VHCF-4

Fourth International Conference on Very High Cycle Fatigue

August 19-22, 2007
University of Michigan
Ann Arbor, Michigan USA

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VHCF-4

VHCF-4 • August 19-22, 2007 • Ann Arbor, Michigan
Horace H. Rackham School of Graduate Studies
University of Michigan

Join the global fatigue community in discussing the latest experimental and theoretical research on the fatigue behavior of structural materials in the very high cycle regime.

Technical Scope

In recent years, there has been a growing emphasis on safely extending the service lives of existing transportation and power generation systems beyond their original design lifetimes. The need to reduce environmental impact and the need for increased economic efficiency are driving the design of new components and systems in which fatigue lifetimes as long as 10^9 to 10^{10} cycles are required. Thus, there is global interest in, and need for, improved understanding of the fatigue behavior of structural materials in the very high cycle fatigue (VHCF) regime.

Conference History

First International Conference: "Fatigue Life in the Gigacycle Regime," June 29-July 1, 1998, Paris; organized by Professor C. Bathias.

Second International Conference: "Fatigue in the Very High Cycle Regime," July 2-4, 2001, Vienna; organized by professors S.E. Stanzle-Tschegg and H. Mayer. At that time, it was agreed that the conference would be held every three years under the name "Very High Cycle Fatigue."

Third International Conference: "Very High Cycle Fatigue (VHCF-3)," Sept. 16-19, 2004, Kyoto/Kusatsu, Japan; organized by professors T. Sakai and Y. Ochi; sponsored by Society of Materials Science, Japan (JSMS), Research Group for Statistical Aspect of Materials Strength (RGSAMS), and Ritsumeikan University.

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Keynote and Invited Speakers

- **Claude Bathias and Paul C. Paris,** *CNAM/ITMA, France*
  "Initiation in the Gigacycle Fatigue Regime"
- **David Davidson,** *Southwest Research Institute, USA*
  "The Effect of Nonuniform Grain Size on the Fatigue Limit of Clean Material"
- **Richard Gangloff,** *University of Virginia, USA*
  "Modeling Environment Sensitive Fatigue at Low Growth Rates"
- **D. Harlow,** *Lehigh University, USA*
  "Data Fusion and Science-Based Modeling: A Technique for Very High Cycle Fatigue Predictions"
- **Peter K. Liaw,** *The University of Tennessee, USA*
  "Fatigue Behavior of Zr-Based Bulk-Metallic Glasses at Different Loading"
- **Petr Lukas,** *Czech Academy of Sciences, Czechoslovakia*
  "Fatigue Behavior of Ultrafine-Grain Copper in Very High Cycle Fatigue Regime"
- **Herwig Mayer,** *BOKU University, Austria*
  "Fatigue Damage of Low Amplitude Cycles Under Variable Amplitude Loading Condition"
- **David McDowell,** *Georgia Institute of Technology, USA*
  "An Efficient Computational Approach to Uncertainty in High Cycle Fatigue Life Caused by Variability in Microstructural Features in Alloys with Inclusions"
- **Hael Mughrabi,** *University of Erlangen, Germany*
  "Fatigue Damage Evolution in Ductile Single-Phase Face-Centered Cubic Metals in the VHCF-Regime"
- **Christopher Muhlstein,** *Pennsylvania State University, USA*
  "Deformation and Fatigue of Face-Centered and Diamond Cubic Structural Films"
- **Yukitaka Murakami,** *Kyushu University, Japan*
  "Effects of Hydrogen on High Cycle Fatigue"
- **Yasuo Ochi,** *University of Electro-Communications, Japan*
  "Effects of Shot Peening Treatment on Very High Cycle Fatigue Property in Austempered Ductile Iron"
- **Jean Petit,** *ENSMA/CNRS, France*
  "Ultra High Cycle Fatigue Behavior of a Ti6246 Alloy in Air and in High Vacuum"
- **Robert Ritchie,** *University of California, USA*
  "An Assessment of Very High Cycle Fatigue Failure in Micron-Scale Polycrystalline Silicon for MEMS"
- **Tatsuo Sakai,** *Ritsumeikan University, Japan*
  "Review and Prospects for Current Studies on Very High Cycle Fatigue of Metallic Materials for Machine Structural Use"
- **William Sharpe,** *Johns Hopkins University, USA*
  "A 20 Kilohertz Optical Strain Gage"
- **Stefanie Stanzl-Tschegg,** *BOKU University, Austria*
  "PSB Threshold and Fatigue Limit of Polycrystalline Copper in the VHCF Regime"

Preliminary Technical Program

Sessions

Advanced Materials and MEMS

Fatigue Behavior of Ultrafine-Grain Copper in Very High Cycle Fatigue Regime: Petr Lukas, Ludvik Kunz, Milan Svoboda, Otakar Bokuvka, *Czech Academy of Sciences*, Czechoslovakia

