



## Long Range Plan for High Pressure Earth Sciences Workshop

— Tempe, Arizona March 2 - 4, 2009

Eighty seven scientists from thirty nine institutions gathered at the Fiesta Resort in Tempe to discuss recent scientific successes of the high pressure mineral physics community and articulate directions of our research over the next decade. This two-day workshop featured nine plenary talks and breakout discussion sessions on

four themes: 1) The Deeper Reaches of the Planet: Properties of Iron and its Alloys and the Novel Materials of the Deepest Mantle; 2) The Dynamic Ceramic Mantle; 3) Mineral Physics and Society; 4) Enabling Cutting-Edge Science: Tools and the Accomplishments they will drive in the Next Decade

COMPRES WORKSHOP



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of Discovery. Participants of the workshop reviewed retrospective about how our field has impacted other subdisciplines of the earth sciences, including seismology, geodynamics and petrology. They also discussed perspective of high pressure Earth science: what are the next major breakthroughs of our community, and what infrastructure will be necessary to achieve them? While recognizing that incremental progress will occur, what new and different developments could occur? And, what long-standing problems might we solve? This is the second COMPRES workshop focusing on long range plan for high pressure Earth sciences. The first one "A Vision for High Pressure Earth and Planetary Sciences (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. NSLS Workshop: Advances in High-Pressure Science using Synchrotron X-rays

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 held in honor of Drs. Jingzhu Hu and Quanzhong Guo and was organized by 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.

## 2. Special Issue of PEPI on "Frontiers and Grand Challenges in Mineral Physics of the Deep Mantle"

Jung-Fu Lin, Shun Karato, Jay Bass, Eiji Ohtani and Charles Prewitt served as editors of this special issue which contains sets of articles on

### a. Transport and Rheological Properties

### b. Elasticity

### c. Phase Transition and Electronic State

with each set introduced by an article by one of the editors. See Vol. 170, Issues 3-4, Nov 2008.

## 3. MgO Pressure Scale from VLab

The team of Renata Wentzcovitch in the VLab at the University of Minnesota has developed a MgO pressure scale, which is a hybrid scale that combines first-principles calculations and experimental data. It is reported in a recent JGR paper by Wu, Wentzcovitch, Umemoto, Li, Hirose, and Zheng [Vol. 113, B02204, doi:10.1029/2007jb005275, 2008].

Wentzcovitch and her colleagues have made this scale available to users via a website at: [http://dasilveira.cems.umn.edu:8080/gridsphere/jsp/pressure\\_scale/index.jsp](http://dasilveira.cems.umn.edu:8080/gridsphere/jsp/pressure_scale/index.jsp)

## 4. Fall 2009 AGU Meeting in San Francisco, California

Mineral physics and COMPRES featured prominently in the sessions and social activities.

### a. Scientific program

The Deep Interior and Mineral Physics sessions were very well-attended. Our compliments and thanks to Heather Watson, Program Committee representative from Mineral and Rock Physics.

### b. Honors

Our congratulations to James Badro who was awarded the James B. Macelwane Medal.

### c. Mineral and Rock Physics Reception

Organized by Carl Agee, Chair of the Focus Group on Mineral and Rock Physics, this reception was once again the best attended and attracted many people

*(continued on page 3)*



## Long Range Plan Workshop *(cont'd from page 1)*

Research: The Planets from Surface to Center" was held on March 22-23, 2003 in Miami, Florida. This year's workshop was organized by tri-chairs: Jim Tyburczy, Mike Brown and James van Orman. The product that arises from this meeting will be a new scientific plan for high-pressure mineral physics: a document that will not only serve as a blueprint for our community as it moves forward, but will also serve as the input of our community to a new NAS report, commissioned by NSF, on Basic Research Opportunities in the Earth Sciences (BROES). Quentin Williams will serve as Editor-in-Chief of this successor to the 2004 Bass Report. ■ ■ ■

*Photo on the left: Plenary Session of the workshop*

## President's message

(cont'd)

from throughout the sections of Tectonophysics, Seismology, Geodesy, and Volcanology-Petrology-Geochemistry.

At the reception, the 2008 Outstanding Student Award was presented to Innokenty Kantor from the Bayerisches Geoinstitut. We all congratulate Innokenty on this well-deserved honor. See separate article in this issue for more details.

d. Breakfast Meetings of COMPRES committees  
The two Standing Committees [Facilities and Infrastructure Development] met on Dec 16 and 17 to review the progress reports for Year #2 and program plans and budget requests for Year #3.

On Dec 18, the Chairs of the Standing Committees reported their recommendations to the Executive Committee.

