Nicholas C. Schmerr

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Curriculum Vitae

Professional Education:

• Beloit College	B.S.	2001	Geology (Physics minor)
• Arizona State University	Ph.D.	2007 (expected)	Geophysics/Seismology

Research Interests:

- Seismology
- Planetary Geophysics
- Dynamics and Structure of the Mantle Transition Zone

Professional Activities:

- Organized - Interdisciplinary dept. seminar series DEEP (http://deep.asu.edu), Arizona State University (Spring 2005).
- Visiting Scientist – Dept. of Earth and Environmental Sciences, Ludwig-Maximilians Universität, München, Germany (Summer 2003).
- Attended - Short course on Numerical Wave Propagation: Modern Approaches, Institute for Geophysics, University of München, München, Germany (Fall 2002).

Field Experience:

- CANOE - Canadian Northwest Experiment [http://canoe.asu.edu/] (2003-2005).
- COARSE - Consortium for an Arizona Reconnaissance Seismic Experiment [http://asuarray.asu.edu/coarse/] (2002–2005).

Research Experience (Extended Version):

August 2001 to Present

Arizona State University PhD Program

Advisor: Dr. Edward Garnero

June 2001 to August 2001

Goddard Space Flight Center NASA Summer Intern Program

Advisor: Dr. Greg Neumann

I spent the summer of 2001 as an intern at the Goddard Space Flight Center, where I worked with the Mars Orbiter Laser Altimeter (MOLA) dataset. My primary responsibility was to help assist in cloud editing the MOLA data, but I also had the opportunity to do some research utilizing the data. I worked with Dr. Greg Neumann, who assisted me in getting started with the MOLA data editing, and provided me with advice on my research topic. The data editing consisted of going through each individual MOLA profile and removing cloud returns, and correcting areas where spacecraft motion produced erroneous ground returns. In addition to this, I developed a project to investigate the seasonal variation in the thickness of the frost deposits within several craters located near the north polar ice cap of Mars. My research provided a regional context for Dr. Neumann and his colleagues who were investigating the large-scale magnitude of temporal changes in the polar regions of Mars. My research at Goddard gave me the chance to interact with a number of scientists interested in Mars, and also allowed me to see how NASA operations and missions work. I also gained experience in using several computing tools, such as General Mapping Tools, and UNIX. I presented my research in a poster at the Fall AGU meeting in San Francisco (reference below). This summer internship took place between my graduation from Beloit and entry in graduate school at Arizona State University.

June 2000 to August 2000

Geophysical Laboratory of the Carnegie Institution of Washington Summer Intern Program

Advisors: Dr. Connie Bertka and Dr. Yingwei Fei

During the summer of 2000, I worked with Drs. Connie Bertka and Yingwei Fei as an undergraduate summer intern at the Geophysical Laboratory of the Carnegie Institution of Washington. For my research, I performed a number of experiments on a model Martian mantle composition using a multianvil apparatus, which is able to generate pressures up to 25 Gigapascals. The purpose of my research was to determine the solidus temperature for the mid to lower mantle of Mars, providing a useful geodynamic constraint for thermal models of the Martian interior. To analyze the samples, I used an electron microprobe to detect the presence or absence of melt, and also to characterize the mineralogy for the model composition. In my research, I was helped by a number of Carnegie postdoctoral students who showed me the ropes of using the multianvil apparatus and taught me how to use the microprobe, as well as provided me with technical advice for processing the data and interpreting it. I also had numerous conversations with Drs. Fei and Bertka who gave me science advice and also helped me to interpret the data I obtained on the electron microprobe. My research at Carnegie was used to write my undergraduate thesis (cited below), and I continued the data analysis at Beloit with the help of my undergraduate advisor, Dr. Cam Davidson. To put it simply, my experiences at Carnegie have set me on the path of study I am following today. Discussions with the postdocs and other scientists and my research experience helped me to decide if graduate school was the right choice for me or not. Carnegie gave me a passion for the study of planetary interiors, and I was able to make some great connections with important scientists in this field. My research was presented at the Lunar and Planetary Science Conference in the Spring of 2001.

June 1999 to August 1999

University of Minnesota Summer Intern Program

Advisors: Dr. Marc Hirschmann and Dr. Larry Edwards

My first undergraduate research experience in geology was during the summer of 1999, at the University of Minnesota. I worked on a project with a graduate student, Rebecca Thomas, and was advised by Drs. Larry Edwards and Marc Hirschmann. I was helping Rebecca to set up a mass spectrometer for measuring the amount of Radium-226 in volcanic samples collected in Central America. The short half-life of Radium-226 makes it ideal for investigating the processes of magma genesis and transport in subduction zones, as well as identifying the characteristics of the magma source region. My project consisted of purifying Radium-228 from pitchblende ore to provide a calibration spike for the unknown samples. An inductively coupled plasma mass spectrometer (ICPMS) was used to measure the purity of the sample and determine the concentration of Radium-228 and Radium-226 in the spike. I worked closely with Rebecca, and under the advice of Dr. Edwards and Hirschmann. This project gave me a taste of what research was like, and I learned a great deal about the life of a graduate student from my internship. This internship also gave me a valuable background in geochemistry and introduced me to the discipline of geophysics.

