



Solidification Course 2010

Announcement

Les Diablerets (Switzerland)

April 25-30, 2010

THE LECTURERS

Courses, discussions and exercises will be presented by the following lecturers :

<i>Prof. Christoph Beckermann</i>	Professor, University of Iowa, Iowa City, USA
<i>Dr William J. Boettinger</i>	NIST Fellow, National Institute of Standards and Technology (NIST), Gaithersburg, USA Member of the National Academy of Engineering
<i>Prof. Hervé Combeau</i>	Professor, Ecole des Mines de Nancy (INPL), France
<i>Prof. Jon Dantzig</i>	Professor Emeritus, University of Illinois, Urbana, USA; Invited Professor, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland
<i>Dr Marco Gremaud</i>	Director, Calcom ESI, Lausanne, Switzerland
<i>Prof. Andreas Ludwig</i>	Professor, University of Leoben, Austria
<i>Prof. Michel Rappaz</i>	Professor, Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland
<i>Dr Philippe Thévoz</i>	Director, Calcom ESI, Lausanne, Switzerland

SCOPE OF THE COURSE

For the nineteenth consecutive year, Calcom ESI, in collaboration with the Swiss Federal Institute of Technology of Lausanne (EPFL), is organizing a solidification course with the participation of renowned lecturers from Swiss, French, Austrian and US universities.

This one-week course held in English is designed for engineers and scientists from industry and research centers who wish to improve their knowledge in the field of solidification. Participants should have a degree in materials science, metallurgy, mechanical engineering, physics or chemistry.

Although the theoretical background of solidification is reviewed, the course is widely oriented towards the application of solidification theories to industrial processes. The macroscopic aspects of the processes (transfer phenomena) are addressed together with the formation of microstructures and defects (microscopic phenomena). Connection between macroscopic and microscopic aspects, such as the prediction of microstructures and defects as a function of process parameters, is also emphasized.

Exercises, discussions, films and computer demonstrations are organized in order to apply, practice and visualize the content of the lectures. Due to the limited number of participants (maximum 35-40), interactions between the participants and the eight lecturers will allow an optimum transfer of knowledge, as was demonstrated during the previous editions.

Finally, private or group discussions can take place during social hours, evenings and Wednesday afternoon in order to treat more specific problems which the participants may encounter.

PROGRAMME

Sunday April 25, 2010

From 18:30 Welcome of the participants, registration
19.15 Dinner

Monday April 26, 2010

08.30 - 09.45 Introduction / Overview of solidification phenomena M. Gremaud
09.45 - 10.15 Break
10.15 - 11.15 Phase diagrams W. Boettinger
11.15 - 12.15 Discussion/Exercises (Phase diagrams) W. Boettinger/M. Rappaz
12.30 Lunch
13.45 - 14.45 Heat and mass transfer J. Dantzig
14.45 - 15.45 Discussion/Exercises (Heat and mass tr.) J. Dantzig/C. Beckermann
15.45 - 16.15 Break
16.15 - 17.15 Nucleation and grain refinement in alloys A. Ludwig
17.15 - 18.00 In-situ visualization of solidification (films) W. Boettinger
18.30 Social Hour
19.30 Dinner

Tuesday April 27, 2010

08.30 - 09.30 Microsegregation C. Beckermann
09.30 - 10.45 Discussion/Exercises (Microsegregation) C. Beckermann/A. Ludwig
10.45 - 11.15 Break
11.15 - 12.15 Dendritic structures H. Combeau
12:30 Lunch
14.00 - 15.00 Eutectic solidification and microstructure selection M. Rappaz
15.00 - 16.15 Discussion/Exercises (Dendrites-Eutectics) M. Rappaz/H. Combeau
16.15 - 16.45 Break
16.45 - 17.45 Mushy zone modeling C. Beckermann
19.00 "Swiss Evening" dinner

Wednesday April 28, 2010

08.30 - 09.30	Porosity	M. Rappaz
09.30 - 10.45	Discussion/Exercises (Microporosity)	M. Rappaz /J. Dantzig
10.45 - 11.15	Break	
11.15 - 12.15	Modeling of columnar and equiaxed solidification	H. Combeau
12.30	Lunch	
	Free time (free discussions with the professors)	
18.00	Social hour	
19.00	Dinner	

Thursday April 29, 2010

08.30 - 09.30	Macrosegregation	A. Ludwig
09.30 - 10.45	Discussion/Exercises (Macrosegregation)	A. Ludwig/H. Combeau
10.45 - 11.15	Break	
11.15 - 12.15	Solidification path in multi-component systems	W. Boettinger
12.30	Lunch	
14.15 - 15.30	Discussion/Exercises (Multi-comp. sys.)	W. Boettinger/C. Beckermann
15.30 - 16.00	Break	
16.00 - 17.00	Thermomechanics	J. Dantzig
17.00 - 17.45	Computer presentation (Coupling of solidification phenomena)	Ph. Thevoz
18.00	Social hour	
19.00	Dinner	