### 5. Lab visits in Southern California by COMPRES President

In mid-February, I spent a week in southern California visiting mineral physics laboratories and meeting students and postdocs. These included:

UCLA - hosted by Abby Kavner

UC Riverside - hosted by Harry Green

Caltech-hosted by Jennifer Jackson and Paul Asimow



These visits bring to 30 the COMPRES institutions I have visited during the past 5 ½ years, of the 53 current US members. I hope to add to that total in the remaining months of my term as president.

I have also visited 9 of the 33 foreign affiliates, with 2 more on the agenda in the next 6 months.

### 6. Visit of Bob Liebermann to Japan in March 2009.

In March, I spent five days at Hiroshima University as a guest of Jun-ichi Ando. During a 2 ½ day period, I gave five tutorial lectures to graduate students from

throughout Japan, as well as a colloquium to the Department of Earth Sciences.

After the visit to Hiroshima, I spent two days at Ehime University in Matsuyama as a guest of Tetsuo Irifune. While there, I observed the first experiments in BOTCHAN, their 6,000 ton press which will be used to synthesize large specimens of nanopolycrystalline diamonds. I also attended at day-long series of presentations of research activity by the graduate students and postdocs of the Geodynamics Research Center.



In an evening event, I offered the congratulations of the COMPRES community to Professor Irifune and his colleagues on the award of a 5-year Global-Center of Excellence grant.

### 7. SMEC 2009: Study of Materials at Extreme Conditions Conference: March 28 to April 2, 2009.

I attended this conference in Miami and the Caribbean along with 150 other persons. The conference was organized by Surendra Saxena and his colleagues at the Florida International University. Details of the scientific program may be found at:

<http://hipssa.org/smec2009/index.php?ac=abslist>

At the invitation of Jihua Chen of FIU, I gave an invited talk on "Indoor vs. Outdoor Geophysics."

### 8. Visits to Washington DC area by Quentin Williams and Bob Liebermann

On April 27 and 28, we spent two days in the DC area visiting various federal agencies and research institutions:

a. Division of Earth Sciences of the NSF in Arlington, VA.

Met with Robert Detrick, the new DD for EAR, and David Lambert, Program Director for Instrumentation and Facilities in EAR to discuss the report emanating from the Long-Range Planning Workshop in Tempe, Arizona in early March. We also met with Robin Reichlin, Russell Kelz, and Lina Patino of EAR and Barbara Ransom of OCE.

The Tempe report and other COMPRES items will serve as valuable input for several planned

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## President's message

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activities/programs, including a strategic plan for EAR, a new BROES [Basic Research Opportunities in Earth Sciences] report by the National Research Council of the NAS, and a new Directorate-wide initiative on "The Dynamic Earth."

As a consequence of the America Recovery and Reinvestment Act [ARRA], we also learned that there will be two RFPs for Major Research Infrastructure [MRI] proposals, in 2009, most likely in May and in November with \$200M in funding available in each competition. By Congressional mandate, a 30% match is required by the proposing institutions.

b. IRIS Headquarters in central Washington.

We met with David Simpson, President of IRIS to discuss mutually interesting topics of science and funding of science.

c. Basic Energy Sciences Headquarters of the DOE in Germantown, MD.

We met with Nicholas Woodward (Program Director for Geosciences Research), Helen Kerch (Team Lead for Scattering and Instrumentation Sciences), and Pedro Montano (Director of Scientific User Facilities Division). We took the opportunity to thank the DOE for providing the excellent synchrotron and neutron facilities, but also to showcase the science achievements of the COMPRES users, from both the Earth sciences and materials science.

Kerch and Montano encouraged COMPRES to explore possible funding from the DOE program on Small Business Innovative Research [SBIR]; they also encouraged COMPRES to cultivate more users at SNAP and other neutron sources.

d. Geophysical Laboratory of the Carnegie Institution of Washington in northwest DC.

We met with Bob Hazen and colleagues (Yingwei Fei and Ron Cohen) to learn about their plans for a "Deep Carbon Observatory." Hazen and Russell Hemley are the PIs on a proposal to the Sloan Foundation to develop the concept and plans for a 10-year initiative in this field.

Watch for Hazen's keynote talk at the Bretton Woods for more details.

9. *Energy Frontier Research Center [EFRC]* awarded to team led by the Geophysical Laboratory

On April 27, the DOE announced the awards to 46 EFRCs in the U. S. One of these to "Accelerate the Discovery of Energy-relevant Materials that can Tolerate Transient Extremes in Pressure and Temperature" is directed by Ho-Kwang (Dave) Mao from the Carnegie Institution of Washington. We congratulate Dave and his team for this new 5-year award.

10. *New mineral physics faculty in in U. S. and overseas institutions.*

Barbara Lavina, University of Nevada at Las Vegas. Ikuo Katayama, Hiroshima University, Japan.

