# GAT 2013 Toulouse, France – scientific program

| | Tuesday, June 11th – Morning |
|---|---|
| 08:30 | Opening session |
| 08:45 | Invited talk<br>Introduction of Gamma Titanium Aluminides in Safran Aero Engines<br>Claude Quilliem<br>SAFRAN, France |
| 09:15 | Development of TiAl alloy for a high temperature application<br>Koyanagi Yoshihiko, Ueta Shigeki<br>Daido Steel Corp. Ltd., Nagoya, Japan |
| 09:35 | Impact of Numerical Simulations in Developing Near-net Shape Gamma-TiAl Casting Process<br>Jana Santhanu, Aguilar Julio, Kättlitz Oliver , Stoyanov Todor, Tiefers Rüdiger<br>Access e.V., Aachen, Germany |
| 09:55 | Embrittlement of TiAl after high temperature exposure<br>Jonathan Paul[1], Florian Pyczak , Frank-peter Schimansky, Friedrich Bleicher, Georg Geiger, Laurent Bortolotto, Andreas Kolitsch, Bernadeta Pelic, Rossi Yankov, Cecile Langlade, Patrick Masset, Gerhard Wolf, David Rafaja, Peter Schumacher, Michael Schütze<br>[1]Helmholtz-Zentrum Geestacht, Germany |

***10:15*** ***Coffee break***

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| 10:35 | Invited talk<br>Protection Concepts for High Temperature Oxidation of TiAl Alloys<br>Michael Schütze<br>DECHEMA-Forschungsinstitut,Frankfurt am Main, Germany |
| 11:05 | The Effect of Brazing Conditions on Microstructures and Hardness of a Powder Metallurgy Beta Gamma Alloy Containing Nb and Mo<br>Dongyi Seo[1], T. Sawatzky , J. K. Hong , H. Saari<br>[1] Aerospace, National Research Council of Canada (NRC), Ottawa, Canada |
| 11:25 | Diffusion brazing of γ-TiAl alloys: Investigations of the joint by electron microscopy and XRD<br>Florian Pyczak, Katja Hauschildt, Uwe Lorenz, Andreas Stark, Norbert Schell<br>Helmholtz-Zentrum Geesthacht, Germany |
| 11:45 | Electron beam brazing of γ-titanium aluminide for linear and circumferential joints<br>Uwe Reisgen, Simon Olschok, Alexander Backhaus<br>ISF - Welding and Joining Institute, Aachen, Germany |

***12:15*** ***Lunch***

# GAT 2013 Toulouse, France – scientific program

| | **Tuesday, June 11th – Afternoon** |
|---|---|
| 14:00 | Invited talk<br>The Application of TiAl Alloys in Commercial Aircraft Engines:<br>The Present and the Future!<br>Bernard P Bewlay[1], Michael Weimer, Thomas Kelly, Akane Suzuki<br>[1]General Electric Global Research, Niskayuna, NY, United States |
| 14:30 | Invited talk<br>Research Activities of γ-TiAl alloys in HIT<br>Yuyong Chen, Shuzhi Zhang, Fantao Kong, Hongzhi Niu<br>Harbin Institue of Technology, China |
| 15:00 | Thermal barrier coatings on a beta-stabilized gamma-TiAl alloy<br>applying the halogen effect<br>Simone Friedle[1], Michael Schütze, Nadine Laska, Reinhold Braun<br>[1]Dechema Forschungsinstitut, Frankfurt a.M. – Germany |
| 15:20 | Composition Optimization of Beta-Gamma TiAl Alloys Containing High Niobium Content<br>Laiqi Zhang[1], Junzi Zheng, Yongming Hou, Junpin Lin, Yongfeng Liang, Guojian Hao<br>[1]State Key Laboratory for Advanced Metals and Materials, Beijing, PR China |
| 15:40 | Effect of thermomechanical treatment on properties variation<br>of orthorhombic Ti2AlNb based alloys<br>Evgeny Alexeev, Nadezda Nochovnaya, Pavel Panin<br>All-Russian Scientific Research Institute of Aviation Materials (VIAM), Moscow, Russia |

