International Symposium on

Process Control and Optimization in Ferrous and Non Ferrous Industry

Hyatt Regency Hotel
Chicago, Illinois, USA
November 9-12, 2003
In Conjunction with MS&T '03
A TMS and ISS Joint Event

Scope:

This symposium is organized to discuss recent technological development in process control and optimization in the field of extraction and processing of metals and materials, both in ferrous and non-ferrous industries. Although distinct from each other, ferrous and nonferrous metals extraction and processing have many aspects of process control, optimization and technology development in common and a shared symposium on these issues should benefit both industries. The specific topics include but are not limited to:

(1) Control and optimization of the feed morphology and composition in processes such as ore sintering, nickel/copper, lead/zinc and aluminium/magnezium smelting and processing;
(2) Control and optimization of the chemistry and transport properties of slags, steels, metals, mattes, and aqueous solutions;
(3) Control and minimization of refractory degradation ;
(4) Control of technologically and environmentally undesirable minor components in product and waste streams;
(5) Control of process parameters in iron sintering, blast furnace, casting, electrical furnaces, flash furnace, converters, refining vessels, etc.;
(6) Control and optimization in deformation processing (forging, rolling, extrusion, etc.), powder metallurgy, solidification, microstructural development (grain growth, recrystallization), electronic materials, welding, etc.
(7) Process automation,

A distinct emphasis will be given to **process modeling & simulation and computer applications** in both ferrous and non-ferrous industries and to the ways they serve to the process control and optimization of any of the above mentioned processes.

Symposium Sponsors:	Symposium Information:
TMS: - Materials Processing & Manufacturing Division/ Jt. MPMD/EPD-Process Modeling Analysis & Control Committee - Extraction & Processing Division, Pyrometallurgy Committee **ISS:** MWSP	**Web Site:** www.flogen.com/ControlSymposium Abstract submission Deadline: **May 15, 2003** Symposium Information: Florian Kongoli FLOGEN Technologies Inc. Tel: (514) 344 8786 x 220; Fax: (514) 344 0361 E-mail: FKongoli@FLOGEN.COM

The Organizing Committee Welcomes You All In Chicago:

Florian Kongoli
FLOGEN Technologies Inc.
Chair

Brian Thomas
University of Illinois at Urbana-Champaign
Co-Chair

Krich Sawamiphakdi
The Timken Company
Co-Chair

PROCESS CONTROL AND OPTIMIZATION IN FERROUS AND NON FERROUS INDUSTRY: Plenary, Thermodynamics and Bio-Processing

Sponsored by: Extraction & Processing Division, Materials Processing & Manufacturing Division, Jt. MPMD/EPD-Process Modeling Analysis & Control Committee

Program Organizers: Florian Kongoli, FLOGEN Technologies, Inc., Materials Technology Department, Montreal, Quebec H3S 2CS Canada; Matthew John M. Krane, Purdue University, Department of Materials Engineering, West Lafayette, IN 47907 USA; Luis Ruiz-Aparicio, University of Pittsburgh, Pittsburgh, PA 15261 USA; Krich Sawamiphakdi, The Timken Company, R&D Manufacturing Technology; Brian G. Thomas, University of Illinois, Department of Mechanical and Industrial Engineering, Urbana, IL 61801 USA

Monday AM Room: Regency Ballroom D
November 10, 2003 Location: Hyatt Regency Downtown Hotel

Session Chair: Florian Kongoli, FLOGEN Technologies Inc., Matls. Tech. Dept., Montreal, QC H3S 2C3 Canada; Brian G. Thomas, University of Illinois, Mechl. & Industl. Engrg. Dept., Urbana, IL 61801 USA

8:00 AM Florian Kongoli: Opening Remarks

8:10 AM
New Opportunities in Optimization and Control of Metals Processing: *H. Shang*[1]; J. B. Wiskel[2]; J. F. Forbes[2]; H. Henein[2]; [1]Laurentian University, Sch. of Engrg., Sudbury, ON P3E 2C6 Canada; [2]University of Alberta, Dept. of Chem. & Matls. Engrg., Edmonton, AB T6G 2G6 Canada