*Ehime University in Matsuyama, Japan*

Tetsuo Irifune reports that many new faculty have been appointed to positions in the Geodynamics Research Center at Ehime University as part of the new Global Center of Excellence program. These include:

Kiyoshi Fujino

Hisako Hirai

Yasuhiro Kuwayama

Norimasa Nishiyama

Jun Tsuchiya

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## Snapshots at the Long Range Plan for High Pressure Earth Science Workshop

Tempe, Arizona March 2 - 4, 2009



## President's message *(cont'd)*

### 11. Special Recognition for members of COMPRES community

We are pleased to share the good news of the following awards to members of the mineral physics community:

Patrick Cordier from Université de Lille

Elected Fellow of the Mineralogical Society of America

Jie Li from the University of Illinois at Urbana-Champaign

Selected as Fellow of the UIUC Center of Advanced Study.

Alexandra Navrotsky from the University of California Davis

Selected to receive the 2009 Roebling Medal of the Mineralogical Society of America (to be awarded at GSA meeting in Portland, Oregon in October 2009).

Ronald Cohen from the Carnegie Institution of Washington

Selected to receive the 2009 Dana Medal of the Mineralogical Society of America.

Russell Hemley from the Carnegie Institution of Washington

Selected to receive the 2009 Bridgman Award of AIRAPT

Robert Hazen from the Carnegie Institution of Washington

Selected to receive the Distinguished Public Service Award of the Mineralogical Society of America.

David Kohlstedt from the University of Minnesota

Selected to receive the 2009 Murchison Medal of the Geological Society of London.

### *New Members of the 2009 Class of AGU Fellows*

Jay Bass, University of Illinois at Urbana-Champaign

Donald Dingwell, University of Munich, Germany

Kei Hirose, Tokyo Institute of Technology

Frederick Ryerson, Lawrence Livermore National Laboratory

The new Fellows will be honored at the Joint Assembly in Toronto, Canada in May 2009.

These awards, in addition to recognizing the significant achievements and contributions of our colleagues, bring honor and visibility to the field of mineral and rock physics throughout the world.

We congratulate all of them on behalf of the entire COMPRES community. ■■■

## MRP 2008 Graduate Research Award



The Mineral and Rock Physics focus group has selected Innokenty Kantor as the recipient of the 2008 Graduate Research Award. Innokenty Kantor pursued his Ph.D. in high-pressure mineral physics at the Bayerisches Geoinstitut, University of Bayreuth under the supervision of Leonid Dubrovinsky and Catherine McCammon, and

successfully defended his thesis entitled "High-Pressure and High-Temperature Structural and Electronic Properties of (Mg,Fe)O and FeO" in July 2007. Innokenty came to Germany with a strong theoretical background after gaining a Masters Diploma with

honours at Moscow State University. At the University of Bayreuth he developed experimental experience by mastering the challenging techniques of diamond anvil cell experimentation, Mössbauer spectroscopy, X-ray and neutron diffraction and X-ray absorption spectroscopy. Highlights of Innokenty's thesis research include the discovery that the rhombohedral distortion in FeO and (Mg,Fe)O does not coincide with the magnetic ordering transition (contrary to what had been assumed for many years previously), a full description of spin crossover in (Mg,Fe)O above 50 GPa including the effect of short-range order, and a new high-pressure monoclinic modification of FeO which may change the interpretation of the B1→B8 transition at high pressure and temperature. All of these results have had a significant impact on the research field and influenced models for behaviour of FeO and (Mg,Fe)O at high pressure. Innokenty's achievements have been recognised by a number of other awards; most recently the EON Bayern Kulturpreis awarded for one of the best doctoral theses in Bavaria across all research fields.

— Catherine McCammon

# COMPRES Distinguished Lecture Series for 2009-2010

We are pleased to announce that the COMPRES Distinguished Lecturers for 2009-2010 are Jackie Li from University of Illinois at Urbana-Champaign and Harry Green from University of California Riverside. The primary target audience for these lectures are undergraduates in departments of geology at colleges of arts & sciences, but applications from all academic institutions in the U. S are welcome. The Lecture Program is designed to run from September 2009 through May 2010. Lecturer requests received by May 22, 2009 will be given priority. Later applications will be considered on a space-available basis. Please bring this opportunity to the attention of the colloquium organizers at your home institutions and encourage colleagues at other institutions to apply to host one of these lecture visits. We invite you to request a visit of a COMPRES lecturer to your institution during the next academic year by following the instructions at [www.compres.us](http://www.compres.us).

## Jackie Li

University of Illinois at Urbana-Champaign



Jackie Li: Received her B.S. in geochemistry at the University of Science and Technology of China in 1992, M.A. in geophysics at Harvard in 1997, and Ph.D. in Earth and Planetary Sciences at Harvard in 1998. She was a Gilbert Postdoctoral Fellow at the Carnegie Institution of Washington between 1998 and 2000 and continued as a researcher for three more years. She joined the Department of Geology at the University of Illinois at Urbana Champaign as an assistant professor in 2003 and became an associate professor in 2009. Her research interests focus on understanding the nature and evolution of Earth and planetary interiors through experimental investigations of material properties under high pressure and high temperature.

