



COMPRES Seventh Annual Meeting — Colorado Springs, Colorado, 25-28 June 2008

Surrounded by a breathtaking backdrop of rugged mountain peaks and rolling foothills, 112 participants from the COMPRES community and other Earth science disciplines gathered at the Cheyenne Mountain Resort in Colorado Springs for the 7th Annual Meeting of COMPRES on June 25-28.

An informative introduction and warm welcome from Robin Reichlin of the NSF Division of Earth Sciences started the meeting. A sequence of splendid keynote talks by Rajdeep Dasgupta, Rebecca Lange, Jie Li, William McDonough, and Justin Revenaugh, plus a special after-dinner talk by Louise Kellogg led



COMPRES Seventh Annual Meeting, June 25-28, 2008, Colorado Springs, Colorado

ANNUAL MEETING

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brainstorming discussions. Sprinkled in between were reports on Community Facilities operations and Infrastructure Development projects supported by COMPRES, poster sessions and breakout sessions. Continuing the tradition of the Annual Meetings, the event heavily featured the theme of bridging the COMPRES community with other disciplines of Earth science in the keynote lectures. Details of the program may be found on the website at: http://www.compres.stonybrook.edu/Meetings/2008/Annual_Meeting/Program.html.

The social activities at the meeting were supported by generous contributions by our industrial sponsors: Almax, Blake Industries, D'Anvils, Depths of the Earth, easyLab, MG63, Rockland Research, Scimed and Technodiamant, Sara Pasternak the CEO of

(continued on page 2)

President's Message

Bob Liebermann

Following are a number of items that may be of interest to you as members of the COMPRES community.

1. March Meeting of the American Physical Society in New Orleans

Boris Kiefer of New Mexico State University and I convened Focus Sessions on Earth and Planetary Materials; these sessions included invited talks by John Brodholt [University College London] and Jonathan Crowhurst [Lawrence Livermore National Laboratory].

Russell Hemley convened a Town Hall Meeting on "Materials Physics at Gigabar Pressures" which featured invited talks by Raymond Jeanloz, David Stevenson and Richard Martin.

2. Special Symposium at Institute for Study of the Earth's Interior, Okayama University, Misasa, Japan

This symposium was sponsored by the Center of Excellence-21 program at ISEI to mark the retirement of Eiji Ito after 40 years of pioneering research in high-pressure mineral physics. In the last month of his formal employment, Ito-sensei achieved pressures of 85 Gpa in a double-stage, Kawai-type apparatus interfaced with the synchrotron at Spring-8; he thus fell a little short of his lifelong dream of reaching a megabar in a large-volume, multi-anvil apparatus.

Among the invited speakers at this international symposium were George Cody, Kei Hirose, Albrecht Hofmann, Trevor Ireland, Eiji Ito, Ian Jackson, Shun Karato, Jung-Fu Lin, Dan McKenzie, Bjorn Mysen, David Rubie, Andrew Steele and Michael Zolensky.

It was a special pleasure for me to contribute to the Ito Symposium and to toast Ito-sensei at the banquet in his honor. One of his many contributions to high-pressure mineral physics is having his Uniaxial Split-Sphere Apparatus-5000 in Misasa serve as the model for similar apparatus at the University of Alberta, Bayreuth Geoinstitut, and Stony Brook University.



3. SNAP/COMPRES Meeting at Oak Ridge National Laboratory

A Joint Meeting of SNAP [Spallation Neutrons at Pressure] and COMPRES was held at the Spallation Neutron Source [SNS] of ORNL from April 13-15. See details of program at:

http://www.compres.stonybrook.edu/Meetings/2008-04-13-SNAP/FINAL_ProgramSNAP-COMPRES.doc

Meeting concluded with a guided tour of the new SNAP beamline by Chris Tulk who oversaw the design and construction on behalf of the project team, which also included John Parise, Russell Hemley and Ho-kwang Mao. *(continued on page 3)*



The COMPRES Seventh Annual Meeting

(cont'd from page 1)

D'Anvils attended in person and Tracy Paul of Depths of the Earth provided commemorative T-shirts for all attendees.

The industrial sponsors all presented information on their products, which we encourage members of the COMPRES community to consider in their future plans for the development of their laboratories; details may be found at the sponsors' websites, via links at:

http://www.compres.stonybrook.edu/Meetings/2008_AnnualMeeting/Sponsors.html

Photo on the left: Graduate students at the poster session ■

President's Message

Bob Liebermann

Congratulations to John for convening such a successful meeting and to Emily Vance [until now the Project Assistant for SNAP and now the Administrative Coordinator for COMPRES] for the splendid organization of the events (see page 11 for more details).

4. Renewal of AP status for COMPRES at the ALS

On May 1, we were pleased to receive approval from the Lawrence Berkeley National Laboratory of our proposal for Approved Program status on Beamline 12.2.2 at the ALS. This new AP status will start on January 1, 2009, for a period of three years, and was approved in recognition of the substantial investment of COMPRES in the operation of this beamline, which is under the oversight of Simon Clark of the ALS/LBNL staff. We thank Simon and Raymond Jeanloz for their collaboration in submitting this successful proposal.

