Neumann-Heyme, Alexander Rack, Kerstin Eckert, Sven Eckert**: High resolution synchrotron imaging of dendritic coarsening in Ga – In alloys

(17) **Patrick Fopp, Matthias Kolbe, Florian Kargl, Raphael Kobold**: Effect of the hypercooling limit on the crystal growth velocity in metallic melts

(18) **Grzegorz Boczkal**: Supergravity 600G effect on crystallization of Zn-25%Bi monotectic alloy

(19) **Virkeshwar Kumar, Atul Srivastava, Shyamprasad Karagadde**: Plausible Evolution Cycle for Buoyant Double diffusive convection

(20) **Sara Battaglioli, Shaun McFadden, Anthony Robinson**: A front tracking model of directional solidification under forced convection conditions as part of the GRADECET project

(21) **B. Jiang, H. Men, Z. Fan**: Effect of surface roughness on prenucleation

(22) **C. M. Fang, Z. Fan**: An ab initio study of the potency of MgO particles for heterogeneous nucleation of light metals

(23) **F. Gao, Z. Fan**: Grain initiation behaviour and its effect on grain refinement

(24) **Feng Wang, Hu-tian Li, Zhongyun Fan**: Effect of high shear on the grain refinement of Al-alloys

(25) **H. Men, Z. Fan**: Effect of positive lattice misfit on prenucleation

(26) **Shihao Wang, Yun Wang, Quentin Ramasse, Zhongyun Fan**: Segregation of Y at the Mg/MgO interface and its effect on grain refinement

(27) **Z. P. Que, Y. Wang, Z. Fan**: Compositional templating for heterogeneous nucleation of intermetallic compounds

(28) **Z. P. Que, Y. Wang, X. R. Zhou, Z. Fan**: Heterogeneous nucleation of intermetallic compound

(29) **F. Gao, Z Fan**: Growth restriction and grain refinement

Short Program of the Conference on Solidification and Gravity ’18

Sunday, Sept. 2, 2018

18 ^{00} – Happy Hour

Monday, Sept. 3, 2018

10 ^{00} – 10 ^{20} Opening Ceremony
10 ^{20} – 12 ^{20} Plenary lecture
12 ^{20} – 14 ^{00} Lunch
14 ^{00} – 14 ^{30} Plenary lecture
14 ^{30} – 14 ^{40} Break
14 ^{40} – 16 ^{20} In situ observation I / Phase field modelling
16 ^{20} – 16 ^{50} Coffee Break
16 ^{50} – 18 ^{30} Casting / Dendritic solidification
19 ^{00} – 23 ^{00} Conference Dinner at Vigadó

Tuesday, Sept. 4, 2018

08 ^{00} – 10 ^{00} Microgravity
10 ^{00} – 10 ^{30} Coffee Break
10 ^{30} – 12 ^{10} Modelling, simulation I / Grain refinement I
12 ^{10} – 14 ^{00} Lunch
14 ^{00} – 14 ^{30} Plenary lecture
14 ^{30} – 14 ^{40} Break
14 ^{40} – 16 ^{00} Modelling, simulation II / In situ observatioin II
16 ^{00} – 16 ^{30} Coffee Break
16 ^{30} – 17 ^{00} Plenary lecture
17 ^{00} – 17 ^{10} Break
17 ^{10} – 18 ^{10} Modelling, simulation III / Dendritic solidification II
18 ^{10} – 19 ^{30} Dinner
19 ^{30} – 23 ^{00} Social event: Cave Bath, Miskolc-Tapolca

Wednesday, Sept. 5, 2018

08 ^{00} – 10 ^{00} Forced convection I
10 ^{00} – 10 ^{30} Coffee break
10 ^{30} – 12 ^{00} Forced convection II
12 ^{00} – 14 ^{00} Lunch
14 ^{00} – 14 ^{30} Plenary lecture
14 ^{30} – 14 ^{40} Break
14 ^{40} – 16 ^{00} Compound solidification / Grain refinement II
16 ^{00} – 17 ^{30} Poster session
17 ^{30} – 23 ^{00} Social event: Wine tour to Tokaj region

Thursday, Sept. 6, 2018

09 ^{00} – 10 ^{30} Eutectic, peritectic, monotectic, foam I
10 ^{30} – 11 ^{00} Coffee Break
11 ^{00} – 12 ^{20} Eutectic, peritectic, monotectic, foam II
12 ^{20} – 12 ^{40} Closing remarks
12 ^{40} – 14 ^{00} Lunch