An Assessment of Very High Cycle Fatigue Failure in Micron-Scale Polycrystalline Silicon for MEMS: Robert Ritchie, Daan Hein Alsem, *University of California*, USA

Fatigue Behavior of Zr-Based Bulk-Metallic Glasses at Different Loading: Peter K. Liaw, Gongyao Wang, Y. Yokoyama, A. Peker, W.H. Peter, M. Freels, Z.Y. Zhang, V. Keppens, A. Inoue, R.A. Buchanan, C.T. Liu, C.R. Brooks, *The University of Tennessee*, USA

Deformation and Fatigue of Face-Centered and Diamond Cubic Structural Films: Christopher Muhlstein, Olivier Pierron, Roi A. Meirom, James G. Collins, M. Clara Zapata, *Pennsylvania State University*, USA

Fatigue of Polycrystalline Thin Film Silicon for Micro-Electro-Mechanical Structures (MEMS): Joerg Bagdahn, Matthias Ebert, Peter Gumbsch, Robert Boroch, *Fraunhofer Institute*, Germany

Very High Cycle Fatigue Characterization of Silicon Structural Thin Films with kHz Frequency Resonators: Olivier Pierron, Christopher Muhlstein, *Qualcomm MEMS Technologies*, USA

High Cycle Fatigue Crack Behavior and Fracture in Poly Si Thin Films: Qiang Chen, Gen Hashiguchi, Norio Kawagoishi, Katsuyori Suzuki, Yuki Nishimori, Hideo Horibe, *Kochi National College of Technology*, Japan

Fatigue at Ultra High Frequencies in Sub-Micron Thin Metal Films: Oliver Kraft, *University of Karlsruhe*, Germany

Influence of Notches and Surface Condition

Effects of Shot Peening Treatment on Very High Cycle Fatigue Property in Austempered Ductile Iron: Yasuo Ochi, Kiyotaka Masaki, Takashi Matsumura, *University of Electro-Communications*, Japan

Effects of Notch and Dynamic Strain Aging on Very High Cycle Fatigue Properties of Austenitic Stainless Steel at an Elevated Temperature: Kenji Kanazawa, *Chuo University*, Japan

Influence of Macroscopic and Microscopic Notch Effects on the VHCF-Behavior of a Precipitation-Hardened Aluminium Alloy: Martina Zimmermann, Hans-Juergen Christ, *University of Siegen*, Germany

Gigacycle Fatigue Behavior of Cold Forging Die Steels: Ryuichiro Ebara, Hideki Kobayashi, Atsushi Ogura, Yasuyuki Kondo, Shinichi Hamaya, *Hiroshima Institute of Technology*, Japan

The Nature of Two-Modal Distributions of the Fatigue Durability of Titanium Alloy VT9 in the Range of Environment Temperature 20– 500 C: Shanyavskiy Andrey, A. Yu. Potapenko, T.N. Zaharova, *State Center for Civil Aviation Flight Safety*, Russia

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Surface Effect on the Fatigue Behavior of Mechanical Components in Giga Cycle Regime: Emin Bayraktar, *Supmeca-Paris*, France

Impact of Modes of Vibration on Goodman Diagrams: A Case Study on Compressor Blades: Ganapathi Krishnan, Robert Tryon, Richard Holmes, *VEXTEC Corp.*, USA

Very High Cycle Fatigue of Notched High Strength Steels: Hitoshi Ishii, Hiroyasu Araki, Yasuki Kudo, Tooru Yagasaki, *Shizuoka University*, Japan

Preliminary Technical Program

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Very High Cycle Fatigue Strength of Bearing Steel with Notch: Yoshiaki Akiniwa, Keisuke Tanaka, *Nagoya University*, Japan

Effect of Alumite Treatment on Ultra-Long-Life Fatigue Property for Aluminum Alloy in Rotating Bending: Tatsuo Sakai, Yuki Nakamura, Hideo Hirano, *Ritsumeikan University*, Japan

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Effect of Carburizing Variables on the Fatigue Behavior of Carburized C015 Low Carbon Steel: Jamal Sultan, *Mosul Technical Institute*, Iraq

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3D Modeling of Potency for Fatigue Crack Nucleation at Primary Inclusions in Carburized and Shot Peened Gear Steels: Rajesh Prasannavenkatesan, Jixi Zhang, David L. McDowell, *Georgia Institute of Technology*, USA

Process Optimization for Pre-Stressed Fastener Holes for Enhanced High Cycle Fatigue Life: Ravindra Kulkarni, *Rashtreeya Vidyalaya College of Engineering*, India

Optimization of C/D Ratio of Adjacent Pre-Stressed Fastener Holes in HCF Using Finite Element Analysis: Shanmukha Nagaraj, *Rashtreeya Vidyalaya College of Engineering*, India

In-Service Very High Cycle Fatigue of Titanium Compressor Blades of Aircraft Engines: Shanyavskiy Andrey, A. Yu. Potapenko, *State Center for Civil Aviation Flight Safety*, Russia