5. Joint Assembly of the AGU and Cooperating Societies

On May 29-30, I attended the Joint Assembly in Ft Lauderdale, Florida where I had the pleasure of honoring the following new AGU Fellows from mineral physics at the Honors Ceremony and Banquet:

Patricia Dove from Virginia Tech

Greg Hirth from Brown University

Tetsuo Irifune from Ehime University in Japan

(see photo below with Tetsuo and his wife)

Renata Wentzcovitch from the University of Minnesota



I also attended the Union symposium on the Deep Earth convened by Andy Campbell, Jihua Chen and Dan Shim.

6. Inelastic X-ray Scattering Workshop at APS on May 30-June 1.

Wolfgang Sturhahn, Jennifer Jackson, Jay Bass and Hasan Yavas convened an excellent workshop

highlighting the current status and future opportunities for inelastic X-ray scattering experiments at the APS and elsewhere in the world. With sponsorship of COMPRES, there were keynote talks by practitioners from the US and overseas, with plenty of time for vigorous discussion. In addition to providing travel support for the invited speakers, COMPRES offered travel grants to 8 graduate students.

7. 2008 IRIS Workshop

From June 4-6, I attended the 2008 IRIS Workshop at the Skamania Lodge on the Columbia River in Stevenson, Washington, along with 280 other scientists. There was a special session on "Integration of Seismology and Mineral Physics", with a keynote talk by Tom Duffy of Princeton University on "Hydrogen in the Upper Mantle: Are the Water-Rich Regions Red or Blue?" Skamania Lodge is an excellent venue for such meetings and COMPRES should consider booking it for an annual meeting.

8. June 2008 issue of Elements on "Deep Earth and Mineral Physics."

Jay Bass and John Parise served as Guest Editors of the most recent issue of Elements in June 2008. This issue includes fine articles on Elastic Properties by Bass, Stas Sinogeikin and Baosheng Li, on the Upper Mantle and Transition Zone by Dan Frost, on the Lower Mantle and Core by Guillaume Fiquet, François Guyot and James Badro, on Post-perovskite and the CMB by Kei Hirose and Thorne Lay, and on Rheology Studies by Shun Karato and Don Weidner. There is also a very thoughtful editorial by Bruce Watson on "Scientific Frontiers and Risky vs Safe Science." (see link on page 12).

9. New Chair of Users' Executive Committee at the NSLS.

In June, John Parise succeeded Daniel Fischer as Chair of the UEC at the NSLS. In this position, he will be working closely with Chi-chang Kao to put the NSLS Five-Year Plan into action and to contribute to the development of a transition plan of NSLS to NSLS-II.

10. Advisory Council of COMPRES meets with Executive Committee

On June 25 at Cheyenne Mountain Resort in Colorado Springs, we convened a joint meeting of the Advisory Council and the Executive Committee

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President's message

(cont'd)

of COMPRES. Attending from the Advisory Council were: Wang-ping Chen, Chi-chang Kao, Louise Kellogg, William McDonough, Guy Masters, and Malcolm Nicol. Special presentations were made by Quentin Williams on Progress and Future Planning, by Tom Duffy for Community Facilities operations, and by Pamela Burnley on Infrastructure Development projects [on behalf of Nancy Ross]. Bob Liebermann summarized the current status of Central Office activities. Vigorous discussion ensued with excellent comments and suggestions from the Advisory Council; over the next few months, the Executive Committee will be following up on these recommendations.

11. 2008 Election of officers and committee members of COMPRES

At the Annual Business Meeting of COMPRES at Cheyenne Mountain on June 27, 2008, the final balloting took place for new officers and members of COMPRES committees.

Of the 52 U. S. member institutions, 20 cast their ballots by mail and 21 at Cheyenne Mountain.

There were no nominations from the floor. The following were elected:

Executive Committee

Vice Chair: Carl Agee for a 2-year term, 2008-2010
Member: James Tyburczy for a 3-year term 2008-2011

Facilities Committee

Members: Andrew Campbell for a 3-year term 2008-2011; Yanbin Wang for a 3-year term 2008-2011

Infrastructure Development Committee

Chair: Thomas Sharp for a 2-year term 2008-2010
Members: Steven Jacobsen for a 3-year term 2008-2011; Jie Li for a 3-year term 2008-2011

On behalf of the entire COMPRES community, we congratulate these persons on their election and also thank the others who agreed to stand for election to these important, volunteer committees.

We also wish to express our gratitude for exemplary service to the following retiring members of the COMPRES committee:

Executive Committee

Michael Brown: Member 2005-2008; Vice-Chair 2007-2008.

Facilities Committee

William Durham, Member 2005-2008
Mark Rivers, Member 2002-2008, Chair 2003-2007

Infrastructure Development Committee

Pamela Burnley, Member 2002-2008.
Russell Hemley, Member 2005-2008.

12. 2008 Gordon Conference on Research at High Pressure

On June 29-July 4, I attended the GRC on High Pressure at the University of New England in Biddeford, Maine. Although this year's conference was thin on geoscience, among the featured speakers were Natalia Dubrovinskaia, Chris Tulk, Baosheng Li, Jeffrey Yarger, and Leonid Dubrovinsky.

This is the longest, continuous Gordon Research Conference, starting in 1955. Among the attendees in 2008 who also attended the GRC in Meriden, NH in 1968 were: Neil Ashcroft (last minute cancellation due to illness), Dattatraya Dandekar, and Bob

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Snapshots at the 7th COMPRES Annual Meeting



President's message *(cont'd)*

Liebermann. Malcolm Nicol missed the 1968 meeting, but earns pride of place for his attendance at the 1966 meeting.