Jackie will offer lectures on “Viewing deep inside the Earth with synchrotron X-rays” and “Using a “pressure cooker” to simulate planetary evolution”

Abstracts for talks by Jackie Li

*Title 1: Viewing deep inside Earth with synchrotron X-rays*

Surface phenomena such as earthquakes, volcanoes and auroras provide fascinating but only basic glimpses of the turbulent processes occurring deep inside planet Earth. Developing a complete understanding of our planet’s inner workings requires specialized and accurate knowledge of material properties under extreme conditions. In the past two decades, synchrotron X-rays and high-pressure instrumentations have opened a new window to the inner Earth.

This talk will showcase how synchrotron X-rays, diamond-anvil cells, and multi-anvil apparatus have helped us 1) decipher the mystery of light elements in the Earth’s core through measuring the density and seismic velocities of iron-rich alloys under high pressures and high temperatures; 2) investigate the composition and properties of the Earth’s lower mantle through probing the electronic spin state of iron in perovskite and post-perovskite.

*Title 2: Using a “pressure cooker” to simulate planetary evolution*

As a planetary body ages, its internal heat gradually escapes to the surface. In Earth-like bodies, this slow cooling may lead to solidification of iron-rich cores and provide energy sources for magnetic dynamos. In giant planet’s icy moons, this slow cooling may result in freezing of their sub-surface oceans and alter their structure and dynamics.

In this talk, I will show recent experimental results of 1) the iron-sulfur binary system melting at high pressure, which suggest Mercury’s core may actually be “snowing” and which reveal new mechanisms for the planet’s dynamo; 2) the thermal conductivity of water-ices under high pressure, with implications for the thermal evolution history of giant planets’ icy moons.

# COMPRES Distinguished Lecture Series for 2009-2010

## Harry Green

University of California Riverside



Harry Green: PhD 1968. Educated at Columbia and UCLA. Postdoc in Materials Science, Case Western Reserve University. Faculty member at the University of California for 39 years; 1970-1993 at Davis and 1993-present at Riverside. Currently Professor of Geology and Geophysics and Director of the Institute of Geophysics and Planetary Physics. Research Interests: Flow and fracture of rocks at high pressure and temperature and the effect of stress on phase transformations -- with particular application to subduction zone processes.

Harry will offer lectures on: "How do earthquakes occur deep inside the Earth?" and "Up the Down Stair Case: Deeply subducted rocks in continental collision zones"

Abstracts for talks by Harry Green

*Title 1: How do earthquakes occur deep inside the Earth?*

Earthquakes near the surface are caused by frictional sliding on pre-existing faults or, rarely, by creation of a new fault by brittle shear failure. Neither mechanism can function at depths greater

than ~30-50 km because pressure strongly inhibits frictional sliding and temperature enhances flow. Experiments show that deeper earthquakes, those in subduction zones, require a mineral reaction that generates a small amount of a new phase with very low viscosity -- a "fluid" -- which could be a real fluid (e.g. H<sub>2</sub>O or melt) or a pseudofluid consisting of a polycrystalline material of nanometric grain size. Work in my lab over the last 20 years has delineated that fluid-producing reactions like dehydration of serpentine are the likely mechanism for earthquake nucleation above ~400 km and that transformation-induced faulting of metastable olivine is the likely mechanism below 400 km. This talk will explore these mechanisms and show how they explain the bimodal distribution of earthquakes with depth, why they stop abruptly before 700 km, that metastable olivine is present in at least 4 subduction zones, and that subducting slabs must be dry below 400 km.