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Modeling Environment Sensitive Fatigue at Low Growth Rates: Richard Gangloff, *University of Virginia*, USA

Effect of Frequency and Environment on High Cycle Fatigue of Cast Aluminum Alloys: Carlos Engler, Robert Frisch, John Lasecki, Herwig Mayer, John Allison, *Ford Motor Company*, USA

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Very High Cycle Fatigue Behavior of Nickel-Base Superalloy René 88DT at Elevated Temperature: Jiashi Miao, Tresa M. Pollock, J. Wayne Jones, *University of Michigan*, USA

Very High Cycle Fatigue of a Single Crystal Nickel-Based Superalloy at Elevated Temperature: Jianzhang Yi, Tresa Pollock, J. Wayne Jones, Joseph Rigney, P.K. Wright, *University of Michigan*, USA

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Fatigue Behavior of a 319-Type Cast Aluminum Alloy in Very Long Lifetime Regime: Xiaoxia Zhu, Jianzhang Yi, J. Wayne Jones, John Allison, *University of Michigan*, USA

Preliminary Technical Program

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Gigacycle Fatigue of Precipitation Hardening Aluminum Alloys: T. Li, M.R. Sriraman, C. Wang, Q.Y. Wang, *Sichuan University*, China

Approaches to Predict the Very High Cycle Fatigue Behavior of Cast Aluminum Alloys: Qigui Wang, *General Motors Corp.*, USA

Strength Level Dependence of Very High Cycle Fatigue Property in Interior Inclusion-Induced Fracture for Bearing Steel in Rotating Bending: Tatsuo Sakai, Noriyasu Oguma, Hisashi Harada, *Ritsumeikan University*, Japan

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The Role of Microstructure on Fatigue Lifetime Variability in a + ß Ti-Alloy: Christopher Szczepanski, Sushant Jha, James Larsen, J. Jones, *University of Michigan*, USA

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An Efficient Computational Approach to Uncertainty in High Cycle Fatigue Life Caused by Variability in Microstructural Features in Alloys with Inclusions: Nima Salajegheh, David McDowell, Hamid Garmestani, Rajesh Prasanna, *Georgia Institute of Technology*, USA

Statistical Approaches Applied to Very High Cycle Fatigue: Carlos Engler, Robert Frisch, John Lasecki, John Allison, *Ford Motor Company*, USA

Small-Crack Behavior and Its Application to Fatigue Property Prediction in a Cast AS7GU Aluminum Alloy: Jianzhang Yi, Xiaoxia Zhu, J. Wayne Jones, John Allison, *University of Michigan*, USA

Probabilistic Life-Prediction in the Long Lifetime Regime: Sushant Jha, *University Technology Corporation*, USA; James Larsen, Andrew Rosenberger, *US Air Force Research Laboratory*, USA

Recent Advances in Apparatus and Instrumentation

Fatigue Damage of Low Amplitude Cycles under Variable Amplitude Loading Condition: Herwig Mayer, *BOKU University*, Austria

A 20 Kilohertz Optical Strain Gage: William Sharpe, *Johns Hopkins University*, USA

A New High Speed (150 Hz) Rotating Bending Fatigue Test Machine: Gonzalo Dominguez, Mauricio Guzman-Tapia, *University of Michoacan*, Mexico

New Measuring Methods for the Fatigue Assessment of Metals in the Very High Cycle Regime: Michael Koster, Guntram Wagner, Frank Walther, Dietmar Eifler, *University of Kaiserslautern*, Germany

Accrual of Small Fatigue Crack Damage in Ti-6Al-4V under Resonant Mini-Sweep Loading: Michael Caton, Ryan Morrissey, *US Air Force*, USA

Observation of Inclusions and Defects in Steels by Micro Computed-Tomography Using Ultra Bright Synchrotron Radiation: Yoshikazu Nakai, Daiki Shiozawa, Yasushi Morikage, Takayuki Kurimura, Hiroshi Tanaka, Hideki Okado, Takuya Miyashita, *Kobe University*, Japan

Schedule of Events*

Sunday, August 19

5 p.m. ..... Registration Opens
6 to 7:30 p.m. ..... Welcoming Reception at Rackham Graduate School Building

Monday, August 20

7:30 a.m. ..... Registration Opens
8:30 a.m. to 12:30 p.m. ..... Morning Session
10:15 to 10:45 a.m. ..... Networking Break and Poster Viewing
12:30 to 2 p.m. ..... Lunch Break
2 to 6 p.m. ..... Afternoon Session
3:45 to 4:15 p.m. ..... Networking Break and Poster Viewing
8:30 to 10 p.m. ..... Poster Reception

Tuesday, August 21

7:30 a.m. ..... Registration Opens
8:30 a.m. to 12:30 p.m. ..... Morning Session
10:15 to 10:45 a.m. ..... Networking Break and Poster Viewing
12:30 to 2 p.m. ..... Lunch Break
2 to 6 p.m. ..... Afternoon Session
3:45 to 4:15 p.m. ..... Networking Break and Poster Viewing
6:15 p.m. ..... Buses Depart for Conference Dinner
7 to 10 p.m. ..... Conference Dinner at Henry Ford Museum