13. Workshop on Long Range Science Plan for Seismology [LRSPS]

On September 17-19, I attended a Workshop on Long Range Science Plan for Seismology [LRSPS] convened by IRIS in Lakewood, Colorado. More than 120 seismologists gathered for this workshop, with three attendees from other geoscience disciplines: Thorsten Becker and Louise Kellogg from Geodynamics and Bob Liebermann from Mineral Physics.

The organizers used the 2004 Bass Report as a model of what the NSF-EAR was asking them to do on behalf of the seismological community. Also, the importance of "mineral physics" data and theory was invoked many times in the LRSPS workshop. Details may be found at: <http://www.iris.edu/hq/lrps>.

As COMPRES moves forward under its new Cooperative Agreement [2002-2012], it is timely to have another workshop to look ahead for the next 5 to 10 years in mineral physics. We anticipate that there will also be a successor to the Bass Report which could provide useful input to the new Basic Research Opportunities in Earth Sciences report [BROES II] which now under consideration for funding in EAR. On behalf of the mineral physics community, COMPRES has tentatively scheduled this new workshop for March 2-5, 2009 in Tempe, Arizona. Please pencil in these dates on your calendar for 2009 if you are interested in attending. (see additional details on page 14)

14. Incorporation Committee

A Special Committee [Jay Bass-Chair and Michael Brown from the ExComm, and Louise Kellogg and Guy Masters of the Advisory Council] investigated the implications of incorporation of the COMPRES organization. Their final report is now available on the COMPRES website at:

[\\sbmp80\Compres_website/Publications/Incorporation_Report_REV_3-08pdf.pdf](http://sbmp80/Compres_website/Publications/Incorporation_Report_REV_3-08pdf.pdf)

15. New faculty appointments in 2008 in Mineral Physics

U. S. institutions

Jung-fu Lin to University of Texas at Austin.

Lars Ehm to Stony Brook University

We congratulate Abby Kavner on receiving tenure as an Associate Professor at the University of California Los Angeles.

Non-U. S. institutions

Falko Langenhorst returned to the Bayreuth Geoinstitut as a W3 Professor, Germany.

Norimasi Nishiyama to Ehime University, Japan.

Motohiko Murakami to Tohoku University, Japan.

Takao Okuchi to Okayama University, Japan.

Naotaka Tomioka to Okayama University, Japan.

Daisuke Yamazaki to Okayama University, Japan.

Takahashi Yoshino to Okayama University, Japan.

Jungfen Zhang to China University of Geosciences (Wuhan), China.

Sytle Antao to University of Calgary, Canada.

16. Honors and Awards to members of the COMPRES community

We congratulate the following awardees:

David Rubie, Abraham-Gottlob-Werner Medal of the German Mineralogical Society and the Schlum-

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Snapshots at the 7th COMPRES Annual Meeting



President's message

(cont'd)

berger Award of the Award of the British Mineralogical society. (see separate article on page 8)

Larissa Dobrzinetskaya, Fellow of the GSA and the AAAS.

Brian Evans, Louis Neel Medal EGU.

Richard O'Connell, Love Medal of the EGU.

Artem Oganov, Research Excellence Medal of the EMU.

Renata Wentzcovitch, Humboldt Prize.

Steven Jacobsen, CAREER Award from the NSF and Packard Fellowship [see separate article in this newsletter].

Charles Prewitt, the First IMA Medal.

Ho-Kwang [David] Mao, Foreign Member of the Royal Society of London.

These distinctions, in addition to recognizing the significant achievements of the awardees, bring honor and visibility to the community of mineral and rock physicists and chemists throughout the world.

17. Geophysicist Robert Detrick Named NSF Division Director for Earth Sciences

The National Science Foundation (NSF) Directorate for Geosciences has appointed Robert Detrick of the Woods Hole Oceanographic Institution

(WHOI) as its new director of the Division of Earth Sciences. Dr. Detrick will take up his new post on November 3, 2008.

18. Transition in administrative leadership of COMPRES

COMPRES has just completed its 6th year of existence and is now supported by the Division of Earth Sciences at the NSF via a Cooperative Agreement for the 5-year period from 2007-2012. In mid-2010, planning will have to commence for a proposal to be submitted in September 2011 requesting funding beyond June 2012.

Following discussions with the Executive Committee and Advisory Council, I have decided to step down from my position as President of COMPRES, as early as September 2009, to allow the new administrative leader to work with the existing Executive Committee Chair (Quentin Williams) on planning for the renewal proposal. A search committee has been appointed by the Executive Committee with David Walker as Chair. A copy of the advertisement appears elsewhere in this Newsletter and will be published in both EOS and Science in late October and early November 2008.

Snapshots at the 7th COMPRES Annual Meeting



New Program of Mineral Physics Lecturers sponsored by COMPRES

In 2008-2009, COMPRES is inaugurating a new distinguished lecture series in the field of mineral physics. This new initiative was developed by J. Michael Brown, a member of the Executive Committee who organized the program and led the selection of the lecturers for the first year of this program. The goals, purpose and charge to lecturers are given below.

Goal: COMPRES will fund travel costs for two speakers, each giving three or four lectures during the 2008-2009 academic year. Colleges or universities will cover "local expenses" including lodging, meals, and transportation to and from the airport. Talks will feature topics that emphasize the exciting high-pressure geoscience research being conducted within the COMPRES community.