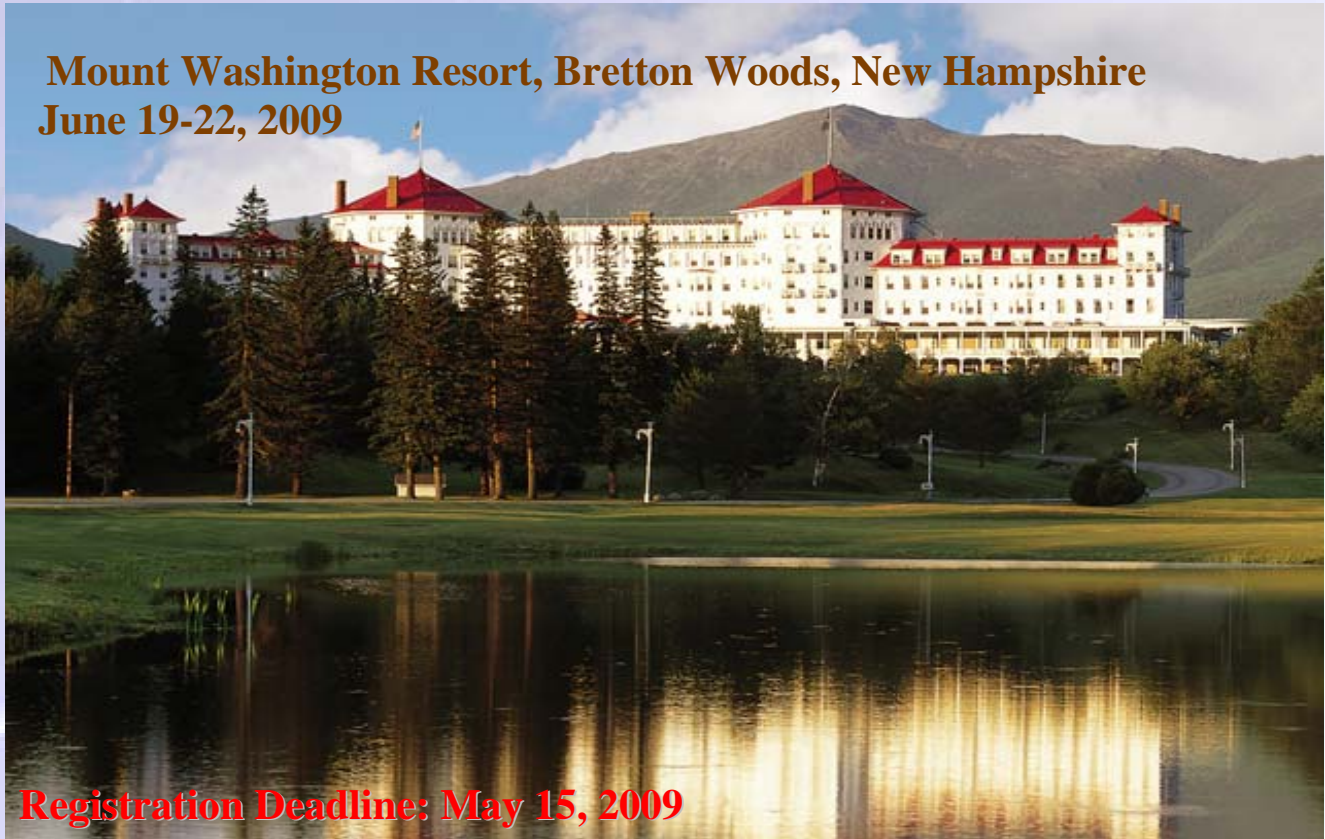
*Title 2: Up the Down Stair Case: Deeply subducted rocks in continental collision zones*

Over the last 40+ years, rocks have been discovered from progressively greater depths in continental collision zones. In particular, in the late 80's coesite was discovered in Italy and Norway and diamonds in sediments from Kazakhstan, giving rise to the field of Ultra-High Pressure Metamorphism, and implying subduction to more than 120 km and return to the surface. More recently, the use of microstructures has extended the evidence in these terranes to much greater depths, culminating in showing that surficial materials have been subducted to at least 350 km (stabilizing stishovite in metapelites, for example) and returned to the surface. Most certainly greater subduction has also occurred and most likely is responsible for the "continental" signal in ocean island basalts. Some peridotites carry "memory" of still greater depths. This talk will explore the evidence for such very deep subduction, the controversies that have swirled around each new discovery, and what these rocks have told us about the upper few hundred km of our planet. I also will touch briefly on a new discovery of very high-pressure minerals in ophiolites that may open a new window into Earth's deep interior in the upwelling limb of mantle convection.



# 2009 COMPRES Annual Meeting

**Mount Washington Resort, Bretton Woods, New Hampshire  
June 19-22, 2009**



COMPRES ANNUAL MEETING

**Registration Deadline: May 15, 2009**

## Keynote Speakers:

- Arwen Deuss - Cambridge University  
*"Seismic Observations of Mantle Discontinuities and their Mineral Physical Interpretation"*
- John Hernlund - University of British Columbia  
*"Some Implications of Recent Progress in High P-T Mineral Physics for Earth's Deep Interior"*
- Jerry Mitrovica - University of Toronto/Harvard University  
*"Mantle Viscosity and Climate (Really)"*
- Michael Wysession - Washington University  
*"Seismically Imaging the Possible Presence of Water in the Mantle"*
- Robert Hazen - Carnegie Institution of Washington  
*"Deep Carbon Observatory"*
- Jun Korenaga - Yale University  
*"The Role of Mineral Physics in the Study of Earth's Evolution"*

## Banquet Speech:

- Alex Navrotsky - University of California Davis  
*"The Earth is not a Spherical Chicken"*

## Travel Scholarships

These travel scholarships will provide full or partial travel scholarships of up to \$500 each for travel expenses incurred in attending the Annual Meeting. Reimbursement will be via travel vouchers submitted with receipts at or following the meeting.