Wednesday, August 22

7:30 a.m. ..... Registration Opens
8:30 a.m. to 12:30 p.m. ..... Morning Session
10:15 to 10:45 a.m. ..... Networking Break and Poster Viewing
12:30 to 2 p.m. ..... Lunch Break
2 to 6 p.m. ..... Afternoon Session
3:45 to 4:15 p.m. ..... Networking Break and Poster Viewing

Thursday, August 23

8:15 a.m. ..... Ford Rouge Factory Tour (optional)

*Schedule is preliminary and subject to change.

Networking and Social Events

Welcoming Reception
Sunday, August 19 ~ 6 p.m.
Rackham Graduate School Building

Conference Dinner
Tuesday, August 21 ~ 7 p.m.
Henry Ford Museum

About the Henry Ford Museum
Henry Ford created the "Model T" car, which changed the world by making drivers of us all. The museum boasts itself as "America's Greatest History Attraction." Must-see artifacts include the Lincoln Chair, Kennedy Presidential Limousine, Rosa Parks Bus, Allegheny Locomotive, Marshmallow Sofa, and Dymaxion House. The museum's entrance houses a clock tower, more than 75 years old but still accurate to within one second a month.

Dinner Schedule
6:15 p.m. ..... Buses Depart University
7 p.m. ..... Reception
7:30 to 8:45 p.m. ..... Buffet Dinner
Immediately Following ..... Strolling Dessert Served. Attendees may tour museum at their leisure.
10 p.m. ..... Buses Depart for Hotels

Tickets for guests may be purchased on the registration form or on-site.

Networking Breaks
Monday, August 20-Wednesday, August 22 ~ 10:15 to 10:45 a.m. and 3:45 to 4:15 p.m.

These breaks provide opportunities for networking with colleagues from around the globe, as well as viewing and discussing the technical posters.

Ford Rouge Factory Tour*
Thursday, August 23 ~ 8:15 a.m. to 12:30 p.m.
$35 per person

Includes
- Driving tour of historic auto-related landmarks and behind-the-scenes of the Rouge complex;
- Look at the history of the Rouge through historic video footage;
- Virtual reality theatre experience;
- Walking tour of the factory's "living roof";
- Walking tour above the actual final assembly area where Ford F-150s are made.

For more details regarding this tour, visit http://www.thehenryford.org/rouge/tour.asp.

Tour Schedule
8:15 a.m. ..... Tour Bus Departs Rackham Building
12:30 p.m. ..... Tour Bus Returns to Rackham Building

Register for the tour via the registration form in this brochure or online at www.tms.org/meetings/specialty/VHCF

**TMS reserves the right to cancel the tour by July 19, 2007, due to lack of participation. If TMS cancels the tour, tour registration fees will be refunded.*

