ALUMINIUM SUMMER SCHOOL 2014

28th July – 01st August 2014 | RWTH Aachen

SUMMER SCHOOL

The school has previously taken place in Trondheim (Norway), Worcester (USA) and Vicenza (Italy). Topics concerning light alloys solidification and processing have been traditionally covered by the Summer School. Additional aspects in 2014 are direct chill casting and recycling, besides die casting, heat treatment, simulation and further fundamental process steps. The Summer School also addresses concrete industrial cases, mainly from the automotive industry. The program will focus on the challenges of innovative design, advanced applications, product and process reliability, industrial competitiveness and technological sustainability.

The success of the light alloys casting technology is based on know-how in the fields of:

- fundamentals of metallurgy,
- modeling and simulation of casting processes and microstructure,
- conventional and innovative aluminium alloys, components and processing solutions,
- advances in process control and foundry management.

The International Summer School will offer an overview of advanced manufacturing of cast light alloys components, aiming at an understanding of topics which are important both for industrial engineers (knowledge of innovative solutions and approaches) and for researchers (knowledge of the industrial requirements to be targeted by innovation). The program and the lecturers have been selected with the basic idea that integration will be the key concept for making research and industrial development in the field of light alloys casting more competitive.

INITIATORS

COMMITTEE

This International Summer School is, in 2014, a joint effort among NTNU (Norway), WPI (USA), DTG (Italy) and RWTH Aachen (Germany).

D. Apelian; WPI, Worcester Polytechnic Institute, USA
L. Arnberg; NTNU, University of Trondheim, Norway
F. Bonollo; DTG, University of Padova, Italy
A. Bührig-Polaczek; Foundry Institute, RWTH Aachen University, Germany

INDUSTRIAL ADVISORY BOARD MEMBER

Dr. Gerd-Ulrich Grün (Hydro Al)
Dr. Hubert Koch (Trimet)
Dr. Claudio Mus (Aluminium Rheinfelden)
Dr. Franco Pinna (Ferrari)
Ansgar Pithan (Martinrea Honsel Germany GmbH)
Dr. Jose Talamantes-Silva (NEMAK)
Dr. David Weiss (Eck Industries)

RWTH AACHEN UNIVERSITY

RWTH Aachen University is one of Germany´s elite universities and one of the most highly recognized technical universities in Europe. With 260 institutes within nine faculties, it is one of Europe´s leading institutions for science and engineering research. With innumerable industrial cooperation partners, the education that students receive at RWTH Aachen University is firmly rooted in real-world applications. As a result, RWTH graduates are highly sought after by business and industry and one in five board members of German corporations is an alumnus of RWTH Aachen University.

More than 6500 people with an international background, from more than 120 countries, currently study, research, teach, and work at RWTH Aachen. This internationality lived out at RWTH Aachen is flanked by strategies, measures, and services for promoting the internationality of academics, teaching, and research.

ORGANISATION

RWTH INTERNATIONAL ACADEMY

As the official executive education academy of RWTH Aachen University, the RWTH International Academy is backed by the diverse knowledge of the various institutes and research organizations of the university. Through this close cooperation, practical executive education programmes are professionally conceived, organized and offered. The institutes of RWTH Aachen University are responsible for the technical content of the programmes.

PARTICIPATION FEE

Participation fees are staggered as follows:
Standard Participant: 2.160 Euro
MPI Member, AIM Member, AMAP Member: 1.920 Euro
Student*: 960 Euro

** Please send proof of your student status by email or by fax (0049 241 80 92525).*

The participation fee includes course materials, meals and framework programme, but not the cost of accommodation and travel expenses.

VENUE

The lectures take place in **lecture room H218**, Foundry Institute at RWTH Aachen, Intzestraße 5, 52072 Aachen, Germany.

HOTEL CONTINGENT

A number of rooms will be provided for the duration of the Summer School. More information ist available on the homepage.

REGISTRATION

For registration please use the online registration. Terms and conditions are available at www.academy.rwth-aachen.de/de/agb.