Purpose: As an important outreach activity for COMPRES, the series will promote a better understanding of the outstanding science and the nature of geoscience research in the early 21st century. Two clear audiences are recognized. (1) our colleagues in related geosciences who might not fully appreciate how high-pressure research is contributing to the understanding of Earth processes and who are not aware of the growing need for large scale research facilities, (2) undergraduates who could be recruited into the COMPRES research community.

Charge to speakers: (1) First and foremost, talk about exciting science using language understandable by a broad audience. (2) Include information about COMPRES facilities and how shared resources like synchrotron beam-lines are expanding opportunities for geoscientists. (3) Be forward-looking and examine the upcoming challenges and opportunities.

The COMPRES Distinguished Lecturers for 2008-2009 are



Wendy Mao of Stanford University who will present talks on: "Viewing the Earth's interior through a diamond window" and "Studying planetary volatiles at extreme conditions"



David Walker of Columbia University who will present talks on: "Could the Earth's core leak?" and "There's a warp in the force: bent chemical potentials"

As of this date, the following lecture visits have been scheduled for Spring 2009:

Wendy Mao

University of Illinois at Chicago
University of California Davis

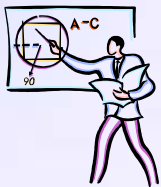
David Walker

University of Nevada at Las Vegas
University of Tennessee at Knoxville
University of Illinois at Urbana-Champaign
Case Western Reserve University

We thank each of these lecturers for agreeing to serve the COMPRES community in this way and Michael Brown for initiating this new program.

This new COMPRES program is modeled on the very successful MSA Lecture Series.

Two of the MSA Lecturers for next year are Donald Dingwell of the University Munich in Germany and Jennifer Jackson of the California Institute of Technology. Both of whom are card-carrying mineral physicists. ■ ■ ■



Rubie awarded Schlumberger Medal and Abraham Gottlob Werner Medal



Prof. David Rubie of the Bayerisches Geoinstitut, Bayreuth, Germany has been awarded the Schlumberger Medal (the highest award of the Mineralogical Society of Great Britain and Ireland) in August 2008 and the Abraham Gottlob Werner Medal (the highest award of the German Mineralogical Society)

in September 2008. He received these awards for his fundamental research into the physical and chemical state and dynamic processes within the Earth's interior. Through innovative high-pressure experiments Dave

was able to test and quantify hypothesis concerning the kinetics of mineral reactions and the relationship between rheology and phase transformations in the deep Earth.

His results helped to shape modern views on key subjects, such as the mechanisms of high-pressure mineral preservation in metamorphic rocks and the driving forces of plate tectonics. Through his investigations of mineral transformation mechanisms, particularly those involving the high-pressure polymorphs of olivine, he connected processes at the atomic level with consequences at a global scale. His research into element fractionation and viscosity in silicate melts under extreme conditions allowed the development of quantitative models describing the differentiation of the proto-Earth through the development of deep global magma oceans. His numerous publications in high-quality journals are a testament to his seminal work in the fields of mineralogy, geochemistry and geophysics.

AWARDS

Jingzhu Hu is awarded NSLS UEC Community Service Award of 2008



The NSLS User Executive Committee (UEC) gave out two Community Service Awards this year: one to Stony Brook University's Jingzhu Hu, COMPRES supported Beamline Scientist at DAC facility at NSLS. Hu has been a beamline scientist for 18 years, first employed by the Carnegie Institution of Washington, then by the University of Chicago, and most recently, by Stony Brook University. During

that time, she has developed and managed beamline X17C, a dedicated high-pressure x-ray diffraction beamline for earth science and materials science research. As a beamline scientist, Hu helps NSLS users set up and run their experiments using a diamond anvil cell, a device consisting of two opposing cone-shaped diamonds that exert extreme pressure on a material when squeezed together, in some cases, mimicking conditions found in the Earth's core.

Hu received her Ph.D. in high-pressure physics from the Institute of Physics at the Chinese Academy of Science (CAS). She then completed a post-doctoral position at Colorado State University and returned to CAS as an associate researcher and professor before joining the NSLS in 1990. After 18 years of excellent service, Hu retired from her beamline scientist position in September 2008.

AWARDS

Advances in High-Pressure Science Using Synchrotron X-rays



Photo courtesy of Tony Yu

A workshop on “Advances in High-Pressure Science Using Synchrotron X-rays” was held at the National Synchrotron Light Source, Brookhaven National Laboratory, on October 4, 2008. The workshop was attended by more than 50 scientists, post-doctoral fellows, and students from the high pressure and synchrotron x-ray research fields.

The workshop was divided into 4 sessions and there were 18 oral presentations. Dave Mao (Carnegie Institution of Washington), a pioneer in diamond anvil cell synchrotron x-ray diffraction studies, offered an overview lecture titled “The legacy of X17” to open the workshop. Qun Shen (Brookhaven National Laboratory) discussed the many opportunities for ground-breaking high-pressure science that will be afforded by the development of NSLS-II. Li Hua Yu (Brookhaven National Laboratory) gave an overview of current research towards free-electron lasers. Gene Ice (Oak Ridge National Laboratory) discussed how improved source brilliance, optics and detectors will enable important new capabilities for high-pressure x-ray and neutron studies.