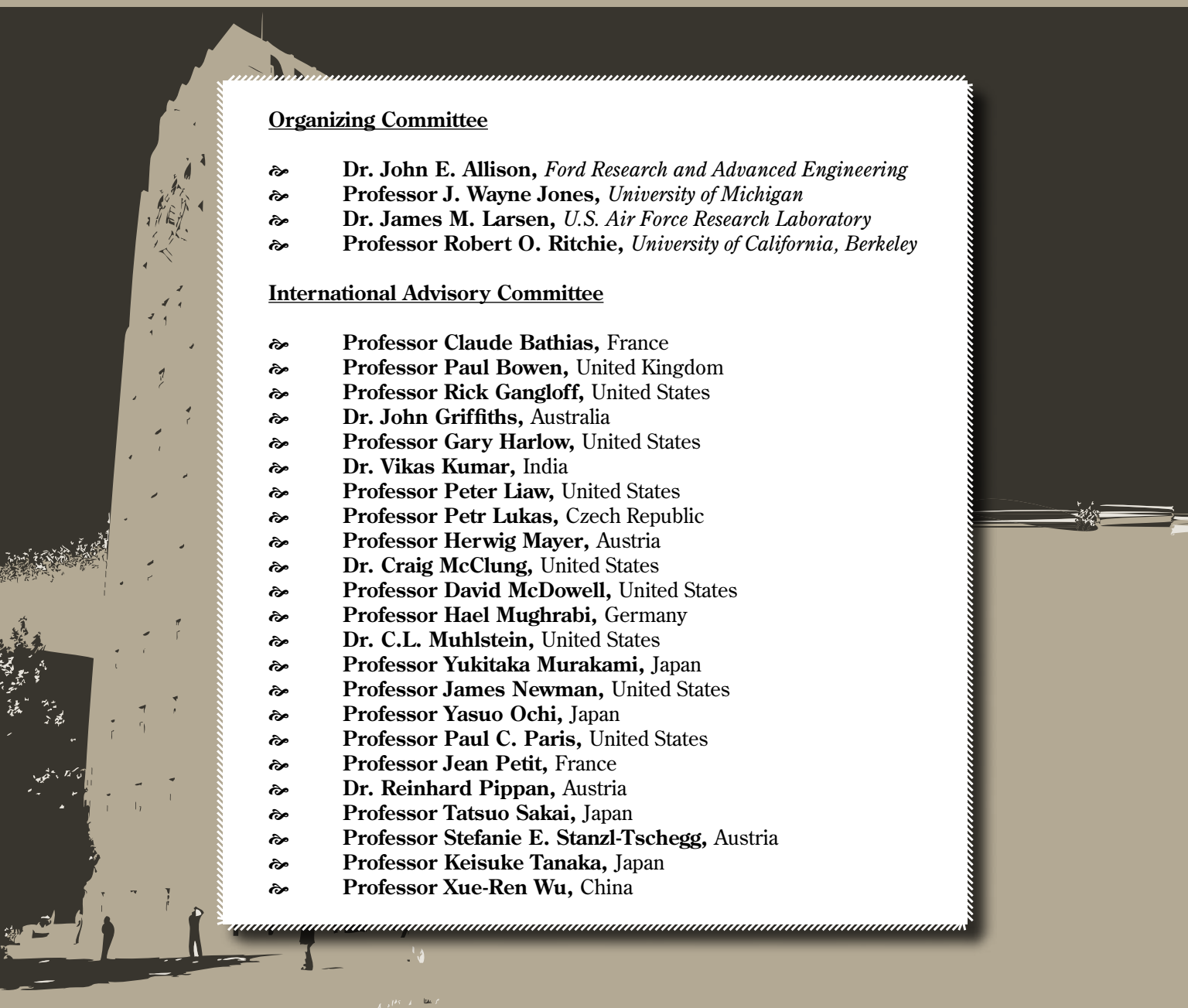
Proceedings and Publications

Proceedings

Proceedings will be published as a softcover book and CD-ROM set. Each full conference registrant will receive a **free** copy of the proceedings set on-site. The proceedings set will also be on sale to students and others in advance on the registration form for $121 (shipping and handling included).

Paper Publication

Authors should review the online instructions for paper preparation at www.tms.org/pubs/Publications.html. There is an eight-page limit for manuscripts. First drafts are due before May 4, 2007.



Organizing Committee

- **Dr. John E. Allison,** *Ford Research and Advanced Engineering*
- **Professor J. Wayne Jones,** *University of Michigan*
- **Dr. James M. Larsen,** *U.S. Air Force Research Laboratory*
- **Professor Robert O. Ritchie,** *University of California, Berkeley*