To be eligible for a travel scholarship, the graduate student must do the following:

Apply for consideration for a travel scholarship via email to Emily Vance [emily.vance@stonybrook.edu] by May 15, 2009. This application should include the following:

- Cover page indicating the name, address, telephone number, FAX number and email address of graduate student, and the name and address of the mentor/advisor.
- Abstract including title and authors, with the applicant as the presenter.
- A paragraph by the applicant describing where they are in their graduate studies and why they want to attend the Annual Meeting.
- A letter of recommendation from their mentor/advisor. This letter should also detail the group's travel funding and explain why the travel scholarship is needed for the student.



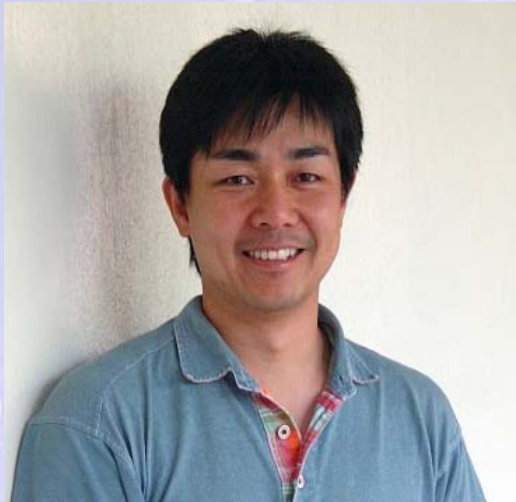


# Recent PhDs

## Tony Yu, Ph.D. 2009

Department of Geosciences, Stony Brook University

Dissertation: *Studies of high pressure and high temperature physical properties of liquid FeS and gallium using synchrotron x-ray*

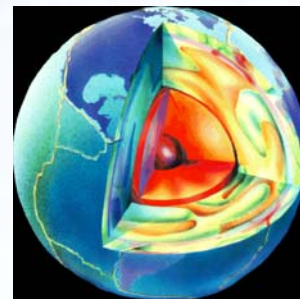


The interior of the earth has always been of great interest to geoscientists. Due to the inaccessibility of samples from deep earth, we have been relying upon other scientific methods and procedures to explore the earth's interior. Cosmochemical and geochemical studies of samples from shallow earth suggest that the core is mainly consisted of Fe, Ni, and one or more lighter elements. Previous investigations from seismic data and mineral physics data indicate that the outer core's density is about 6% to 10% less than that of pure Fe at the outer core's pressure and temperature conditions, and thus there must be a significant amount of a light element or various kinds of light elements existing in the outer core. The light element candidates in the outer core include C, H, O, S, Si, and the caused density variation might play a critical role in the liquid outer core convection. Using the x-ray absorption radiograph system, we have successfully measured the density of liquid phase FeS at 1673K and up to 5.6GPa in pressure. Our self-developed absorption image fitting program has proved to be reliable in determining the density of liquid FeS. The 15.4 GPa isothermal bulk modulus of liquid FeS at 1673K derived from the density compression curve provides information in constraining

the sulfur content in the liquid outer core, which is one of the strong light element candidates that might be responsible for the density deficit in the outer core. To further understand the liquid behavior under extreme condition, we used the pair distribution function (PDF) method to study the structure of an elemental liquid - gallium and its atomic structure change due to compression. Diffuse scattering data were collected over the whole pressure range of liquid state (0.1-2GPa) at ambient temperature. The PDF results show that the first nearest neighbor peak position did not change with pressure increasing, while the farther peaks positions in the intermediate distance range decreased with pressure increasing. This leads to a conclusion of the possible existence of "locally rigid units" in the liquid. With the addition of a series of reverse Monte Carlo modeling of the liquid structure, we have observed that the coordination number in the local rigid unit increases with pressure. The bulk modulus of liquid gallium derived from the volume compression curve at ambient temperature is 12.1(6) GPa.

### Personal Statement:

*It has been an exciting journey exploring the interior of our planet Earth while working with an incredible group of mineral physicists at Stony Brook University and the NSLS during my grad school years. I specially thank my PhD thesis advisor Professor Jihua Chen at the Florida International University for leading and guiding me through the study of liquid phase materials under high pressure by applying synchrotron x-ray. I am looking forward to pursuing my research career as an experimentalist to understand the structure of liquids/amorphous materials and their physical properties under extreme conditions.*



# Solicit Contributions to Web-based Instructional Resources Related to Mineral Physics



In a collaboration between *COMPRES* and the *On the Cutting Edge* program for professional development of geoscience faculty, we are soliciting your contributions to a new collection of web-based instructional resources related to Mineral Physics. The goal is to develop a comprehensive collection of instructional resources that can be used specifically in Mineral Physics courses, and more generally to help teach "Mineral Physics Across the Curriculum" by making these resources available in related courses such as petrology, geochemistry, and structure/tectonics. The first version of this website can be viewed at: <http://serc.carleton.edu/31415>.