Teaching Positions and Community Service:

- ***Geology Tutor*** (1998-2001)

As a tutor, I met with a student on a regular basis who requests help with a particular geology class. I tutor students in Introductory Geology and Historical Geology. I answer their questions, discuss the course material in more detail, and help them with labs and assignments. I have been a tutor for greater than 3 years.

- ***Teacher Assistantships***

I have been a TA in several subjects, which are listed below. As a teacher's assistant, I graded labs, helped students during their laboratory period, and provided review sessions and extra lab hours. Each position lasted for a semester, unless otherwise noted.

Introductory Astronomy
Historical Geology
Paleontology
Environmental Geology
Introductory Geology Labs (2 semesters)
Geodynamics

- ***Observatory Tour Guide***

The Beloit College Thompson Observatory has public nights, where people from the community and college are invited to come up and look at objects in the night sky using our telescopes. Student volunteers help set up and operate the telescopes, and provide interpretation and tours for visitors. I have been a tour guide for 3 years.

Awards and Honors:

2006-2007 Achievement Rewards for Colloege Scientists (ASU)
2003-2007 National Science Foundation Graduate Research Fellowship (ASU)
2001-2003 University Graduate Scholarship (ASU)
2000-2001 Schneider Scholarship in Geology (Beloit)
1999 Teacher Assistantship Award (Beloit)
2000 Teacher Assistantship Award (Beloit)
1998-2001 James Ferwerda Science Scholarship (Beloit)

1998 Lockwood Scholarship in Geology (Beloit)
1999 Mineralogy Prize (Beloit)
1997-2001 Beloit College Presidential Scholarship

Professional Memberships:

American Association for the Advancement of Science
American Geophysical Union
Geological Society of America
Mineralogical Society of America
National Association of Geoscience Teachers
Phi Beta Kappa
Seismological Society of America

Publications:

Schmerr, N.C., Fei, Y., and Bertka, C., 2001, Extending the Solidus for a Model Iron-rich Martian Mantle Composition to 25 GPa. Lunar and Planetary Science XXXII, Abstract #1157.

Schmerr, N., Garvin, J., Neumann, G., and Sakimoto, S., (2001) Seasonal Changes in the Thickness of Martian Polar Crater Deposits From the Mars Orbiter Laser Altimeter. *Eos Trans. AGU, 82*(47), Fall Meet. Suppl., Abstract P31A-0544.

Schmerr, N., Garnero, E., Igel, H., Treml, M., Jahnke, G., (2003) Probing the nature of the 410- and 660-km discontinuities beneath hotspots using the SS-precursors. *Eos Trans. AGU, 84*(46), Fall Meet. Suppl., Abstract S21E-0356.

Kargel, J. S., Carlson,R. W., Davies, A.G., Fegley, B., Gillespie, A., Greeley, R., Howell, R. R. Jessup, K. L., Kamp, L., Keszthelyi, L. P., Lopes,R. M., MacIntyre, T.J., Marchis, F., McEwen, A. S., Milazzo, M., Perry, J., Radebaugh, J., Schaefer, L., Schmerr, N., Smythe, D. W., Spencer, J. R., Williams, D. A., Zhang, J., and Zolotov, M. Yu. (2003) Extreme Volcanism on Io: Latest Insights at the End of Galileo Era, *Eos, Transactions, Amer*. *Geophysical Union*, 84, No. 33, 113, 318.

Schmerr, N., Garnero, E., Igel, H., Jahnke, G., Thorne, M., Treml, M. (2004), Imaging the 410 and 660-km Discontinuity Structure Beneath Hawaii using the SS-precursors, 2004 SEDI Meeting.

Treml, M., Schuberth, B., Schmerr, N., Igel, H., (2004), 3-D wavefield simulation through models for the Iceland plume, 2004 SEDI Meeting.

Schmerr, N., Garnero, E., Rost, S., Thomas, C., (2004) Migration of SS precursor Data to Image Fine-scale Structure on the Upper Mantle Discontinuities Beneath Hawaii. *Eos Trans. AGU, 85*(47), Fall Meet. Suppl., Abstract U41A-0713.

Revenaugh, J., Courtier, A., Avants, M. D., Gaherty, J., Garnero, E.J., Schmerr, N., Thorne, M., Ford, S., Yoburn, J.L., Bostock, M., Baig, A., Langlois, A., Mercier, J., Oueity, J., Nicholson, T., Barstow, N. , (2004) CANOE: A Broadband Array in Northwestern Canada, *Eos Trans. AGU, 85* (47) Fall Meet. Suppl. Abstract S53B-0208.

Schmerr, N., Garnero, E., Stixrude, L., (2005) Evidence for Positive Correlation of 400- and 670-km Discontinuity Topography Beneath the Central Pacific from SS Precursors, *Eos Trans. AGU, 85* (52), Fall Meet. Suppl., Abstract DI41A-1246.

Schmerr, N., Garnero, E., (2006), Investigation of upper mantle discontinuity structure beneath the central Pacific using SS precursors, *J. Geophys Res*, doi:10.1029/2005JB004197, in press.