The Neutron Scattering Society of America is pleased to announce the 2012 recipients of its four major prizes.

Chancellor Robert J. Birgeneau

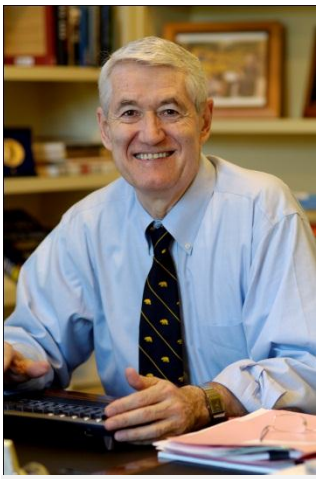
University of California Berkeley

is the recipient of the

2012 Clifford G. Shull Prize

of the Neutron Scattering Society of America (NSSA) with the citation

"For his seminal scientific contributions, tireless leadership, and devoted mentoring in the field of neutron scattering"



Chancellor Robert Birgeneau

The Neutron Scattering Society of America (NSSA) established the Clifford G. Shull Prize in Neutron Science to recognize *outstanding research in neutron science and leadership promoting the North American neutron scattering community*. The prize is named in honor of Prof. Clifford G. Shull, who received the Nobel Prize in 1994 with Prof. Bertram Brockhouse for seminal developments in the field of neutron science. The establishment of the prize was announced at the inaugural American Conference on Neutron Scattering (ACNS) in 2002.

The nominations were reviewed by a committee of experts in the field of neutron science and the NSSA is pleased to announce that the recipient of the 2012 Shull Prize is **Robert J. Birgeneau**, chancellor of the University of California, Berkeley, and Professor of Physics. The prize and $5000 honorarium will be awarded at the 2012 ACNS in Washington, DC, June 24-28, 2012 (http://www.mrs.org/acns-2012/).

"*This lifetime achievement award is very special for me*," said UC Berkeley Chancellor Robert Birgeneau. "*Clifford Shull is the founder of the field of neutron scattering and a former colleague of mine at MIT. He was a wonderful, very creative scientist, and also modest and soft-spoken.*

He was the kind of person who was in the lab himself every single day. Even as chancellor, I remain dedicated to my research and to mentoring physics students. I am fortunate to be at UC Berkeley, pursuing new experiments in materials science among some of the greatest minds in my field."

Professor Birgeneau has used neutron scattering as the primary experimental tool for a long series of seminal discoveries in the field of magnetism and correlated electrons. His research has tackled the leading scientific questions of the time, and his work has had lasting impact. Professor Birgeneau's celebrated studies of the physics of low-dimensional magnetism defined his early career in neutron scattering. This work began in the late 1960s in collaboration with Dr. Gen Shirane at Brookhaven National Laboratory, where they studied the magnetic phase transition and associated spin correlations in the two-dimensional antiferromagnet K_2NiF_4. The technique that they developed for the efficient energy-integration of spin fluctuations in low-dimensional systems, without sacrificing q-resolution, is both powerful and elegant. The power of this technique is highlighted by its use 20 years later to elucidate the physics of the spin-1/2 square-lattice antiferromagnets La_2CuO_4 and $Sr_2Cu_2OCl_2$. This latter work was again performed by Professor Birgeneau and again represents landmark contributions of the neutron scattering technique to central questions in condensed matter physics.

Professor Birgeneau has had enormous impact in the field of high-temperature superconductivity. In a research program that began in the late 1980's and continues to this day, he has revealed how the magnetism evolves across the cuprate phase diagram (from the lightly doped to the overdoped compositions) - a key issue in this field. In early work, he and his collaborators found that antiferromagnetic fluctuations persists in the doped La_2CuO_4 based compounds, and that the spin fluctuations become incommensurate at superconducting doping levels. The quality and quantity of his work in the field of high-T_c superconductivity is hard to overstate. Professor Birgeneau's research also includes pioneering discoveries related to magnetic excitations in spin chains, the magnetic structure and dynamics in percolative and random field systems, and spin-Peierls physics. Of his over 425 papers, 85 have been cited at least 85 times, with almost 25,000 total citations to date.

An equally important legacy has ensued from his academic role as a mentor and teacher. Professor Birgeneau has trained numerous young scientists who now populate the ranks of the North American neutron scattering community, as well as the international community. His enthusiasm for science and high standards for performing research are often noted by those he has mentored as having an indelible influence on their careers. Professor Birgeneau has also

been a tireless and articulate advocate of the neutron scattering technique in public lectures and articles. He has served on many scientific advisory panels and has been an active voice in various capacities regarding the science enabled by the DOE scattering facilities. He has also chaired an important DOE-BESAC panel regarding the future of neutron reactor facilities in this country.