Friday April 30, 2010

08.30 - 09.30	Hot tearing	C. Beckermann
09.30 - 10.30	Discussion/Exercises (Thermomec.&Hot Tear.)	J. Dantzig/C. Beckermann
10.30 - 11.00	Break	
11.00 - 11.45	Synthesis – Linking solidification phenomena	Ph. Thevoz
11.45	Concluding remarks	M. Gremaud
11.55	End	
12.00	Lunch	

PRACTICAL INFORMATION

- Dates : from Sunday April 25, 2010 evening
to Friday April 30, 2010, mid-day (lunch included).
- Location : Hotel "Eurotel Victoria", Les Diablerets, Switzerland
(Mountain resort in the Swiss Alps, 100 km from Geneva)
www.eurotel-victoria.ch
- Access : Train or car (2.5 hours by train from Geneva Airport and
4.5 hours by train from Zurich Airport).
- Registration : As soon as possible with the enclosed registration form
(to be sent by post, by fax or scanned by email to Calcom ESI).
*Thanks to send also an email to solidification.course@esi-group.com in
order to make sure that we have well received your registration.*

Only the first 35-40 persons will be taken into consideration.
All registrations will be confirmed in written within 2-3 weeks.

- Price : € 3'620.- (€ = EUR = Euro currency)
This price includes the registration fee, the booklet of the course
with the lecture notes, the book "Solidification", the hotel (full
board), drinks during the meals, social hours and coffee breaks.

The course fee should be paid before March 30, 2010.

*A confirmed registration corresponds to a firm commitment. This means that
the course fee should be paid in any case, unless this registration is cancelled in
written at least 30 days prior to the start of the course.*

- Address for
payment : Banque Cantonale Vaudoise (BCV)
Case postale 300
CH-1001 Lausanne, Switzerland
SWIFT code : BCVLCH2L
Clearing number : 767
Calcom ESI account : CO E 5001.77.74
IBAN : CH12 0076 7000 E500 1777 4
To the order of CALCOM ESI

An information package with the practical details will be sent in advance (around end
of March 2010) to each registered participant.

REGISTRATION

Solidification Course 2010

Les Diablerets (Switzerland) April 25-30, 2010

Mr Mrs Ms First name : _____

Last name : _____

Company : _____

Position in the company : _____

Address : _____

City : _____ Country : _____

Phone : _____ Fax : _____

E-mail : _____

(As email the address is quite often difficult to read on faxed registration forms, thanks to send us an email in parallel to your registration. This will allow to double check it. Send your email to solidification.course@esi-group.com)

Indicate below the requested information:

- Material(s) of primary interest: _____

- Process(es) of primary interest: _____

- Working in industry Working in National Institute Working in University

- If working in industry specify: R&D Production Quality control

Describe with 3 keywords your main interests/expectations/topics to be addressed in the course :

Limited to the first 35-40 registrations. All registrations will be confirmed.

Payment Information (no credit card):

- Payment by bank transfer
 Payment by check (drawn on a Swiss Bank)

Signature of the participant : _____

Authorized^{**/} signature(s) of the company : _____

^{**/} I have noticed that this registration is a firm commitment and that the course fee will be paid in any case, unless this registration is cancelled in written at least 30 days prior to the start of the course.

Return as soon as possible (by post or by fax +41-21-693 4740) to:
CALCOM ESI, Parc Scientifique EPFL - PSE-A, CH-1015 Lausanne, Switzerland
(send also an email to : solidification.course@esi-group.com
to check that we have well received your registration)

Previous courses were attended by participants from the following companies or institutions :