8:40 AM
Interactions of Molten Fe-Cr Alloy with Refractories: Yuhsuke Mizukami[1]; Tsuneo Itoh[2]; Masakazu Kimoto[3]; Takahiro Miki[4]; Tetsuya Nagasaka[4]; *Mitsutaka Hino*[4]; [1]Tohoku University, Grad. Sch. of Engrg.; [2]Shibukawa Works, Daido Steel Co. Ltd., Formerly ofTohoku University; [3]Hitachi Systems and Services Ltd., Formerly of Tohoku University; [4]Tohoku University, Dept. of Metall., Grad. Sch. of Engrg., 02 Aoba-yama, Sendai 980-8579 Japan

9:10 AM
On-Line Detection of Quality Problems in Continuous Casting of Steel: *B. G. Thomas*[1]; [1]University of Illinois, Dept. of Mechl. & Industl. Engrg., 1206 W. Green St., Urbana, IL 61801 USA

9:40 AM
Process Control, Optimization and Automation Through Modeling and Simulation: *Florian Kongoli*[1]; Ian McBow[1]; S. Llubani[1]; [1]FLOGEN Technologies Inc., Metals Dept., 5757 Decelles Ave., Ste. 511, Montreal, QC H3S 2C3 Canada

10:10 AM Break

10:20 AM INVITED
Effects of Ca Addition on the Thermodynamic Properties of P and B in Molten Silicon Alloys: *Kazuki Morita*[1]; [1]The University of Tokyo, Dept. of Matls. Engrg., 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656 Japan

10:45 AM INVITED
Experimental Techniques to Characterize High-Temperatures Processes Such as the Direct Decomposition of Metal Sulfides: *Marcel Sturzenegger*[1]; I. Alxneit[1]; C. Guesdon[1]; M. Musella[1]; H.-R. Tschudi[1]; L. Winkel[1]; [1]Paul Scherrer Institut, High-Temp. Solar Tech., OVGA/103, 5232 Villigen PSI Switzerland

11:10 AM INVITED
Thermodynamic Simulation of Complex Metallurgical and Chemical Systems With the Method of Chemical Dynamics: *B. Zilbergleyt*[1]; *M. Zinigrad*[2]; [1]System Dynamics Research Foundation, Chicago, IL USA; [2]College of Judea and Samaria, Ariel Israel

11:35 AM INVITED
Parameters for Control and Optimisation of Bioleaching of Sulphide Minerals: *H. Deveci*[1]; *A. Akcil*[2]; I. Alp[1]; [1]Karadeniz Teknik Universitesi, Dept. of Mining Engrg., Trabzon TR 61080 Turkey; [2]S. Demirel University, BIOMIN Grp., Mineral Procg. Div., Dept. of Mining Engrg., Isparta TR 32260 Turkey

12:00 PM
Investigation of Genus Alyssum Species for Control and Optimization of Nickel Phytoextraction Processes and Phytoremediation of Nickel Contaminated Soils: *A. Hasko*[1]; A. «ullaj[2]; F. Kongoli[3]; [1] Agricultural University of Tirana, Dept. of Agronomy, Tirana Albania; [2]University of Tirana, Dept. of Chmst. Albania; [3]FLOGEN Technologies Inc., 5757 Decelles Ave., Ste. 511, Montreal, QC H3S 2C3 Canada

PROCESS CONTROL AND OPTIMIZATION IN FERROUS AND NON FERROUS INDUSTRY: Feeds, Furnaces and Slags

Sponsored by: Extraction & Processing Division, Materials Processing & Manufacturing Division, Jt. MPMD/EPD-Process Modeling Analysis & Control Committee