Kenneth Evans-Luterodt (Brookhaven National Laboratory) described the status and planned future developments of x-ray kinoform optics for high-pressure science. Alexander Goncharov (Carnegie Institution of Washington) discussed recent developments in the laser-heated diamond anvil cell with

a focus on pulsed heating techniques. Other talks covered such topics as anomalous scattering at high pressures (Wenge Yang, Carnegie Institution of Washington), combining high pressures with heavy-ion radiation (Maik Lang, Michigan), and x-ray tomography of amorphous materials under diamond anvil cell compression (Luhong Wang, Harbin Institute of Technology).

A number of talks focused on applications to geological sciences. Jie Li (Illinois) described her work on density and sound velocities of Fe alloys with applications to the Earth’s core. Andy Campbell (Maryland) presented results on the high-pressure behavior of metal/oxygen buffer systems. There were also presentations on thermal equations of state of perovskites (Yingwei Fei, Carnegie Institution of Washington) and viscoelasticity of mantle minerals at high pressures and temperatures (Li Li, Stony Brook). Many other interesting and exciting talks were offered by distinguished experts in this field followed by fruitful discussions.

This workshop was organized in honor of Jingzhu Hu and Quanzhong Guo in celebration of their retirement after up to 18 years of dedicated service to the high-pressure community as beamline scientists at X17. Chi-chang Kao (Chairman of NSLS), Robert Liebermann (President of COMPRES), and Don Weidner (Director of the
(continued on page 10)

WORKSHOP

Advance in HP Sci.

(cont'd)

Mineral Physics Institute, Stony Brook University) all made presentations to express the gratitude of the community to Drs. Hu and Guo. At the end of his talk, Gene Ice (ORNL) brought out a guitar and sang a humorous song he composed for the occasion to celebrate the often unsung role of the beamline scientist. The concluding verse went as follows:

*Its publish or perish in the synchrotron game
With such good equipment excuses are lame
The beamline scientists get everything done
And the very best ones- make research fun.*

The workshop was organized by Thomas Duffy (Princeton), Haozhe Liu (Harbin Institute of Technology), Lars Ehm (BNL), Dave Mao (Carnegie Institution of Washington), Zhenxian Liu (Carnegie Institution of Washington), and Jihua Chen (Florida International University). Financial support was provided by the Consortium for Materials Property Research in Earth Sciences (COMPRES), the Carnegie-DOE Alliance Center (CDAC), and the Harbin Institute of Technology. The workshop benefited from professional logistical support from the NSLS Users Office including Gretchen Cisco, Liz Flynn, and Kathy Nasta. ■ ■ ■

WORKSHOP

Jacobsen awarded a Packard Fellowship for Science and Engineering



COMPRES member and Northwestern University assistant professor Steven Jacobsen has been awarded a Packard Fellowship for Science and Engineering. Jacobsen is among 20 scientists selected nationally this year to receive the award. Funding will support development of Jacobsen's nano-pulsed GHz-ultrasonic interferometer to study the physical properties of superhard materials targeted for future technological applications. Earlier this year, Jacobsen was awarded a Faculty Early Career Development Award (CAREER) from the National Science Foundation to study the effects of hydration on the physical properties of mantle materials from atomic to geophysical scales.

“Steve Jacobsen is one of the very best young generation of mineral physics faculty in the U. S. today. He is one of the most talented practitioners of the

GHz-ultrasonics technology, starting as a graduate student of Hartmut Spetzler and Joseph Smyth at Colorado and pursued this research vigorously and innovatively while a postdoc at the Bayreuth Geoinstitut and the Geophysical Laboratory.

In collaboration with other investigators [both in the U. S. and in Germany], Steve has made valuable contributions to the experimental elasticity database as well as the topics of water in the mantle and spin transitions in iron-bearing minerals. Particularly notable in these results of previous work is the successful generation of pure-mode shear waves, which in combination with the compressional wave data, allow the complete elasticity of minerals to be characterized in one experiment, now done in the diamond anvil cell to pressures of 10 GPa.

Jacobsen's move to Northwestern opens up a new dimension to his career. In his diamond-anvil cell laboratory at Northwestern, he has upgraded the original GHz-ultrasonic system developed in Spetzler's lab with NSF support [via Carnegie] and a 2007 award from the NSF Instrumentation and Facilities program. He is currently funded by the NSF for studies of the elasticity of mantle minerals and also a Faculty Early CAREER Award. His proposal to the Packard Foundation is focused on the application of the techniques of Gigahertz-ultrasonic interferometry to study the elastic behavior of ultra-hard materials. This proposed research will be of fundamental importance in characterizing the properties of several new forms of synthetic diamond, including single crystals grown by the chemical deposition process and polycrystals hot-pressed from nano-size powders.” — Bob Liebermann

AWARD

A Joint Meeting Exploring Opportunities for Scattering using Neutrons and HE X-rays

SNAP/COMPRES, April 14-15, 2008



The Spallation Neutrons and Pressure (SNAP) instrument at the Spallation Neutron Source (SNS) has taken its first neutrons and the first single crystal data set has been collected. The beamline is now being commissioned and is accepting user proposals. Beamline responsible Christopher Tulk and colleagues are now independently performing high pressure cell loading with all cells delivered and operating to specifications.

