The present proceedings of the 7th International Conference on Processing and Manufacturing of Advanced Materials – THERMEC’2011 which was held during August 1-5, 2011 in Quebec City, Canada, under the co-sponsorship of The Minerals, Metals & Materials Society (TMS), USA. The Conference was also under the international auspices of professional organizations from Japan, Korea, France, Italy, The Netherlands, PR China, India, and Canada. The Conference was intended to bring together the researchers and engineers/technologists working in different aspects of processing, fabrication, structure/property evaluation and applications of both ferrous and non-ferrous materials including biomaterials, and smart/intelligent materials. In addition to the contributed papers, the conference committee included in the final program the invited presentations by active researchers from various countries in several topic areas covered at THERMEC’2011.

Internationally known experts from several countries were invited to deliver Plenary/Keynote lectures at THERMEC’2011. Much of the credit of the success of the conference was due to topic coordinators who have devoted their time, expertise and experience in promoting and in general co-ordination of the activities for the organization and operation of the Conference. The coordinators of various session topics have devoted a considerable time and energy in soliciting papers from relevant researchers for presentation at the Conference. The Chairpersons of the different sessions played important role in conducting the proceedings of the session in a timely and efficient manner and the Committee expresses sincere appreciation for their involvement. The reviewers of the manuscripts, those who by tradition would remain anonymous, have been very helpful in efficiently reviewing the manuscripts, providing valuable comments well within the time allotted to them. The Editors express their sincere and grateful thanks to all reviewers.

Sincere thanks to over 50 students who received STUDENT GRANTS from Laval University and other Universities in USA, Canada, Germany, France, UK, Belgium, The Netherlands, Italy, Spain, Russia, Japan, Korea, PR China, Brazil and India and who assisted in monitoring various sessions during THERMEC and also helping the Committee in successfully staging the distinguished award ceremony at THERMEC2011.

We express sincere thanks to NSF, USA for providing grants to 30 students towards participation at this Conference.

Finally, our sincere thanks Mr Bruno Begin and his staff at Hospitalite Quebec: Convention Management Company for designing the Conference web page and assisting organizers in the preparation of the final Conference program.

T. Chandra
University of Wollongong, Australia

M. Ionescu
Australian Nuclear Science & Technology Organization, Australia

D. Mantovani
Laval University, Canada


**General Chairmen**
D. Mantovani, Canada  
S. Takaki, Japan  
R. Srinivasan, USA  
T. Chandra, Australia

**Program Chairmen**
H. Alamdari, Canada  
C. Ravindran, Canada  
K. Tsuzaki, Japan  
B. Mishra, USA  
F. Montheillet, France