Program Organizers: Florian Kongoli, FLOGEN Technologies, Inc., Materials Technology Department, Montreal, Quebec H3S 2CS Canada; Matthew John M. Krane, Purdue University, Department of Materials Engineering, West Lafayette, IN 47907 USA; Luis Ruiz-Aparicio, University of Pittsburgh, Pittsburgh, PA 15261 USA; Krich Sawamiphakdi, The Timken Company, R&D Manufacturing Technology; Brian G. Thomas, University of Illinois, Department of Mechanical and Industrial Engineering, Urbana, IL 61801 USA

Monday PM Room: Regency Ballroom D
November 10, 2003 Location: Hyatt Regency Downtown Hotel

Session Chair: TBA

2:00 PM INVITED
New Approach for the Optimization of Copper Concentrates Flash Combustion Through the Control of Blends and Slag Composition: *Roberto Parra*[1]; Florian Kongoli[2]; Roberto Parada[3]; [1]University of ConcepciÛn, Dept. of Metallurgl. Engrg., Edmundo Larenas 270, ConcepciÛn Chile; [2]FLOGEN Technologies Inc., Matls. Tech. Dept., 5757 Decelles, St.e 511, Montreal, QC H3S 2C3 Canada; [3] CompaÒÌa Minera Disputada, Chagres Smelter, Pedro de Valdivia 291, Santiago Chile

2:25 PM
Modelling and Control of the Feed Preparation System of a Copper Flash Smelter: *Mr. Mikko Korpi*[1]; Prof. Hannu Toivonen[2]; Dr. Bjˆrn Saxen[1]; [1]Outokumpu Research Oy, Pyrometall., PO Box 60, FIN-28101, Pori Finland; [2]≈bo Akademi, Proc. Control Lab., Dept. of Chem. Engrg., Biskopsgatan 8, FIN-20500, ≈bo Finland

2:50 PM
Optimization of Coke Rate and Sintering Quality by Genetic Algorithm for Two-Layer Sintering of Iron Ore: *Niloy K. Nath*[1]; Kishalay Mitra[2]; [1]Tata Research Development and Design Centre, 54B Hadapsar Industl. Estate, Pune India; [2]Tata Consultancy Services, Mfg. Practice, 54B Hadapsar Industl. Estate, Pune India

3:15 PM Break

3:25 PM INVITED
Examining Reheating Furnace Thermal Response to Mill Delays: *P. V. Barr*[1]; [1]University of British Columbia, Dept. of Metals & Matls. Engrg. Canada

3:50 PM
Comparison of Different Control Strategies for Reheating Furnaces: *Mr. Chetan Premkumar Malhotra*[1]; [1]Tata Research Development & Design Centre, Proc. Engrg., 54/B, Hadapsar Industl. Estate, Pune, Maharashtra 411013 India

4:15 PM INVITED
Laser Off-Gas Measurement of CO, O2 and Temperature in EAFs: *Andreas Dietrich*[1]; [1]Linde AG, Linde Gas Div., SDM, Prod. Mgr. Mini Mills,, Unterschleiflheim 85716

4:40 PM INVITED
Vaporization Processes and Thermodynamic Properties of Multicomponent Oxide Slags: *V. L. Stolyarova*[1]; [1]Institute of Silicate Chemistry of the Russian Academy of Sciences, ul. Odoevskogo 24, korp. 2, St. Petersburg 199155 Russia

5:05 PM
Mathematical Model of Trace Contaminants Distribution in Copper-Nickel Production: *P. S. Seryogin*[1]; O. V. Korotkova[1]; L. Sh. Tsemekhman[1]; D. V. Rumyantsev[1]; [1]Kola MMC JS, Gipronickel Inst. JS Russia

5:30 PM
Theoretical and Practical Aspects of the Direct Recycling of Slags in EAF Furnaces: *Petre Stelian Nita*[1]; [1]University ìDunarea de Josî Galati, Faculty of Metall. & Matls. Sci. Romania

5:55 PM
Optimization of the Reverb Furnace Slag Composition in the RTB BOR Serbia: *Natasa Mitevska*[1]; Zivan D. Zivkovic[2]; [1]RTB BOR, Copper Inst., Zeleni bulevar 35, Bor 19210 Serbia; [2]University of Belgrade, Techl. Faculty, VJ 12, Bor 19210 Serbia