International Advisory Committee

- **Professor Claude Bathias,** France
- **Professor Paul Bowen,** United Kingdom
- **Professor Rick Gangloff,** United States
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- **Professor Herwig Mayer,** Austria
- **Dr. Craig McClung,** United States
- **Professor David McDowell,** United States
- **Professor Hael Mughrabi,** Germany
- **Dr. C.L. Muhlstein,** United States
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- **Professor James Newman,** United States
- **Professor Yasuo Ochi,** Japan
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- **Professor Tatsuo Sakai,** Japan
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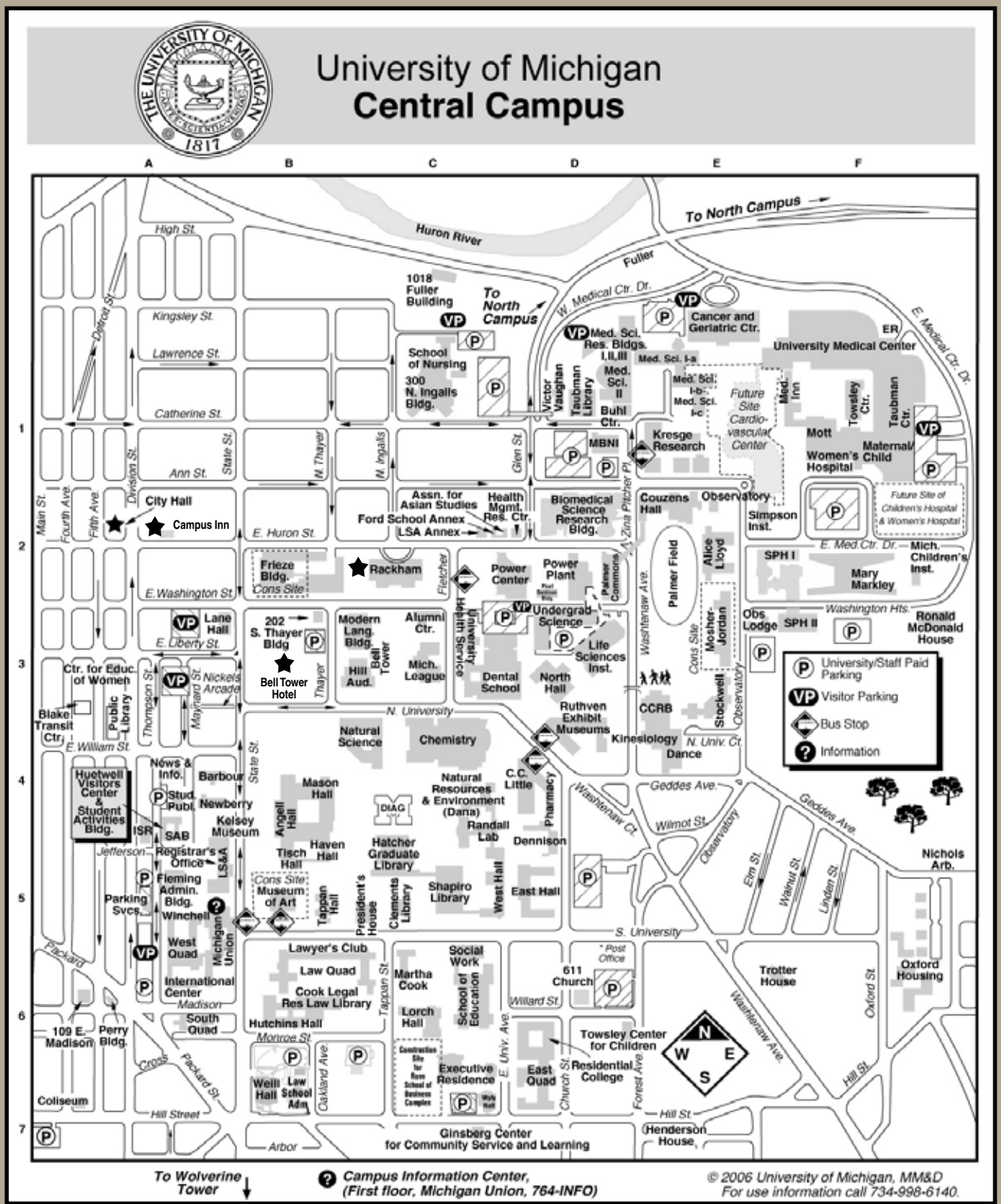
- **Professor Keisuke Tanaka,** Japan
- **Professor Xue-Ren Wu,** China

About Rackham Graduate School

Since conferring its first doctoral degree in 1876, the University of Michigan has advanced the value of graduate education. In 1935, donor Mary Rackham worked with university president Alexander Ruthven to endow the graduate school. Today, the Horace H. Rackham School of Graduate Studies is a community of scholars, researchers and students in 130 programs, joined together by the rigors of their academic pursuits and housed in the magnificent Rackham building. The Rackham community is engaged in the creation of new knowledge, discoveries and, perhaps more important, future leaders. More than 85,000 Rackham alumni all over the world bring their talents and training to problems they encounter and can claim important accomplishments within their professional and personal lives. For more information about the university and this special graduate school, **visit http://www.rackham.umich.edu.**

About the Location



Reserve your room before July 18 to secure conference rates!

The Dahlman Campus Inn Single Room Rate: $146 Double Room Rate: $170

A full-service hotel in downtown Ann Arbor, this inn features guest rooms and a business center. Wireless Internet is available on main floors and direct high-speed Internet is available in all rooms. Amenities include outdoor pool, saunas, fitness center and gift shop. Dining is available at Victors Restaurant.

For Reservations: Telephone (800) 666-8693 or complete the reservation form on the next page. Reference meeting code 6803 to receive conference rates.

Bell Tower Hotel Single Room Rate: $146 Double Room Rate: $170

The Bell Tower Hotel is adjacent to the university campus. Hotel guests receive complimentary parking and continental breakfast. Amenities include use of the university's fitness facilities. Dining is available at the Earle Uptown Restaurant.

For Reservations: Telephone (800) 562-3559 or complete the reservation form on the next page. Reference meeting code 2815 to receive the conference rates.

Hertz Car Rental

Designated car rental company for VHCF-4

Take advantage of special rates, which include unlimited mileage, by using this special code, **CV#02QJ0023**, when you or your travel agent make reservations.

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- Elsewhere (405) 749-4434

VHCF-4

Fourth International Conference on Very High Cycle Fatigue

August 19-22, 2007
Ann Arbor, Michigan

TMS
Housing Form

Reservation Deadline: July 18, 2007

Complete this form and send with payment to appropriate hotel.

Hotel Selection:

☐ **The Dahlman Campus Inn**
☐ Single: $146 ☐ Double: $170
Room Tax: 8%
Reservation Code: 6803
Check-in: 4 p.m. Check-out: 11 a.m.