***16:00*** ***Coffee break***

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|---|---|
| 16:20 | Invited talk<br>Development of Gamma TiAl for Gas Turbine Engines<br>Gopal Das<br>PW, USA |
| 16:50 | Fatigue resistance of a TiAl alloy prepared by SPS<br>Gilbert Henaff, Véronique Pelosin, Yacine Kchaou, Denis Bertheau,<br>Médéric Morisset, Mathieu Comyn<br>University of Poitiers, France |
| 17:10 | A study of deformation mechanisms associated with fatigue fracture surface<br>morphologies in a fully lamellar TiAl-base alloy<br>Rengen Ding[1], Hangyue Li, David Hu, Nigel Martin, Dixon Mark, Bowen Paul<br>[1]University of Birmingham, UK |
| 17:30 | Fracture of a γ-TiAl polycristal: model versus experiment.<br>Dominique Geoffroy , Eva Héripré, Jérôme Crépin, Arjen Roos<br>ONERA, Châtillon, France |
| 17:50 | Microstructural Characterisation of Fatigue Fracture Surfaces<br>of Lamellar $Ti_{45}Al_2Mn_2Nb_1B$<br>Jing Yang[1], Dawei Hu, Hangyue Li, Mark Dixon<br>[1]University of Birmingham, UK |

# GAT 2013 Toulouse, France – scientific program

| | Wednesday, June 12th – Morning |
|---|---|
| 08:30 | Invited talk<br>Production of GEnx LPT blades at PCC Structurals<br>Paul McQuay<br>PCC Structurals, USA |
| 09:00 | Additive manufacturing of high-niobium titanium aluminide aerospace components: process development and material properties<br>Kourtis Lampros, Iain Todd, Mark W Rainforth<br>University of Sheffield, UK |
| 09:20 | Manufacturing and properties of TiAl TNM sheet materials<br>Matthias Achtermann[1], Joachim Klose, Christiane Rothe, Ines Eulitz, Volker Guether<br>[1]GfE Metalle und Materialien GmbH, Nuremberg, Germany |
| 09:40 | The recovery of TiAl from the TiPro process by-product by froth flotation<br>Kenneth Sichone, Brian Gabbitas<br>University of Waikato, New Zealand |

***10:00*** ***Coffee break***

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| 10:20 | Invited talk<br>Boron addition in cast TiAl alloys – a double-edged sword<br>Hu D<br>University of Birmingham, UK |
| 10:50 | Boron Effect in GE-TiAl Alloys Prepared by Spark Plasma Sintering<br>Jiangshan Luo[1], Thomas Voisin, Jean-philippe Monchoux , Alain Couret<br>[1]Research Center of Laser Fusion, Mianyang, China |
| 11:10 | The effect of carbon addition to a β-solidifying Ti-43.5Al-4Nb-1Mo-0.1B alloy<br>Emanuel Schwaighofer[1], Andreas Stark, Janny Lindemann, Helmut Clemens, Volker Güther, Svea Mayer<br>[1]Montanuniversität Leoben, Austria |
| 11:30 | Effect of carbon on microstructures and mechanical behaviors of a new Ti-45Al-3Fe-2Mo alloy<br>Yong Liu, Canxu Zhou, Huang Lan, Congzhang Qiu, Shangru Meng, Wei Zhang, Baiyun Huang<br>Central South University, Changsha, China |
| 11:50 | Microsegregation and omega phase in high Nb containing TiAl<br>Lin Song[1], Xiangjun Xu, Jian Sun, Junpin Lin<br>[1]University of Science and Technology, Beijing, China |