The commissioning of SNAP is a major milestone and the culmination of a great deal of effort on the part of the Instrument Design Team (IDT), many of whom are part of the COMPRES community. For the past 5 years this group has met to discuss the instrument design (2004, 2005) beamline modification (2007) and science opportunities (2007, 2008). An early decision was taken to give the SNAP instrument a “synchrotron” feel with movable detectors and an innovative focusing optic, designed by Gene Ice. The IDT was crucial in the implementation of several innovative design features.

This year’s meeting was the last and brought together synchrotron and neutron scatters from several disciplines interested in incorporating HP neutron scattering into their programs. The science highlighted joint x-ray and neutron studies as well as an array of novel applications at COMPRES-supported synchrotron beamlines. The meeting extended over two days and included facility overviews, science highlights and short presentations from speakers in lieu of posters. These talks present latest results and have provided much excitement as young and not so young researchers discuss their very latest results and interpretations.

COMPRES president Robert Liebermann then gave an excellent overview of the organization’s mission, goals and reach. Members of the COMPRES community has been involved from the inception of the SNAP project and now will provide an on-going pool of expertise and projects for high pressure neutron science in the US.

The meeting was organized by John Parise and attracted nearly 60 attendees from the world.



WORKSHOP

Future Directions in High Pressure Research Workshop at NSLS

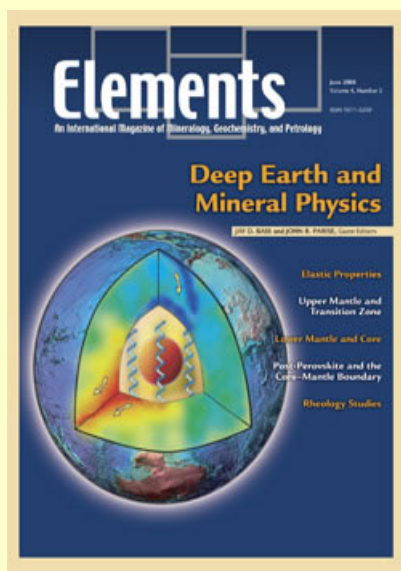


WORKSHOP

The workshop “**Future Directions in High Pressure Research**” was held on May 21, as part of the joint user meeting of the National Synchrotron Light Source and the Center for Functional Nanomaterials at Brookhaven National Laboratory. Over fifty scientists from different scientific disciplines gave fifteen presentations during the workshop. We were very happy to count over twenty postdoctoral scholars and students among the participants. The scientific program included presentation and discussions on mineral physics, material science, solid state physics, and high pressure techniques. Furthermore, the needed capabilities for high-pressure

research at the NSLS and NSLS-II were discussed extensively.

The workshop was organized by and Lars Ehm (Stony Brook University /Brookhaven National Laboratory), Jihua Chen (Florida International University), Baosheng Li (Stony Brook University) and Zhenxian Liu (Carnegie Institution of Washington). We would like to thank all participants for the productive workshop, COMPRES and the User Executive Committee of the NSLS for their sponsorship, and Emily Vance (COMPRES) and the Team from the User Office at NSLS for their administrative assistance. ■ ■ ■



Deep Earth and Minerals Physics

June 2008 Issue of Elements Edited by Jay Bass and John Parise highlights recent progress in deep Earth and minerals physics research:

Deep Earth and Recent Developments in Mineral Physics (Jay D. Bass and John B. Parise)

Elastic Properties of Minerals: A Key for Understanding the Composition and Temperature of Earth's Interior (Jay D. Bass, Stanislav V. Sinogeikin, and Baosheng Li)

The Upper Mantle and Transition Zone (Daniel J. Frost)

The Earth's Lower Mantle and Core (Guillaume Fiquet, François Guyot, and James Badro)

Discovery of Post-Perovskite and New Views on the Core-Mantle Boundary Region (Kei Hirose and Thorne Lay)

Laboratory Studies of the Rheological Properties of Minerals under Deep-Mantle Conditions (Shun-ichiro Karato and Donald J. Weidner)

PUBLICATIONS



Recent PhDs

Hongbo Long, Ph.D. 2008

Department of Geosciences, Stony Brook University

Dissertation: *Investigation on Deformation of Olivine at High Pressure and Low Temperature*

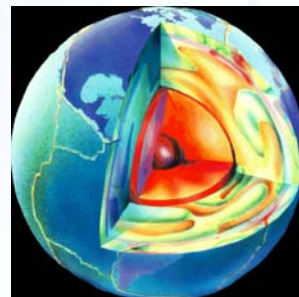


Olivine is the dominant mineral in the upper mantle. Several deformation experiments of polycrystalline powdered San Carlos olivine at subduction zone conditions (pressures of 3-5 GPa and temperatures of 25-1100°C) have been performed on a deformation DIA (D-DIA) apparatus, SAM85, at X17B2, National Synchrotron Light Source (NSLS). Enstatite (MgSiO_3) (3-5% total quality of sample) is used as buffer to control the activity of silica. Ni foil is used in some experiments to buffer the oxygen fugacity. Water content is confirmed by IR spectra of the recovered samples. The Total (plastic and elastic) strains (macroscopic) are derived from the direct measurements of the images taken by X-ray radiograph technique. Differential stresses are measured at constant strain rate ($\sim 10^{-5}$ - 10^{-7} s $^{-1}$) and at different pressures and temperatures with synchrotron x-ray. It can be concluded that in the regime of 25-400°C, there is a small increase stress at steady state along with the temperature drop; in the regime of 400°C to transition temperature, the differential stress at steady state is a constant (~ 3 GPa) and is relatively insensitive to the changes of temperature and strain rate; however, it drastically decreases to about 1 GPa and becomes temperature-dependent above the transition temperature and thereafter. The transition temperature