PROCESS CONTROL AND OPTIMIZATION IN FERROUS AND NON FERROUS INDUSTRY: Molten Mattes, Metals and Aqueous Processing

Sponsored by: Extraction & Processing Division, Materials Processing & Manufacturing Division, Jt. MPMD/EPD-Process Modeling Analysis & Control Committee

Program Organizers: Florian Kongoli, FLOGEN Technologies, Inc., Materials Technology Department, Montreal, Quebec H3S 2CS Canada; Matthew John M. Krane, Purdue University, Department of Materials Engineering, West Lafayette, IN 47907 USA; Luis Ruiz-Aparicio, University of Pittsburgh, Pittsburgh, PA 15261 USA; Krich Sawamiphakdi, The Timken Company, R&D Manufacturing Technology; Brian G. Thomas, University of Illinois, Department of Mechanical and Industrial Engineering, Urbana, IL 61801 USA

Tuesday AM Room: Regency Ballroom D
November 11, 2003 Location: Hyatt Regency Downtown Hotel

Session Chair: TBA

8:00 AM INVITED
Optical Spectroscopy for Process Monitoring and Production Control in Ferrous and Non-Ferrous Industry: *Dr Willy Persson*[1]; M. Sc. Wilhelm Wendt[1]; [1]Semtech Metallurgy AB, Ideon, Lund S-223 70 Sweden

8:20 AM
Ultrasonic Inclusion Detection and Cleanliness Measurement in Molten Aluminum and Magnesium: *Dr. Yuu Ono*[1]; Mr. Jean-Francois Moisan[1]; Mr. Yuanbei Zhang[2]; Dr. Cheng-Kuei Jen[1]; Prof. Chun-Yi Su[2]; [1]National Research Council of Canada, Industl. Matls. Inst., 75 de Mortagne Blvd., Boucherville, Quebec J4B 6Y4 Canada; [2]Concordia University, Dept. of Mechl. & Industl. Engrg., 1455 de Maisonneuve Blvd. W, Montreal, Quebec H3G 1M8 Canada

8:40 AM
Accurate, Responsive Melt Rate Control During Vacuum Arc Remelting: *Dr. Rodney L. Williamson*[1]; Dr. Joseph J. Beaman[2]; Dr. David K. Melgaard[1]; [1]Sandia National Laboratories, 1835, MS 1134, PO Box 5800, Albuquerque, NM 87185-1134 USA; [2]University of Texas, Mechl. Engrg., Austin, TX 78712 USA

9:00 AM
Solidification of Melt on a Rapidly Rotating Disc in Centrifugal Atomisation: *K. H. Ho*[1]; Y. Y. Zhao[1]; [1]University of Liverpool, Dept. of Engrg., Liverpool L69 3GH UK

9:20 AM
Ladle Sculling Process Study on the Base of a Mathematical Model: *I. Yu. Petrovich*[1]; V. A. Blinov[1]; O. I. Zheldybin[1]; L. Sh. Tsemekhman[1]; Yu. A. Chumakov[1]; [1]Kola MMC JS, Gipronickel Inst. JS Russia

9:40 AM
Mathematical Model for Control of Autogenous Smelting of Copper Concentrate after High-Grade Matte Separation: *V. D. Zhidovetskiy*[1]; V. A. Blinov[1]; O. I. Zheldybin[1]; L. Sh. Tsemekhman[1]; L. B. Tsymbulov[1]; A. N. Golov[1]; [1]Kola MMC JS, Gipronickel Inst. JS Russia

10:00 AM Break

10:15 AM
Mathematical Model for Copper-Nickel Mattes Converting: *I. Yu. Petrovich*[1]; V. A. Blinov[1]; O. I. Zheldybin[1]; L. Sh. Tsemekhman[1]; Yu. A. Chumakov[1]; [1]Kola MMC JS, Gipronickel Inst. JS Russia

10:35 AM INVITED
Role of CFD as a Process Monitoring and Prediction Tool for Secondary Steelmaking: *A. Mukhopadhyay*[1]; [1]FLUENT Inc.