Argentina : INTI Mecanica / **Australia** : BHP, Comalco, Monash Univ., Wollongong Univ. / **Austria** : Amag, ARC Leichtmetallkompetenz-zentrum, Hertwich Engineering, Leoben Univ., Materials Center Leoben Forschung, Österreichisches Giesserei Institute, Siemens VAI, TU Graz, Voest-Alpine / **Belgium** : Allard-Europe, Bekaert, CRIF, Heraeus Electro-Nite Intl., KU Leuven, Liège Univ, Magotteaux, Union Minière, Umicore / **Brazil** : Gerdau SA, Villares Metals SA / **Canada** : Alcan, Aluminium Tech. Centre NRC, Carlton Univ., Windsor Univ. / **Czech Republic** : Mecas ESI, Vitkovice Heavy Machinery, VSB Technical Univ. Ostrava / **Finland** : Helsinki Univ., Outokumpu, VTT / **France** : Alcoa Howmet, Ascometal Creas, Aubert&Duval, Cabinet Braun, CEA, Cemef, Cezus-Areva, CLAL-MSX, Clecim, Creusot-Loire Industrie, Ctif, Ecole des Mines Albi, Electricité de France, ENSAM, ESI Group, Fonderie Nouvelle Jouve, Forcast, Griset, Imphy, INPG, IRSN, Le Bélier, Manoir Industries, Montupet, Péchiney, Pont-à-Mousson, Renault, Sambre et Meuse, Saint-Gobain Cree, SCC, Sepr, SNECMA, Tecphy, Trefimetaux, Turbine Casting, Ugine, Ugitech Groupe Arcelor, Umicore, Unimetal, Vallourec&Mannesmann Tubes, Waeles / **Germany** : Access, Aluminiumfeinguss Soest, Daimler AG, Daimler Chrysler, DLR, Doncasters Precision Casting, Fraunhofer IWS/ITWM, GKSS, Hydro Aluminium, MAN, MKM, Otto Fuchs Metallwerke, Ritter Aluminium Giesserei, Salzgitter-Mannesmann, Schmidt & Clemens, Siempelkamp Giesserei, SMS Siemag, Thyssen, VAW / **Greece** : Egnatia Foundry, Elval / **India** : Anant Entreprises, Concast, General Motors, HAL / **Ireland** : Materials Ireland, Montupet / **Italy** : Aera3 - Studio Tecnico Associato, Bologna Univ. Brembo, Brescia Univ., Centro Ricerche Fiat, Centro Sviluppo Materiali, Ecotre, Europea Microfusioni Aerospaziali, FAR Spa, Fonderia C. Atti, Inn Tech Brescia, Metra, Microfusione Stellite, Politecnico di Torino, Teksid, Udine Univ, Zanardi Fonderie / **Japan** : JIPS, Mitsubishi Heavy Industries, Tokyo Univ. / **Korea** : Hyundai Heavy Industries, Korea Inst. of Industrial Tech. (KITECH) / **Mexico** : Castech, Ciateq, Cinfusa / **Netherlands** : Corus, ESA, Honeywell, Hoogovens, Netherlands Inst. for Metal Research, Shell , TU Delft / **Norway** : Elkem A/S, Elkem ASA, Hydro Aluminium, Institute for Energy Technology, KA Rasmussen, NTNU, Sintef / **Poland** : Warsaw Univ, WSK / **Portugal** : Funfrap, Instituto Superior Tecnico, Zollern&Comandita / **Russia** : FSUE MMPP SALUT, KUMW, OJSC Aviadvigatel / **Saudi Arabia** : Sabic / **Slovakia** : US Steel Kosice / **Slovenia** : Impol, TCG Unitech / **South Africa** : Mattek-CSIR / **Spain** : Analisis Y Simulacion, Centro Metalurgico Azterlan, Cidaut, Edertek, Fagor Ederlan, Fuchosa, Inasmet, Labein-Tecnalia, Mondragon Univ., Precicast Bilbao / **Sweden** : ABB Process Industries, Erasteel Kloster, Lulea Univ., MEFOS, Ovako Steel, Sandvik Rock Processing, Sapa Technology, Swedish Foundry Association, Swerea SweCast, Volvo Truck / **Switzerland** : Advanced Aerofoil Tech., Alcan, Algroup, Alusuisse-Lonza, Asulab, Bühler, Cendres et Métaux, Concast, Kugler Bimetal, Metalor, Precicast, PX Holding, Rolex, Sulzer, Swatch Group, Swissmetal Boillat, UMS, Wolfensberger / **Taiwan** : National Taiwan Univ. / **Turkey** : Assan/Kibar Group, CMS Light Alloy Wheels, Eyap Artema, Gedik Döküm / **United Kingdom**: AETC, Aeromet International, Alloy Wheels, Ashland, AWE, British Aerospace, Cambridge Univ., Doncasters, Namtec, Rolls Royce, Sheffield Forgemasters, Sim-Cast, T&N Technology, Vulcan SFM / **USA** : Alumax, Carnegie Mellon, Caterpillar, Dura-Bar, Ford Motor Company, General Electric, General Motors, Howmet, Iowa Univ., Illinois Univ., Los Alamos Natl. Lab., Naval Surface Warfare Center, NIST, PCC Structural, Stuller, United Technologies, Virginia Tech, Wagstaff, Wyman Gordan.

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