***12:15*** ***Lunch***

# GAT 2013 Toulouse, France – scientific program

| | Wednesday, June 12th – Afternoon |
|---|---|
| 14:00 | Invited talk<br>Third generation Gamma-TiAl alloys: recent developments at Avio<br>Silvia Sabbadini[1], Federica Pelissero, Mauro Filippini, Stefano Beretta, Sara Biamino<br>[1]Avio S.p.A, Rivalta di Torino - Italy |
| 14:30 | Invited talk<br>One-step near-net shaping of TiAl turbine blades by SPS<br>Jean-philippe Monchoux[1], Thomas Voisin, Houria Jabbar, Lise Durand, Marc Thomas<br>[1]CEMES-CNRS, Toulouse, France |
| 15:00 | On the microstructure-property relationships in a PM TiAl-based alloy<br>Marc Thomas, Olivier Berteaux<br>ONERA, Chatillon, France |
| 15:20 | Gamma TiAl by selective electron beam melting: Microstructure and Aluminium loss<br>Schwerdtfeger Jan[1], Singer Robert F, Körner Carolin<br>[1]University of Erlangen-Nürnberg, Germany |
| 15:40 | Scale-up of SPS for the sintering of TiAl alloys<br>Miguel A. Lagos[1], Iñigo Agote, Juergen Hennicke<br>[1]Tecnalia, San Sebastian - Spain |

***16:00*** ***Coffee break***

| | Poster session |
|---|---|
| 16:20<br>17:30 | Hot Deformation Behavior of TiAl Prepared by Triple VAR Melting<br>Fan Gao, Zhenxi Li<br>Beijing Institute of Aeronautical Materials, China |
| | Effects of short crack on fatigue threshold and fatigue crack growth in a nearly full lamellar TiAl alloy<br>Shiyuan Wang[1], Hangyue Li, Nigel Martin, Mark Dixon<br>[1]University of Birmingham, UK |
| | Investigation of fatigue failures of a high-Nb TiAl alloy at different temperatures<br>Min Zhang 1, Xiping Song, Junpin Lin<br>University of Science and Technology, Beijing, China |
| | Features of PREP High Nb Containing TiAl Pre-alloying Powder and its Effect on the Densification Microstructure<br>Weiwe He , Yong Liu, Huiping Tang, Zhengping Xi, Changshu Xiang,Wenpeng Jia<br>Central South University, Changsha, China |
| | High Temperature Mechanical Properties and Oxidation Resistance of New Gamma TiAl Alloys<br>Seung Eon Kim<br>Korea Institute of Materials Science, Changwon, Gyeongnam - South Korea |
| | Surface engineering of gamma-titanium aluminide alloys for combined improvements in environmental durability at elevated temperatures<br>Rossen Yankov[1], Andreas Kolitsch, Johannes Borany, Patrick Masset, Laurent Bortolotto, Alexander Donchev, Michael Schütze<br>[1]Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany |
| | Microstructures and Mechanical Properies of TNM-TiAl alloys densified by SPS<br>Thomas Voisin[1], Jean-Philippe Monchoux, Helmut Clemens, Alain Couret<br>[1]CEMES-CNRS, Toulouse, France |
| | Microscopic mechanisms of spark plasma sintering in TiAl alloys<br>Zofia Trzaska[1], Guillaume Bonnefont, Alain Couret, Jean-Philippe Monchoux<br>[1]CEMES-CNRS Toulouse, France |

# GAT 2013 Toulouse, France – scientific program

| | **Thursday, June 13th – Morning** |
|---|---|
| 08:30 | Invited talk<br>High energy X-Rays and neutrons as tools for development<br>of intermetallic titatnium aluminides<br>Helmut Clemens<br>Montanuniversitaet Leoben, Austria |
| 09:00 | Crystallographic texture and elastic modulus anisotropy<br>of titanium aluminides based alloys<br>Pavel Panin, Nadezda Nochovnaya, Dmitry Kablov<br>All-Russian Scientific Research Institute of Aviation Materials (VIAM), Moscow, Russia |
| 09:20 | Creep damage characterisation of TiAl based alloy using 3D computed tomography<br>Stanekova Hana, Lapin Juraj<br>Slovak Academy of Sciences, Bratislava, Slovak Republic |
| 09:40 | Atomic-scale simulations of radiation effects in Ti-Al based intermetallic compounds<br>Roman Voskoboinikov<br>Australian Nuclear Science and Technology Organisation, Lucas Heights, Australia |