10:55 AM
Column Flotation Scale-Up after Considering the Bubble Surface Area Flux: *R. Escudero*[1]; F. J. Tavera[1]; [1]Universidad Michoacana de San Nicol·s de Hidalgo, Inst. de Investigaciones Metal˙rgicas, Santiago Tapia 403, Morelia 48000, Michoac·n MÈxico

11:15 AM
Optimization of Downcomer Performance in the Jameson Cell by Measuring Electrical Conductivity: *F. J. Tavera*[1]; R. Escudero[1]; [1]Universidad Michoacana de San Nicol·s de Hidalgo, Inst. de Investigaciones Metal˙rgicas, Santiago Tapia 403, Morelia 48000, Michoac·n MÈxico

11:35 AM
A Procedure for Chromate Conversion Coating of Commercial Galvanized Steel to Olive Color at Normal Temperature: *A. A. Mottahedi*[1]; [1]Iranian Aluminum Company (IRALCO), Kilometer 5 of Qom Rd., PO Box 31, Arak Iran

PROCESS CONTROL AND OPTIMIZATION IN FERROUS AND NON FERROUS INDUSTRY: Thermo-Mechanical Process Modeling: Deformation, Quenching, Casting and Welding

Sponsored by: Extraction & Processing Division, Materials Processing & Manufacturing Division, Jt. MPMD/EPD-Process Modeling Analysis & Control Committee

Program Organizers: Florian Kongoli, FLOGEN Technologies, Inc., Materials Technology Department, Montreal, Quebec H3S 2CS Canada; Matthew John M. Krane, Purdue University, Department of Materials Engineering, West Lafayette, IN 47907 USA; Luis Ruiz-Aparicio, University of Pittsburgh, Pittsburgh, PA 15261 USA; Krich Sawamiphakdi, The Timken Company, R&D Manufacturing Technology; Brian G. Thomas, University of Illinois, Department of Mechanical and Industrial Engineering, Urbana, IL 61801 USA

Tuesday PM Room: Regency Ballroom D
November 11, 2003 Location: Hyatt Regency Downtown Hotel

Session Chair: Krich Sawamiphakdi, The Timken Company, Canton, OH USA

2:00 PM INVITED
Computer Modeling of Continuous Bar Rolling Mill: *K. Sawamiphakdi*[1]; P. M. Pauskar[1]; M. D. Conneely[1]; M. A. Soorma[1]; [1]The Timken Company, Timken Rsch., Canton, OH 44706 USA

2:25 PM
Mathematical Modeling of Formation of Cross-Sectional Wall Thickness Variations in Tubes During Their Cold Plug Drawing: Prof. Gennady I. Gulyayev[1]; Dr. Yu. G. Gulyayev[2]; Mr. Ye. I. Shifrin[1]; *Dr. K. Sawamiphakdi*[3]; [1]Osada State Tube Institute (DTI-VNITI), 1a Pisarzhevsky St., 5, Dniepropetrovsk 49600 Ukraine; [2]Nizhniednieprovsk Tubeworks, Dniepropetrovsk Ukraine; [3]The Timken Company, Canton, OH USA

2:45 PM
Visualizing the Evolutions of Microstructure Through Quenching Process: *Ms. Makiko Takahashi*[1]; *Dr. Mohammed Maniruzzaman*[1]; Dr. Richard D. Sisson, Jr.[1]; [1]Worcester Polytechnic Institute, Matl. Sci. & Engrg., 100 Institute Rd., Worcester, MA 01609 USA

3:05 PM Break

3:20 PM
Computer Simulation of Temperature and Thermal Stress Fields Generated During Heat Treating of JIS415H Steel Parts: *H. Castillo*[1]; M. A. Neri[1]; [1]Advanced Materials Research Center (CIMAV), Miguel de Cervantes N∞ 120, Complejo Industl. Chihuahua, C.P. 31109, Chihuahua MÈxico