**General Vice-Chairmen**
G. Laroche, Canada  
Dong Nyung Lee, Korea,  
R. Taillard, France  
R. Vaidyanathan, USA

**International Advisory Committee:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Country</th>
<th>University/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. Chandra</td>
<td>Australia</td>
<td></td>
</tr>
<tr>
<td>Akhisa Inoue</td>
<td>Japan</td>
<td></td>
</tr>
<tr>
<td>E. Arzt</td>
<td>Germany</td>
<td></td>
</tr>
<tr>
<td>K.U. Kainer</td>
<td>Germany</td>
<td></td>
</tr>
<tr>
<td>Dong Nyung Lee</td>
<td>Korea</td>
<td></td>
</tr>
<tr>
<td>D.B. Santos</td>
<td>Brazil</td>
<td></td>
</tr>
<tr>
<td>T. Furuhara</td>
<td>Japan</td>
<td></td>
</tr>
<tr>
<td>Oleg D. Sherby</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>Dong Han</td>
<td>PR China</td>
<td></td>
</tr>
<tr>
<td>T.G. Langdon</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>J.T.M De Hosson</td>
<td>Netherlands</td>
<td></td>
</tr>
<tr>
<td>C. Sommitsch</td>
<td>Austria</td>
<td></td>
</tr>
<tr>
<td>I.V.S. Bott</td>
<td>Brazil</td>
<td></td>
</tr>
<tr>
<td>P. Sittner</td>
<td>Czech Republic</td>
<td></td>
</tr>
<tr>
<td>Y. Houbaert</td>
<td>Belgium</td>
<td></td>
</tr>
<tr>
<td>F. Rizzo</td>
<td>Brazil</td>
<td></td>
</tr>
<tr>
<td>Y. Brechet</td>
<td>France</td>
<td></td>
</tr>
<tr>
<td>M. Mahoney</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>R. A. N. Barbosa</td>
<td>Brazil</td>
<td></td>
</tr>
<tr>
<td>S. Takaki</td>
<td>Japan</td>
<td></td>
</tr>
<tr>
<td>R. Vaidyanathan</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>H.K.D.H. Bhadeshia</td>
<td>UK</td>
<td></td>
</tr>
<tr>
<td>D. Mantovani</td>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>E.A. Holm</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>S.C. Sharma</td>
<td>India</td>
<td></td>
</tr>
<tr>
<td>Young Won Chang</td>
<td>Korea</td>
<td></td>
</tr>
<tr>
<td>M. Niinomi</td>
<td>Japan</td>
<td></td>
</tr>
<tr>
<td>Chong Soo Lee</td>
<td>Korea</td>
<td></td>
</tr>
<tr>
<td>M. Militzer</td>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>Suk Joong L. Kang</td>
<td>Korea</td>
<td></td>
</tr>
<tr>
<td>K. Tsuzaki</td>
<td>Japan</td>
<td></td>
</tr>
<tr>
<td>Jai-Sung Lee</td>
<td>Korea</td>
<td></td>
</tr>
<tr>
<td>Rui Yang</td>
<td>P.R. China</td>
<td></td>
</tr>
<tr>
<td>W. Bleck</td>
<td>Germany</td>
<td></td>
</tr>
<tr>
<td>E.J. Palmiere</td>
<td>UK</td>
<td></td>
</tr>
<tr>
<td>R. Montanari</td>
<td>Italy</td>
<td></td>
</tr>
<tr>
<td>B. Mishra</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>T.R. McNelley</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>F. Montheillet</td>
<td>France</td>
<td></td>
</tr>
<tr>
<td>J.M. Rodriguez-Ibabe</td>
<td>Spain</td>
<td></td>
</tr>
<tr>
<td>Shanben Chen</td>
<td>P.R. China</td>
<td></td>
</tr>
<tr>
<td>P. Knauth</td>
<td>France</td>
<td></td>
</tr>
<tr>
<td>F. Caballero</td>
<td>Spain</td>
<td></td>
</tr>
<tr>
<td>A.J. DeArdo</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>E. Kozeschnik</td>
<td>Austria</td>
<td></td>
</tr>
<tr>
<td>K. Marthinsen</td>
<td>Norway</td>
<td></td>
</tr>
<tr>
<td>C. Ravindran</td>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>Young Won Kim</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>O. Ruano</td>
<td>Spain</td>
<td></td>
</tr>
<tr>
<td>R. Kaibyshev</td>
<td>Russia</td>
<td></td>
</tr>
<tr>
<td>P. Prangnell</td>
<td>UK</td>
<td></td>
</tr>
<tr>
<td>M. Jeandin</td>
<td>France</td>
<td></td>
</tr>
<tr>
<td>R. Srinivasan</td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>R. Taillard</td>
<td>France</td>
<td></td>
</tr>
<tr>
<td>C. Klinkenberg</td>
<td>Germany</td>
<td></td>
</tr>
<tr>
<td>Taku Sakai</td>
<td>Japan</td>
<td></td>
</tr>
<tr>
<td>M. S. Mousa</td>
<td>Jordan</td>
<td></td>
</tr>
<tr>
<td>N. Wanderka</td>
<td>Germany</td>
<td></td>
</tr>
<tr>
<td>M. Ionescu</td>
<td>Australia</td>
<td></td>
</tr>
<tr>
<td>E. Essadiqi</td>
<td>Canada</td>
<td></td>
</tr>
<tr>
<td>Leon Shaw</td>
<td>USA</td>
<td></td>
</tr>
</tbody>
</table>
Topics & Coordinators:

Al/Ti Alloys/ Mg Alloys
K. Marthinsen, G. Itoh, Mary Wells, S. B. Kang, X. Zhang

Aerospace Structural Metallic Materials
K. U. Kainer, E. Essadiqi, K.S. Shin, Xiaoquin Zeng

Y. Kawamura,

Alloys/ Steels(HSLA/IF/TRIP/Stainless/Bainitic/HNS)
F. Monthiillet, Chong. Soo Lee, Y. Waku, S. Yue

S. Takai, E.Poliak, A.J. DeArdo, A. Howe, K. Tsuzaki, E.Palmiere, Sung Joon Kim, Chengjia Shang,

C. Klinkenberg, Yun Peng

Thermomechanical Processing: Steels
P.D.Hodgson , S.Yue, M.Militzer

(John Jonas Honorary Symposium)
W. Bleck, D. Raabe, J. M. Rodriguez- Ibabe

C. Sommitsch, T. Matsuo, A. Wusatowska-Sarnek

New Methods in Steel Design
D. Mantovani, M. Niinomi, Thomas Webster, D. Letourneur

Superalloys/ High & Super High Temp.
F. Witte, D. Mantovani, Yufeng Zheng, M.Steiger

Materials/Heat Resistant Steels
F.Abe, R.Viswanathan, Xuejie Huang, O.Bouaziz,

R.Srinivasan

Advanced Materials in Biomedical
M.Jeandin, B.Mishra, Fuhui Wang, Jung Joong Lee

& Bioengineering Applications

Degradable Metals for Biomedical
Applications

Energy Materials

Surface Engineering/Coatings

Composites
R. Taillard, S. Ochiai, Yang, V.Acoff, Zhang Di

Dynamic Behaviour of Materials
D.E. Eakins, K. Hokamoto, C.Bolme, R.Montanari,

J.J. Yoh, T.Mashimo

Fuel Cells & Hydrogen Storage &Battery
Y.W. Kim, H. Inui, R. Yang, M. Oehring

Intermetallics
M. Mahoney, P. Prangnell, R.S. Mishra, Yutaka S. Sato

Friction Stir Processing/Welding
Hidemi Kato, E. Napolitano, Jun Shen, Do Hyang Kim

Metallic Glasses/ Bulk Metallic Amorphous

Materials

Nanostructured Materials
L. L. Shaw, E. Gaffet, K. Ameyama, Jai Sung Lee, Qing Jiang

Severe Plastic Deformation
T.G. Langdon, N. Tsuji, Maria T. Perez-Prado, K. Xia

Smart/Intelligent Materials
K. Mizuuchi, P. Sittner , A.Imam,

H. Hosoda, R. Vaidyanathan

Neutron Scattering & X-Ray Studies of
Advanced Materials
K.D. Liss, U. Lienert, T. Sasaki, V. Honkimaki, Kewe Xu,

Modelling & Simulation/Multiscale Modeling
P. Bocher, R. Loge, Jitai Niu, D. Ferguson

Thin Films
A.M. Hodge, Zoe Barber, Feng Pan

Multiscale Modeling of Complex Materials
S. S. Babu, P. Trovalusci, M.Geers

Texture
D. Brown, Dong Nyung Lee, J. Szpunar, Hirofumi Inoue,

Liang Zuo

Welding & Joining
H. K. D. H Bhadeshia, Hidetoshi Fujii, W. S. Chang,

Shanben Chen

Fracture & Mechanical Behaviour
F. Minami, Dongil Kwon, Z. F. Zheng, T.Chandra
Scientific Committee:

G. Abbruzzese, Italy
V. Acoff, USA
O. Andersen, Germany
H. Asanuma, Japan
M. M. Beppu, Brazil
A. Belyakov, Russia
D. Bhattacharya, USA
H. Berns, Germany
Bingzhe Bai, PR China
E. Blangino, Argentina
O. Bouaziz, France
M. Brochu, Canada
H. P. Buchkremer, Germany
B. Buchmayr, Austria
U. Chhakingal, India
M. Demura, Japan
C. Desrayaud, France
Zhang Di, PR China
Maria L. Di Vona, Italy
C. Esling, France
E. Essadiqi, Canada
D. Ferguson, USA
D.P. Field, USA
H. Fukutomi, Japan
V. Gavrilyuk, Ukraine
M.G.D. Geers, The Netherlands
M.J.M. Hermans, The Netherlands
Dora A. Cortes Hernandez, Mexico
K. Higashi, Japan
B. Huneau, France
Jacob C. Huang, Taiwan

Lynn L.H. Huang, Taiwan
M. Ikeda, Japan
T. Ishihara, Japan
G. Itoh, Japan
Z. Jiang, Australia
Wu Kaiming, PR China
M. Kassner, USA
Y. Kawamura, Japan
S. Kleber, Austria
M. Krzyzanowski, UK
N. Llorca-Isern, Spain
A. Lodini, France
M. Lopez, Chile
A. Makino, Japan
V. Massardier, France
J. Merker, Germany
Hideshi Miura, Japan
Hiromi Miura, Japan
Francisco Montevecchi, Italy
Bernardo H. Morales, Mexico
D.O. Northwood, Canada
S. Nagraj, India
S. Ochiai, Japan
M. Oehring, Germany
Yohgoe, Japan
C. Paglia, Switzerland
Elena Pereloma, Australia
Maria T. Perez-Prado, Spain
D. Ponge, Germany
V. Randle, UK
P. Rios, Brazil
J. Robson, UK

A. Salinas Rodriguez, Mexico
G. Herranz Sanchez, Spain
H. Sandim, Brazil
Yoshiyuki Saito, Japan
W. Schneider, Germany
J. Sietsma, The Netherlands
J. Siwka, Poland
Tian Sugui, PR China
K. Suzuki, Australia
A. Tachibana, Japan
M.J. Tan, Singapore
M. Tatoulian, France
Maria L. Terranova, Italy
N. Thadani, USA
W. Tillmann, Germany
Y. Tomota, Japan
P. Trovalusci, Italy
S. Tsurekawa, Japan
C. Y. A. Tsao, Taiwan
R. Tsay, Taiwan
N. Tsuji, Japan
S. Van der Swaag, The Netherlands
S. Vogel, USA
E. Vogli, Germany
Weiguo Wang, PR China
P. Wanjara, Canada
P. Withers, UK
J. Wood, Canada
Yudong Zhang, France
Liang Zuo, PR China
Co-Operating Organizations:

The Minerals, Metals, Materials Society (TMS), USA
ASM International, USA
The Iron & Steel Institute of Japan
The Japan Institute of Metals, Japan
The Japan Institute of Light Metals, Japan
The Society of Materials Science of Japan, Japan
The Japan Society for Technology for Plasticity, Japan
The Korean Institute of Metals & Materials (KIMM), Korea
Canadian Institute of Materials (CIM), Canada
Chinese Society for Metals (CSM), P.R. China
Societe Francaise de Metallurgique et Materieaux, France
Bond voor Materialenkennis, The Netherlands
Associanzione Italiana di Metallurgia, Italy
Indian Institute of Metals (IIM), India
The Canadian Academy of Engineering (CAE), Canada

Acknowledgements:

The THERMEC Committee expresses sincere thanks for all sponsors listed on website but especially NSF, USA for supporting student participation at THERMEC2011.