Mail or fax to
The Dahlman Campus Inn
615 East Huron Street
Ann Arbor, MI 48104
Fax: (734) 769-6222

☐ **Bell Tower Hotel**
☐ Single: $146 ☐ Double: $170
Room Tax: 8%
Reservation Code: 2815
Check-in: 4 p.m. Check-out: noon

Mail or fax to
Bell Tower Hotel
300 South Thayer Street
Ann Arbor, MI 48104
Fax: (734) 769-4339

Arrival Date_____**Departure Date**_____

Special Requests *(subject to availability)*_____

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Reservations must be guaranteed by personal check or credit card for the cost of room and tax for one night. Cancellations must be made at least 24 hours prior to arrival to avoid billing for one night.

Requests for reservation dates prior to and after the conference will be accepted on a space-available basis only.

Register by July 19 to save $50 off the on-site rates.

	Advance *Through July 19*	On-site *After July 19*
Full Conference	$425	$475
Student	$150	$200

Full Conference Registration Includes
- Technical Sessions
- Welcoming Reception
- Conference Dinner at Henry Ford Museum
- Proceedings CD-ROM

Student Registration Includes
- Technical Sessions
- Welcoming Reception
- Conference Dinner at Henry Ford Museum

Register online at www.tms.org/meetings/specialty/VHCF or complete the enclosed registration form.

For Our International Attendees

Citizens of countries that require a visa to enter the United States are reminded that the process of obtaining a visa may take several months. It is necessary to begin the application process early. For visa information, visit the U.S. State Department Web site at www.state.gov. If a letter is needed to obtain a visa, please contact Deborah Price, TMS meeting services coordinator, via e-mail at price@tms.org.

Policies

Badge Policy
Badges must be worn to gain access to technical sessions and social functions.

Cancellation/Refund Policy
A request for refund due to cancellation must be made in writing and received at TMS World Headquarters no later than July 19, 2007. A $75 processing fee is charged. Refunds cannot be granted after the deadline. Mail refund request to TMS, Meeting Services, 184 Thorn Hill Road, Warrendale, Pa., 15086-7514, USA.

Audio/Video Recording Policy
TMS reserves the right to all audio and video reproductions of presentations at TMS sponsored meetings. Recording of sessions (audio, video, still photography, etc.) intended for personal use, distribution, publication, or copyright without the express written consent of TMS and the individual authors is strictly prohibited. Contact TMS Technical Programming at (724) 776-9000, ext. 212, to obtain a copy of the waiver release form.

Americans With Disabilities Act
TMS strongly supports the federal Americans with Disabilities Act (ADA) which prohibits discrimination against, and promotes public accessibility for, those with disabilities. In support of ADA, we ask those requiring specific equipment or services to contact TMS Meeting Services in advance.

Advance Registration Form

August 19 - 22, 2007
University of Michigan
Ann Arbor, Michigan, USA

VHCF-4

Fourth International Conference on Very High Cycle Fatigue

Advance Registration Deadline: July 19, 2007
Register online, by fax or by mail.

(Forms received past the deadline will be processed at the on-site fee. Payment must accompany form.)

Choose only one option for submitting your registration form.

WEB	FAX	MAIL
Take advantage of online advance registration at www.tms.org *(Requires credit card payment)*	Fax this form to TMS Meeting Services at (724) 776-3770. *(Requires credit card payment)*	Return this form with payment to TMS, Meeting Services, 184 Thorn Hill Road, Warrendale, PA 15086-7514 USA

Please print or type:

Salutation ☐ Dr. ☐ Prof. ☐ Mr. ☐ Mrs. ☐ Ms.

Last Name _____ First Name _____ Middle _____

Employer _____ Job Title _____

Address is ☐ Business ☐ Home Street/P.O. Box _____

City _____ State/Province _____

Zip/Postal Code _____ Country _____

Telephone _____ Fax _____

E-mail _____

Name of Guest (if applicable) *(Guests do not receive admission to technical sessions.)* _____

Registration Fees:

	Advance Fees *(Through July 19)*	On-Site Fees *(After July 19)*
Full Conference*	$425	$475
Student**	$150	$200

(Students must attach a copy of school identification card.)

**Fee includes technical sessions, welcoming reception, coffee breaks, banquet and proceedings.*

***Fee includes technical sessions, welcoming reception, coffee breaks and banquet.*

Additional Post-Conference Proceedings:
One copy of the proceedings in book and CD-ROM format is provided to those paying the full conference registration fee. Additional copies of the CD and hardcopy are also available for purchase. Proceedings will also be available for purchase at the conference.

Additional Copies of Proceedings:

	Fees	Quantity	Total
Hardcopy and CD-ROM	$121	_____	$ _____

Ford Rouge Plant Tour (optional):

	Fees	Quantity	Total
Thursday, August 23, 8 a.m.	$35	_____	_____

Prepaid tour registrations are refundable if cancelled by July 19, 2007. There will be no refunds after the deadline.