is between 700°C and 900°C. No significant difference of differential stress and strain is observed between the samples with/without Ni foil buffered below 700°C. Two regimes with different deformation mechanisms for olivine have been determined in this study: regime of low temperature plasticity at low temperature (below transition temperature) and regime of power law creep at high (above the transition temperature). The annealing process can obviously shift up the transition temperature between regimes of temperature insensitive and sensitive. Grain size affects the rheological properties of olivine in the low temperature dislocation regime. Existence of water obviously decreases the transition temperature of the boundary between the regimes of low temperature plasticity and power-law creep. (100)[001] and {hk0}[001] ($h > k$) are the predominant active slip systems in the deformation at low temperature. The instability of olivine could be the mechanism for the deep-focus earthquake happened in the subduction zone slab.

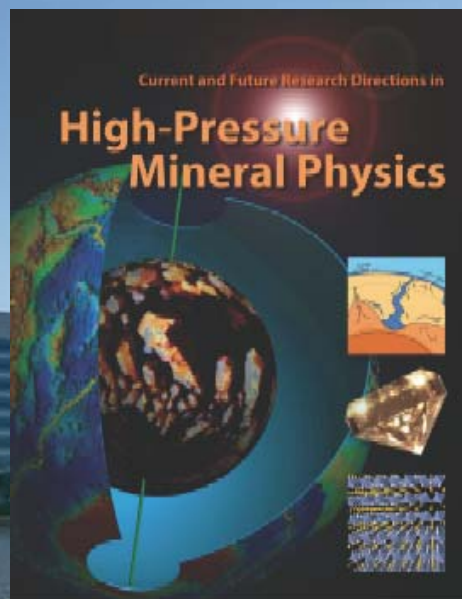
Personal Statement:

I would like to thank my advisor, Professor Donald J. Weidner at Stony Brook University, for his guidance throughout this project and his help in the preparation of this dissertation. I would also like to thank Professor Jihua Chen for his kindly showing me hand by hand how to set up the high pressure experiment in detail when I was a new one in this field, as well as my colleagues at Stony Brook and at X17B, National Synchrotron Light Source for their help during my many overnight runs. I am still an "official" student at Stony Brook until this December. I am now looking for a postdoctoral position in the high pressure research field related to synchrotron methods.



Mineral Physics Long Range Science Planning Workshop

As COMPRES moves forward under its new Cooperative Agreement [2002-2012], it is timely to have another workshop to look ahead for the next 5 to 10 years in mineral physics. We anticipate that there will also be a successor to the Bass Report which



The Bass Report from the workshop: *A Vision for High Pressure Earth and Planetary Sciences Research: The Planets From Surface to Center* held on March 22-23, 2003 in Miami, Florida

could provide useful input to the new Basic Research Opportunities in Earth Sciences report [BROES II] which is now under consideration for funding in EAR. On behalf of the mineral physics community, COMPRES has tentatively scheduled this new workshop for March 2-5, 2009 in Tempe, Arizona. Please pencil in these dates on your calendar for 2009 if you are interested in attending. Tri-chairs of this Workshop will be Jim Tyburczy [Lead Chair], Mike Brown and James van Orman.

A report resulting from this Workshop to be prepared and published in collaboration with

GeoProse, in much the same manner that the Bass Report [2004] resulted from the 2003 Miami Workshop. Quentin Williams will serve as Editor-in-Chief of this new report and will be assembling a writing team to prepare the report.

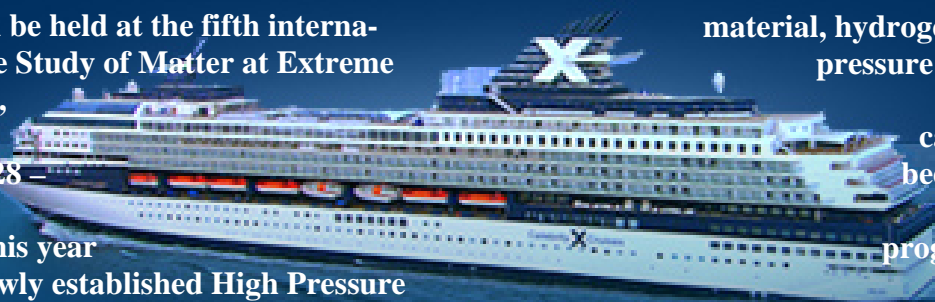
Supplemental funding for both the Workshop and the Report has been requested from the NSF via the Instrumentation and Facilities Program in EAR.

IMPORTANT EVENT



High Pressure Mineral Physics Symposium

The symposium will be held at the fifth international meeting of the Study of Matter at Extreme Conditions (SMEC), Miami - Western Caribbean. March 28 - April 2, 2009. The SMEC meeting of this year is sponsored by the newly established High Pressure Science Society of America (HiPSSA). Twenty one symposia, spanning wide range of high pressure research including phase equilibrium, elasticity, superconductivity, nanomaterials, superhard



material, hydrogen storage, high pressure technology and theoretical calculation, have been proposed for the scientific program. The five-day meeting

will be held on Celebrity Century cruise ship sailing from the port of Miami to Caribbean Islands. Deadline for cruise cabin reservation is Nov. 18, 2008. (<http://hipssa.org/smec2009/>)

Search for New President of COMPRES



COMPRES Announcement of Search for the post of President of COMPRES, to succeed Bob Liebermann.