3:40 PM
The Effect of Agitation on the Quenching Performance of a Quench Oil Using the CHTE Quench Probe System: *Dr. Mohammed Maniruzzaman*[1]; Mr. Mike Straton[1]; Mr. Thomas A. Rogers[1]; Mr. Lee P. Barber[1]; Prof. Richard D. Sisson, Jr.[1]; [1]WPI, Matls. Sci. & Engrg., 100 Inst. Rd., Worcester, MA 01609 USA

4:00 PM
Accurate Temperature Measurement During Water Quench Operations Characterized by Boiling Water Heat Transfer: *Mr. Dianfeng Li*[1]; Dr. Mary A. Wells[1]; [1]The University of British Columbia, Dept. of Metals & Matls. Engrg., 309-6350 Stores Rd., Vancouver, BC V6T 1Z4 Canada

4:20 PM INVITED
Process Control and Optimization of Near and Net-Shaped Aluminum-Silicon Alloys Premium Cast Products: *Reza Ghomashchi*[1]; [1]University of Quebec at Chicoutimi, CURAL, AMPRG, Dept. of Appl. Scis., Chicoutimi, QuÈbec G7H-2B1 Canada

4:40 PM
Multidisciplinary Coupled Simulations of Investment Casting Processes Using CASTS-FLUENT: *Dr. Juergen Jakumeit*[1]; Mr. Romuald Laqua[1]; Mr. Toni Ivas[1]; Mr. Joseph Scheele[1]; Dr. Markus Braun[2]; Dr. Aniruddha Mukhopadhyay[2]; [1]Access e.V., Intzestr. 5, Aachen 52072 Germany; [2]FLUENT, Hindenburgstr. 36, Darmstadt 64295 Germany

5:00 PM
Thermal Boundary Conditions for Computer Simulation of Grey Cast Iron Solidification in Sand Moulds: Mr. Niall Coone[1]; *Dr. David J. Browne*[1]; Mr. Martin Hussey[1]; Dr. Denis OíMahoney[2]; [1]University College, Dept. of Mechl. Engrg., Belfield, Dublin 4 Ireland; [2]University College, Natl. Microelect. Rsch. Ctr., Cork Ireland

5:20 PM

Casting Solidification and Coupled Thermo Mechanical Behaviour of a AlSi9Cu3 Investment Casting Alloy: *Eray Erzi*[1]; Dr. Suat Yilmaz[1]; [1]Istanbul University, Engrg. Faculty, Metallurgl. & Matls. Engrg. Dept., Avcilar Campus, Istanbul 34850 Turkey

5:40 PM

Prediction of Evolutional Stress in Friction Stir Welding: *Dr. Changming Chen*[1]; [1]Southern Methodist University, Rsch. Ctr. for Advd. Mfg., Dept. of Mechl. Engrg., 1500 Internatl. Pkwy., Ste. #100, Richardson, TX 75081 USA

PROCESS CONTROL AND OPTIMIZATION IN FERROUS AND NON FERROUS INDUSTRY: Microstructure Modeling: Heating, Grain Growth and Precipitation

Sponsored by: Extraction & Processing Division, Materials Processing & Manufacturing Division, Jt. MPMD/EPD-Process Modeling Analysis & Control Committee

Program Organizers: Florian Kongoli, FLOGEN Technologies, Inc., Materials Technology Department, Montreal, Quebec H3S 2CS Canada; Matthew John M. Krane, Purdue University, Department of Materials Engineering, West Lafayette, IN 47907 USA; Luis Ruiz-Aparicio, University of Pittsburgh, Pittsburgh, PA 15261 USA; Krich Sawamiphakdi, The Timken Company, R&D Manufacturing Technology; Brian G. Thomas, University of Illinois, Department of Mechanical and Industrial Engineering, Urbana, IL 61801 USA