Social Function Tickets for Guests:

	Fee	Quantity	Total
Banquet	$90	_____	$ _____

Dietary Restrictions ☐ Vegetarian ☐ Kosher

☐ Other (specify) _____

_____

TOTAL FEES: $ _____

Payment Options:
☐ Check payable to TMS in U.S. dollars drawn on a U.S. bank
☐ Visa ☐ MasterCard ☐ American Express ☐ Diners Club

Card Number _____

Expiration Date _____

Cardholder Name *(Please print.)* _____

Cardholder Signature _____

Refund Policy:
Written requests for refunds due to cancellations must be received by TMS no later than July 19, 2007.
A $75 processing fee is charged for registration cancellations.
No refunds are processed after the above deadline.

Questions?
Telephone TMS Meeting Services at (800) 759-4TMS or (724) 776-9000, ext. 243, or e-mail mtgserv@tms.org.

Gain added value for your company by becoming a VHCF-4 sponsor!

Level I: Special Event

Option A: Conference Banquet/Reception
- Gold sponsor benefits
- Plus recognition in banquet program

Sponsor Contribution: $15,000 (U.S.)

Option B: Welcoming Reception
- Silver sponsor benefits

Sponsor Contribution: $3,000 (U.S.)

Option C: Coffee Breaks
- Silver sponsor benefits

Sponsor Contribution: $3,000 (U.S.)

Level II: Gold

Benefits:
- One complimentary conference registration
- Company name/logo/link on conference Web site
- Company name in proceedings
- Company name/logo on sponsor signage on-site
- Company name in final program on-site
- Formal recognition at conference events

Sponsor Contribution: $5,000 (U.S.)*

Level III: Silver

Benefits:
- Company name in proceedings
- Company name/logo on sponsor signage on-site
- Company name in final program on-site
- Formal recognition at conference events

Sponsor Contribution: $3,000 (U.S.)*

Level IV: Final Program

Benefits:
- Company name on final program as sponsor of the piece distributed to all attendees
- Formal recognition at conference events

Level V: Personal Donation*
- Name in final program on-site
- Formal recognition at conference events

*Funds from undesignated sponsorships will be utilized to offset proceedings costs and other conference expenses.

VHCF-4

Fourth International Conference on Very High Cycle Fatigue

August 19-22, 2007
Ann Arbor, Michigan

TMS

Sponsorship Form

Complete this form and send with payment to:
Jacqueline DeLuca
The Minerals, Metals & Materials Society
184 Thorn Hill Road, Warrendale, PA 15086 USA
Fax (724) 776-3770 / E-mail jdeluca@tms.org

Date_____Contact Name_____

Company Name_____

Mailing Address_____

City_____State/Province _____

Postal Code_____Country_____

Telephone_____Fax _____

E-mail_____

Sponsorship Selection

Level I: Special Event ☐A. Banquet/Reception ☐B. Welcoming Reception ☐C. Coffee Breaks

☐**Level II: Gold Sponsorship** ☐**Level III: Silver Sponsorship** ☐**Level IV: Final Program**

☐**Level V: Personal Donation**

Sponsor Payment Amount $_____

Payment Method

Charge my credit card: ☐VISA ☐MasterCard ☐American Express

Credit Card Number_____Expiration Date_____

Cardholder Name (please print)_____

Signature_____

If the cardholder's mailing address is different than the address above, please complete the following:

Address_____

City_____State/Province _____

Postal Code_____Country_____

☐**Check Enclosed:** Payable to The Minerals, Metals & Materials Society, in U.S. dollars, drawn on a U.S. bank, referencing "VHCF-4 Conference"

☐**Wire Transfer Ordered to:**
PNC Bank, NA, Cranberry Township, PA, USA
ABA Number 043000096, SWIFT Code: PNCC US33
TMS account number 10 186 207 12
Referencing "VHCF-4 Conference"

☐**Invoice me at the above address.**

A letter acknowledging your contribution and benefits to be received will be mailed to you.

Questions about completing this form? Telephone (724) 776-9000, ext. 253, or (800) 759-4TMS.

TMS

Your Professional Partner for Career Advancement

Who We Are

The Minerals, Metals & Materials Society (TMS) is the professional organization encompassing the entire range of materials science and engineering, from minerals processing and primary metals production to basic research and the advanced applications of materials. The Society's broad technical focus covers light metals; electronic, magnetic and photonic materials; extraction and processing; structural materials; and materials processing and manufacturing.

Our Members

Included among TMS professional members are metallurgical and materials engineers, scientists, researchers, educators and administrators who work in industry, government and academia, as well as students. They hail from more than 70 countries on six continents.

Our Mission

The mission of TMS is to promote the global science and engineering professions concerned with minerals, metals and materials. The Society works to accomplish its mission by providing technical learning and networking opportunities through interdisciplinary and specialty meetings; continuing education; publications, including four journals and proceedings; and the Web at www.tms.org.

TMS
184 Thorn Hill Road
Warrendale, PA 15086-7514 USA
Telephone: (724) 776-9000 / (800) 759-4TMS
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E-mail: tmsgeneral@tms.org

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