All formal applications should be sent to: Ms. Samantha Lin
ESS Building Room 167
Stony Brook University
Stony Brook, NY 11794-2100

Ms. Lin will forward all applications directly to Professor David Walker of Columbia University, who is chairing the Search Committee.

If you wish further information about this position, please contact Professor Walker at dwalker@ldeo.columbia.edu or (845)-365-8658.

Principal Investigator/President of COMPRES

COMPRES, the Consortium for Materials Properties Research in the Earth Sciences, seeks a Principal Investigator who will function as the President/Chief Executive Officer. COMPRES is funded by the NSF Division of Earth Sciences, and has more than 50 U.S. member institutions and more than 35 foreign affiliates. COMPRES' mission, on behalf of its community of member institutions, is to facilitate the operation of beamlines and use of high-pressure Earth sciences facilities at national laboratories, to develop new technologies for high-pressure research, and to advocate for science and educational programs (www.compres.us). The Principal Investigator works with the elected committees, the community, and administrative support to advance the goals of COMPRES. The incumbent will be expected to maintain and enhance the funding base, scope, and outreach of COMPRES. Duties include interacting with funding agencies and the community; overseeing COMPRES operations at national facilities; COMPRES infrastructure development projects, and the COMPRES budget; and organizing and leading COMPRES meet-

Required: Ph.D. in a related field; extensive current knowledge of the field of investigation and thorough familiarity with the research or scientific work being done in the area of activity; demonstrated scientific leadership skills and scientific administrative abilities; and excellent interpersonal skills. The position is anticipated to be full-time. Salary and starting date are negotiable, with the start date being not later than February 2010. Evaluation of applications will commence immediately.

To apply online or view a full job description visit

<http://www.stonybrook.edu/jobs/>
(Ref #WC-R-5284-08-09-S) or submit cover letter and résumé to:

Samantha Lin
Search Coordinator
ESS Building, Room 167,
Stony Brook University,
Stony Brook, NY 11794-2100

Equal Opportunity/Affirmative Action Employer. Women, people of color, individuals with disabilities, and veterans are encouraged to apply.

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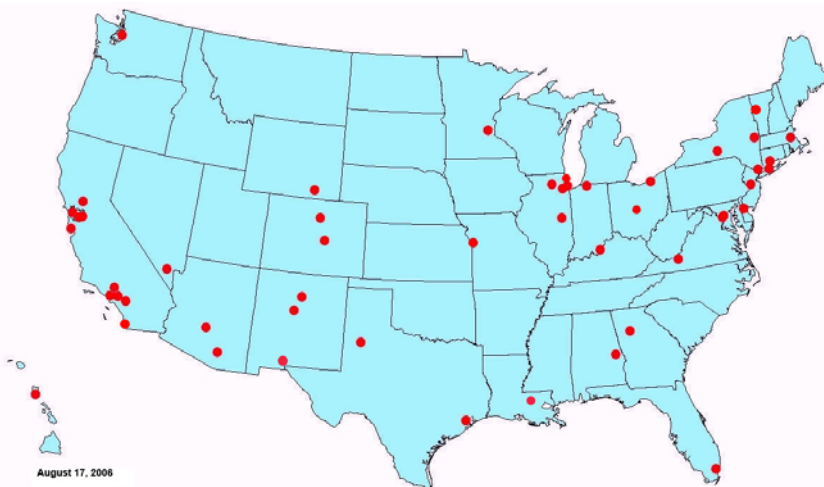
Caleb Holyoke, Elector; Andreas Kronenberg, Alternate Elector

Harvard University:

Sarah Stewart-Mukhopadhyay, Elector; Richard O'Connell, Alternate Elector

University of Texas at Austin:

Jung-fu Lin, Elector; Stephen Grand, Alternate Elector



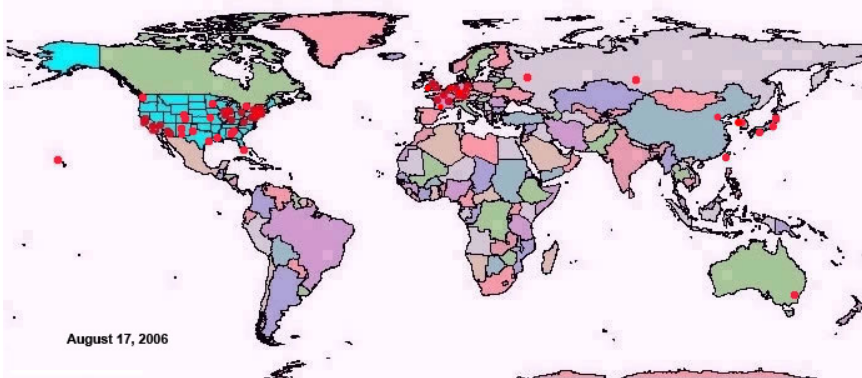
Foreign affiliates

China University of Geosciences in Wuhan:

Zhenmin Jin, Representative

Macquarie University in Australia:

Tracy Rushmer, Representative



These additions brought the active membership to 53 U. S. institutions and 33 foreign members.

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