Wednesday AM Room: Regency Ballroom D
November 12, 2003 Location: Hyatt Regency Downtown Hotel

Session Chair: TBA

8:00 AM INVITED
Cementite and Carbide Dissolution in Steels During Austenitization at High Heating Rates: *T. C. Tszeng*[1]; G. Shi[1]; S. Purohit[1]; [1]Thermal Processing Technology Center, Dept. of Mechl., Matls. & Aeros., Illinois Inst. of Tech., Chicago, IL 60616 USA

8:25 AM
Process Design and Optimization for High-Temperature Carburizing: *Dr. X. Jay Gao*[1]; Prof. Gregory B. Olson[1]; Dr. Frode Stavehaug[2]; Ms. Christina Scharer[2]; [1]Northwestern University, Matls. Sci. & Engrg., 2220 Campus Dr., Evanston, IL 60208 USA; [2]QuesTek Innovations LLC, 1820 Ridge Ave., Evanston, IL 60201 USA

8:50 AM
Grain Boundary Grooving by Surface Diffusion with Strong Surface Energy Anisotropy: Mr. T. Xin[1]; *Dr. Harris Wong*[1]; [1]Louisiana State University, Mechl. Engrg. Dept., Baton Rouge, LA 70803 USA

9:15 AM
Asynchronous Parallel Potts Model for Simulation of Grain Growth: *Dr. Priya A. Manohar*[1]; Prof. Anthony D. Rollett[1]; [1]Carnegie Mellon University, Matls. Sci. & Engrg., 4340 Wean Hall, 5000 Forbes Ave., Pittsburgh, PA 15213 USA

9:40 AM
Irregular Cellular Automata Modeling of Recrystallization and Grain Growth in an Al-Killed Steel Including the Influence of AlN-Precipitation: *Dr. Koenraad G.F. Janssens*[1]; Dr. Ernst Kozeschnik[2]; Dr. Fabiano Vanini[1]; [1]Swiss Federal Institute of Technology, Inst. of Virtual Mfg., ETH Zentrum CLA, Tannenstrasse 3, Zurich, Zurich CH-8092 Switzerland; [2]Graz University of Technology, Inst. for Matls. Sci., Welding & Forming, Kopernikusgasse 24, Graz A-8010 Austria

10:05 AM Break

10:20 AM
Competing Processes of Hardening and Softening in Mild Steel: *Mrs. Izendu Emenike Alu Aghachi*[1]; Prof. David H. Chandler[2]; [1]Technikon Pretoria, Dept. of Mechl. Engrg., PB X680, Pretoria, Gauteng Province 0001 S. Africa; [2]University of the Witwatersrand, Sch. of Mechl. Engrg., PB 3, Wits, Gauteng Province 2050 S. Africa

10:45 AM
Modelling of Precipitation in Multi-Component, Multi-Particle, Multi-Phase Systems: *Ernst Kozeschnik*[1]; Jiri Svoboda[2]; Franz Dieter Fischer[3]; [1]Graz University of Technology, Inst. for Matls. Sci., Welding & Forming, Kopernikusgasse 24, Graz 8010 Austria; [2]Academy of Science of the Czech Republic, Inst. of Physics of Matls., Zizkova 22, Brno 616 62 Czech Republic; [3]Montanuniversitaet Leoben, Inst. of Mech., Franz-Josef-Str. 18, Leoben 8700 Austria

11:10 AM
Simulation of Precipitation in a Complex 9-12% Cr Steel for Modern Steam Power Plants: *Joachim Rajek*[1]; Ernst Kozeschnik[1]; Horst Cerjak[1]; [1]Graz University of Technology, Inst. for Matls. Sci., Welding & Forming, Kopernikusgasse 24, Graz 8010 Austria

11:35 AM
Precipitation Kinetics of NbC in Ferrite of a Nb Microalloyed Steel: *Dr. Young-Kook Lee*[1]; [1]Yonsei University, Dept. of Metallurgl. Engrg., Shinchon-dong 134 Seodaemun-ku, Seoul 120-794 S. Korea