Further information and registration
RWTH International Academy
Kackertstraße 10 I 52072 Aachen, Germany
E-Mail: aluminium.summerschool2014@academy.rwth-aachen.de
Web: www.academy.rwth-aachen.de/aluminiumsummerschool2014

dtg · NTNU – Trondheim Norwegian University of Science and Technology · WPI

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28TH JULY– 01ST AUGUST, 2014

PROGRAM

28th July – 01st August 2014 | RWTH Aachen

MONDAY, 28TH JULY 2014

10.00 – 14.00 **Welcome and Registration**

1. Introduction, Overview Process - Structure - Properties

14.00 – 15.00 **The Molten Metal and Its Care Prior to Casting**
Diran Apelian (WPI)

15.15 – 16.15 **Development of Microstructure During Solidification**
Lars Arnberg (NTNU)

16.45 – 17.45 **Transport Phenomena Considerations - Heat Flow, Fluid Flow and Mass Flow-affecting and Influencing Microstructure and Control of Defects**
Diran Apelian (WPI)

TUESDAY, 29TH JULY 2014

09.00 – 11.15 **2. Simulation**
Simulation and Optimization of Aluminium Castings and Casting Processes
Moritz Weidt (MAGMA GmbH)

11.45 – 13.00 **Simulation of as cast Microstructures for Al-alloys on the Grain Scale**
Markus Apel (ACCESS e.V.)

14.00 – 15.00 **3. Processes and Process Control**
A short Overview of Foundry Processes for Light Alloys
Franco Bonollo (DTG),
Nicola Gramegna (Enginsoft)

15.15 – 16.15 **Quality Mapping in Light Alloys Castings**
Franco Bonollo (DTG),
Nicola Gramegna (Enginsoft)

16.45 – 17.45 **Key-Process Parameters for High-Quality Light Alloys Castings**
Franco Bonollo (DTG),
Nicola Gramegna (Enginsoft)

WEDNESDAY, 30TH JULY 2014

9.00 – 09.45 **4. Alloys**
Principals for the Design of Cast Alloys and an Overview of Commercial Alloys
M. M. Makhlouf (WPI)

10.00 – 10.45 **Primary, Secondary Alloys, and the Effect of Impurities and Trace Elements**
Giulio Timelli (DTG)

11.15 – 12.00 **Grain Refinement and Modification of Cast Alloys**
Lindsay Greer (Cambridge University)

12.15 – 13.00 **The Science of Heat Treatment of Aluminium: An Industrial Perspective**
Kevin Anderson (Mercury Marine)

14.00 – 14.45 **5. Innovative processes and materials**
Diffusion Solidification for the Casting of Wrought Alloys
S. Shankar (McMaster University),
Diran Apelian (WPI)

15.00 – 15.45 **Semi-Solid Processing - status report**
John Jorstad (JLJ Technologies),
Diran Apelian (WPI)

16.15 – 17.00 **Innovations in High Pressure Die Casting**
Lothar Kallien (GTA)

17.15 – 18.00 **Hybrid Components**
(Steel/Al/Mg/Polymer) produced in High Pressure Die Casting
Andreas Bührig-Polaczek (RWTH)

THURSDAY, 31ST JULY 2014

9.00 – 09.45 **6. Ingot casting**
DC Casting Fundamentals
Gerd-Ulrich Grün
(Hydro Aluminium Rolled Products GmbH)

10.00 – 10.45 **Recycling**
Gerd-Ulrich Grün
(Hydro Aluminium Rolled Products GmbH)

11.15 – 12.00 **DC Casting Technologies**
A. Håkonsen (Hycast)

12.15 – 13.00 **Melt Treatment of Aluminium**
A. Håkonsen (Hycast)

14.00 – 15.00 **7. Advances in Foundry Management**
Life Cycle Assessment (LCA) applied to Light Alloys Casting Production
Franco Bonollo (DTG)

15.15 – 16.15 **Recycling of Aluminium**
Ragnhild Aune (NTNU)

16.45 – 17.30 **AI Mini Mills**
Diran Apelian (WPI)

FRIDAY, 01ST AUGUST 2014

9.00 – 09.45 **8. Industrial Cases**
Automotive Aluminium Cylinder Blocks: has the Engineering Community a winning Casting Process?
Claudio Mus (Aluminium Rheinfelden)

10.00 – 10.45 **Development of a Low Pressure Sand Cast Stator Housing**
David Weiss (Eck Industries)

11.15 – 12.00 **Rapid Solidification Processes for Aluminium Castings for the Automotive Industry**
Jose Talamantes-Silva (NEMAK)

12.15 – 13.00 **Foundry Process Robustness Requirements for Automotive Light Metal Cast Parts**
Ulrich Weiss (Ford Europe)

13.00 – 13.15 **Closing of the Summer School**
Andreas Bührig-Polaczek (RWTH)