Here's how you can help: if everyone on the COMPRES listserv contributes one or two teaching resources (we know that you all have a couple of really good Powerpoints, problem sets, lab exercises, etc.) we will have a tremendous collection to share with the larger geoscience community. We are looking for contributions of:

- Teaching Activities (e.g. problem sets, demonstrations, lab activities...)
- Supporting web-based resources (e.g. URLs with links to Powerpoints, class notes, tutorials, and to sites you use in class such as USGS, analytical facilities, information posted on professors' personal webpages...);
- Citations to articles from scholarly journals that you use in your own classes, and that could be used to develop additional teaching activities; and
- Course syllabus.

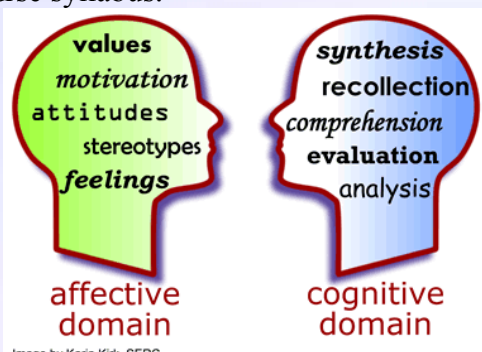


Image by Karin Kirk, SERC

<http://serc.carleton.edu/NAGTWorkshops/affective>

These contributions can be submitted at:

<http://serc.carleton.edu/NAGTWorkshops/mineralogy/contribute.html>

For URLs and articles, submit the citation information and a brief description of why the resource is interesting or important. For Teaching Activities, our submission form requests contextual information such as learning goals, target audience, skills or knowledge required, and then simply upload any Word, PDF, Excel, and/or image files related to the activity. It may take ~30 minutes to provide this information. We will be happy to either link to resources that are posted on your own website, or we can post these resources directly on the Mineral Physics page if you prefer.

Our initial task is to aggregate, organize and disseminate the resources that are already "out there". We have already repurposed the teaching resources currently online at On the Cutting Edge into this new Mineral Physics module. At a later stage, we will do a gap analysis of the newly contributed resources and will then recruit additional contributions on topics of particular interest.

For now, please check out the Mineral Physics website, and please take a few minutes to contribute the resources at your disposal. Thanks in advance for your help,

Bob Liebermann, President, COMPRES  
Dave Mogk, co-PI, On the Cutting Edge  
([mogk@montana.edu](mailto:mogk@montana.edu) for questions, comments about the webpage or inquiries about contributing resources; feedback is always appreciated)



# Obituary for Malcolm Nicol



## Professor Malcolm F. Nicol, 1939-2009

Malcom Foertner Nicol, Professor of Chemistry and Physics, Department of Physics and Astronomy passed away on May 7, 2009, Born on September

13, 1939 in New York City, Nicol was a graduate of Amherst College (B.A., Chemistry, 1956) and the University of California, Berkeley (Ph.D., Chemistry, 1963). He held faculty positions at the University of California, Los Angeles as assistant professor, 1965-1970; associate professor, 1970-75; professor, 1975-99; and professor, emeritus, 1999-2009. At UNLV, Nicol served as visiting professor in the Department of Physics & Astronomy and Department of Chemistry, 1998-2009 and as Executive Director, High Pressure Science and Engineering Center, (HiPSEC), 1998-2009. HiPSEC is a key component of a Department of Energy (DOE), National Nuclear Security Administration (NNSA), UNLV cooperative agreement for studies related to the NNSA's Stockpile Stewardship and Management Program (SSMP). The SSMP ensures that the nuclear capabilities of the United States are not eroded as nuclear weapons age.

HiPSEC, established in July, 1998, brings together chemists, mechanical engineers, and physicists to consider fundamental experimental, computational, and engineering problems of materials under high

pressure. A central focus is properties of materials relevant to NNSA's Stockpile Stewardship Program. HiPSEC's mission also encompasses shock experiments at NNSA's Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and Sandia National Laboratory Albuquerque and recovering samples from these experiments for chemical, physical, and mechanical analysis. Theoretical and computational studies focus on highly correlated and "warm" condensed matter systems. Under the Department of Defense's MURI program, HiPSEC scientists study the effect of defects on the mechanisms of initiation and energy release in energetic molecular crystals. (This integration of high pressure science programs in Nevada with programs at NNSA's National Laboratories, DOD Research Laboratories, and other university laboratories aims to enhance Nevada's scientific and educational infrastructure, while developing focused high pressure research programs relevant to the missions of DOE and DOD.)