***10:00*** ***Coffee break***

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|---|---|
| 10:20 | Invited talk<br>In-situ Obsevation of Cracking in Gamma Lamellar Alloys<br>Masao Takeyama<br>Tokyo Institute of Technology, Japan |
| 10:50 | Invited talk<br>Modulated Microstructures in Multiphase Titanium Aluminide Alloys:<br>Origin and Design Potential<br>Fritz Appel<br>Helmholtz-Zentrum Geesthacht, Germany |
| 11:20 | Generalized planar fault energies and mechanical twinning in gamma TiAl alloys:<br>relation to stoichiometric effect<br>Jian Sun<br>Shanghai Jiaotong University, China |
| 11:40 | Microstructure sensitive modeling of deformation behavior of a TiAl alloy<br>with variable lamellae thickness<br>Mohammad Rizviul Kabir, Mubeen Shahid, Marion Bartsch<br>Institute of Materials Research, German Aerospace Center |

***12:00*** ***Buffet lunch***

***13:30*** ***Tours to Airbus and to old Toulouse***

***19:30*** ***Workshop banquet***

# GAT 2013 Toulouse, France – scientific program

| | Friday, June 14th – Morning |
|---|---|
| 08:30 | Invited talk<br>Application of ceramic crucible melting for precision-cast and hot-forged TiAl components<br>Toshimitsu Tetsui<br>National Institute for Materials Science, Tsukuba, Japan |
| 09:00 | Development of forging processes for TiAl engine components for aerospace and automotive industries<br>Othman Skalli, Jacques Tschofen<br>Manoir Aerospace-Forges de Bologne, France |
| 09:20 | Microstructure and mechanical properties of large size Ti-43Al-9V-Y alloy pancake produced by quasi-isothermal forging<br>Fantao Kong[1], Shuzhi Zhang, Yongjun Su, Yuyong Chen<br>[1]Harbin Institute of Technology, China |
| 09:40 | Microstructure and mechanical properties of low cost TiAl-based precision cast turbocharger wheels<br>Lapin Juraj ,Stanekova Hana, Demian Svetozár, Čičman Ján<br>Slovak Academy of Sciences, Bratislava, Slovak Republic |
| 10:00 | Effect of Heat Treatments on Mechnical Properties of Forged Ti-43Al-5V-4Nb Alloy<br>Keiji Kubushiro[1], Satoshi Takahashi, Masao Takeyama<br>[1]Tokyo Institute of Technology, Japan |

***10:20*** ***Coffee break***

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|---|---|
| 10:40 | Invited talk<br>Crystallography of phase transformations in TiAl-based alloys<br>Emmanuel Bouzy, Alain Hazotte<br>LEM3, Université de Lorraine, Metz, France |
| 11:10 | Thermomechanical analysis of phase transition temperatures on γ-TiAl produced by electron beam melting<br>Sara Biamino[1], Mathieu Terner, Federica Pelissero, Matteo Pavese, Paolo Fino, Claudio Badini<br>[1]Politecnico di Torino, Torino, Italy |
| 11:30 | ω-phase formation in a TiAl-Nb-Mo alloy<br>Martin Schloffer Boryana Rashkova, Thomas Schöberl, Zaoli Zhang, Svea Mayer, Helmut Clemens<br>Montanuniversitaet Leoben, Austria |
| 11:50 | Phase transformations in silicon-doped TiAl alloys<br>Antoine Paris[1], Mikael Perrut, Anne Denquin, Dominique Daloz<br>[1]ONERA, Châtillon, France |
| 12:10 | Effect of V/Nb Combined Addition on Phase Stability of Beta-Ti Phase in TiAl Based Alloy<br>Hirotoyo Nakashima, Masao Takeyama<br>Tokyo Institute of Technology, Japan |
| 12:30 | Concluding remarks |

***12:45*** ***Buffet lunch***