PROCESS CONTROL AND OPTIMIZATION IN FERROUS AND NON FERROUS INDUSTRY: Microstructure Modeling: Solid-State, Cooling Processes

Sponsored by: Extraction & Processing Division, Materials Processing & Manufacturing Division, Jt. MPMD/EPD-Process Modeling Analysis & Control Committee

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Wednesday PM Room: Regency Ballroom D
November 12, 2003 Location: Hyatt Regency Downtown Hotel

Session Chair: TBA

2:00 PM
Prediction of Austenite Decomposition During Cooling of Low and Medium Carbon Low-Alloy Steels: *Dr. Ettore Anelli*[1]; Dr. Maria Cristina Cesile[1]; Dr. Paolo Emilio Di Nunzio[1]; [1]Centro Sviluppo Materiali S.p.A., Via di Castel Romano 100-102, Rome I-00128 Italy

2:25 PM
Computer Simulation of the Austenite-to-Ferrite Transformation in a Fe-20%Cr//Fe-7%Cr Diffusion Couple: *Dr. Anders SalwÈn*[1]; [1]Swedish Institute for Metals Research, Drottning Kristinas v. 48, Stockholm S-114 28 Sweden

2:50 PM
Modeling the Formation of Bainitic Ferrite in Low-Carbon Steels: *Mr. Fateh Fazeli*[1]; Dr. Matthias Militzer[1]; [1]University of British Columbia, The Ctr. for Metallurgl. Proc. Engrg., 309-6350 Stores Rd., Vancouver, BC V6T1Z4 Canada

3:15 PM Break

3:30 PM
3D FEM-Model for the Bainitic Transformation in TRIP-Aided Steels: *Mr. Danny Van Dooren*[1]; Dr. Philippe Thibaux[2]; Dr. Bruno Charles De Cooman[1]; [1]Ghent University, Lab. for Iron & Steelmaking, Technologiepark 903, Ghent 9052 Belgium; [2]OCAS NV, Arcelor Grp., John Kennedylaan 3, Zelzate 9060 Belgium

3:55 PM
Strain-induced martensite transformation in 0.2C-1.5Si-1.5Mn steels - influence of strain rate and deformation temperature : *A. Wasilkowska*[1]; D. Huckert[2]; E. Werner[1]; S. Traint[3]; A. Pichler[3]; [1]Technical University Munich, Christian-Doppler-Laboratory for Modern Multiphase Steels Germany; [2]Grande Ècole díingÈnieurs, Institut National des Sciences AppliquÈes de Lyon, Lyon, France; [3]voestalpine Stahl GmbH, Linz, Austria

4:20 PM
Theory, Validation and Application of a Microstructure Evolution Model Used for Hot Steel Rolling: *Mr. Richard A. Shulkosky*[1]; *Mr. David L. Rosburg*[1]; *Mr. Jerrid D. Chapman*[1]; [1]INTEG Process Group, Inc., 11279 Perry Hwy., Ste. 502, Wexford, PA 15090 USA

4:45 PM
Process Simulation Development for Shape Rolling Applications: *Dr Dave Lambert*[1]; Mr. John M Walters[1]; Dr. Christian E Fischer[1]; [1]SFTC, 5038 Reed Road, Columbuus, oh 43220 usa

5:10 PM
Microstructure Prediction in Thermo-Mechanical Processing by Multi-Scale Simulation: *Mr. Qiang Yu*[1]; Dr. Sven K. Esche[1]; [1]Stevens Institute of Technology, Dept. of Mechl. Engrg., Castle Point on Hudson, Hoboken, NJ 07030 USA

5:35 PM
A Numerical Model of Thermokinetics of Technology Processes with a Phase Change: *Frantisek Kavicka*[1]; Josef ätÏtina[1]; Bohumil Sekanina[1]; Pavel Ramik[1]; [1]Brno University of Technology, Faculty of Mechl. Engrg., Technicka St. 2, Brno 616 69 Czech Republic