Linking these different activities together was a task which required a scientist with broad and profound knowledge which Malcolm possessed. It was also the particular kindness and warmheartedness of Malcolm which made HiPSEC an excellent and pleasant environment for research. Malcolm also was a leader in the high-pressure community throughout the world; most recently he served on the board of AIRAPT, Malcolm will be missed by the community of High-Pressure scientists and by everybody who knew him. — Pamela Burnley and Oliver Tschauner



*Malcolm Nicol delivering keynote talk at the 2007 Annual Meeting of COMPRES at Lake Morey, Vermont. For the past three years, he has provided valued service as a member of the Advisory Council of COMPRES.*

*We send our condolences to his colleagues at UNLV on behalf of this worldwide community.*



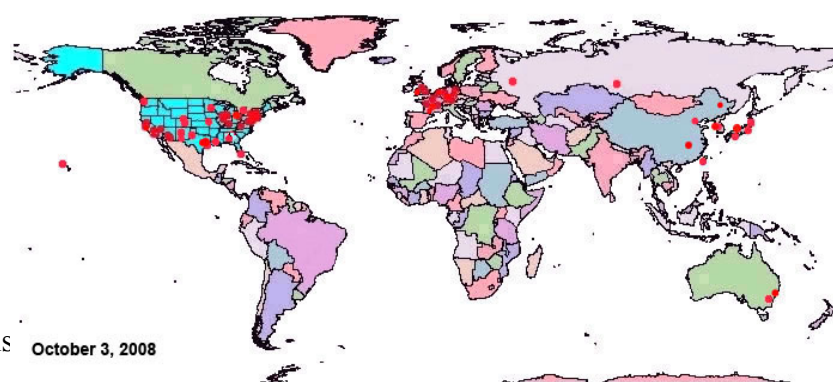
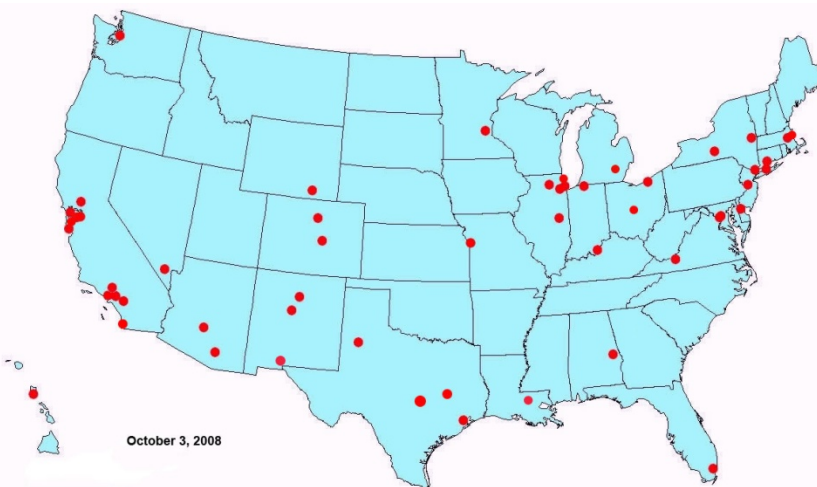
# COMPRES Membership

## Institutional Members

COMPRES is community based. Educational and not-for-profit US Institutions are eligible to become members, and each institution is entitled to one vote in the decision process. The membership defines policy and charts the future of the consortium. Other organizations and non-US institutions are eligible to be affiliated members with a non-voting representative to all COMPRES business meeting.

Membership in COMPRES brings a voice in the decision-making process of the organization and financial support for the representative to attend the annual meeting. There is no financial cost to the Institution. The only obligation that the Institution assumes is an active interest and participation in the organization. Thus, becoming a member offers only gains with little cost to the Institution.

Currently active members of COMPRES include 53 U. S. institutions and 33 foreign affiliated members.



COMPRES MEMBERSHIP

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### COMPRES Contacts:

President, Robert C. Liebermann, (631)632-1968, [Robert.Liebermann@stonybrook.edu](mailto:Robert.Liebermann@stonybrook.edu)  
Chair of Executive Committee, Quentin Williams, [quentw@emerald.ucsc.edu](mailto:quentw@emerald.ucsc.edu)  
Administration, Emily Vance, (631)632-8213, [Emily.Vance@stonybrook.edu](mailto:Emily.Vance@stonybrook.edu)  
Newsletter Editor, Jiuhua Chen, (305)348-3140, [Jiuhua.Chen@fiu.edu](mailto:Jiuhua.Chen@fiu.edu)