Professor Birgeneau received his PhD from Yale University in 1966. He was a scientist at Bell Laboratories from 1968-1975 and became a Professor of Physics at MIT in 1975. He served as the Head of the Department of Physics from 1988-1991 and then Dean of the School of Science at MIT from 1991-2000. From 2000-2004, he was President and Professor of Physics at the University of Toronto. He is currently Chancellor and Professor of Physics at the University of California, Berkeley. In recognition of his research accomplishments, he has received numerous awards which include the APS Oliver E. Buckley Award (1987), the IUPAP Magnetism Award (1997), and the APS J. E. Lilienfeld Award (2000).

Dr. Gian Piero Felcher

Argonne National Laboratory

is the recipient of the

2012 Sustained Research Prize

of the Neutron Scattering Society of America (NSSA) with the citation

"For pioneering the development of neutron reflectometry and demonstrating its application to magnetic and polymer film systems."

Dr. Gian Piero Felcher

The Neutron Scattering Society of America (NSSA) established the Sustained Research Prize to recognize a *sustained contribution to a scientific subfield, or subfields, using neutron scattering techniques, or a sustained contribution to the development of neutron scattering techniques*. The primary consideration shall be an enduring impact on science. Preference shall be given to applicants whose work was carried out predominantly in North America.

The nominations were reviewed by a committee of experts in the fields to which neutron scattering contributes and the NSSA is pleased to announce that the 2012 recipient of the Sustained Research Prize is **Dr. Gian Piero Felcher** of Argonne National Laboratory. The prize and $2500 honorarium will be awarded at the 2012 ACNS in Washington, DC, June 24-28, 2012 (http://www.mrs.org/acns-2012/).

Throughout his career Dr. Gian Felcher has been involved in developing neutron scattering instrumentation, the most notable of which is the polarized neutron reflectometer. In 1981, he published his first paper related to neutron reflectometry, suggesting the use of polarized neutrons as a way to probe the surface magnetism of a ferromagnetic material, nickel, a topic of great interest at the time. The interaction of neutrons with magnetic materials had previously been described in optical terms, and reflectivity measurements were used to determine coherent scattering lengths of materials, but the suggestion that polarized neutron reflectivity could be used to learn about the magnetism close to the surface was unique. Through his foresight, the first dedicated polarized neutron reflectometry instrument was

constructed by him at Intense Pulsed Neutron Source (IPNS) at Argonne National Laboratory in 1984. Dr. Felcher was quick to realize the potential of neutron reflectometry in polymer science as well, and split the IPNS beam line into two instruments, one with a polarized beam dedicated to magnetism and one to soft condensed matter. Among his many significant achievements were the experimental confirmation of de Genne's reptation theory for diffusion in polymers and the measurement of off-specular scattering due to lateral structures within polymer films. These developments came at a time when expanding research programs on surfaces, interfaces, and multilayers encountered many questions that could be answered with this new technique. As a result, neutron reflectometry was quickly recognized as one of the most powerful tools for characterizing surface phenomena or buried interfaces, and reflectometers were put into operation at all major neutron scattering facilities throughout the world. He has continued this record of creativity throughout his career, his most recent achievement being the first successful demonstration of the use of neutron spin-echo in grazing incidence geometry as a way of measuring surface inhomogeneity with enhanced resolution and flux.

Dr. Felcher received his *dottore in fisica* from the University of Milano, Italy in 1958. He worked at Argonne National Laboratory for more than 40 years, ultimately as Senior Physicist in the Materials Science Division before his retirement in 2007.

Dr. Guangyong Xu

Brookhaven National Laboratory

is the recipient of the

2012 Science Prize

of the Neutron Scattering Society of America (NSSA) with the citation

"For his work on relaxor ferroelectrics that have provided new insights into the role of polar nano-regions in determining the extreme electromechanical properties of these materials"

Dr. Guangyong Xu

The Neutron Scattering Society of America (NSSA) established the Science Prize to recognize a *major scientific accomplishment or important scientific contribution within the last 5 years* using neutron scattering techniques. Nominees must be within 12 years of receiving their PhD degree. Preference shall be given to applicants whose work was carried out predominantly in North America.

The nominations were reviewed by a committee of experts in the scientific areas to which neutron scattering contributes, and the NSSA is pleased to announce that the 2012 recipient of the Science Prize is **Dr. Guangyong Xu** of Brookhaven National Laboratory. The prize and $2500 honorarium will be awarded at the 2012 ACNS in Washington, DC, June 24-28, 2012 (http://www.mrs.org/acns-2012/).

Over the past five years Dr. Guangyong Xu has achieved profound experimental insights in relaxor ferroelectrics through neutron and synchrotron x-ray diffraction. By combining these techniques, he discovered that single crystalline relaxors such as $PbZn_{1/3}Nb_{2/3}O_3$ (PZN) and $PbMg_{1/3}Nb_{2/3}O_3$ (PMN) form a rhombohedral surface layer with a thickness up to 10 µm. Within the cubic bulk he obtained clear evidence through coherent diffuse scattering of polar nano-regions that respond by changing shape to an applied electric field. He also found through inelastic neutron scattering that the field dependent configuration of polar nano-regions strongly affects phonon propagation through the bulk.

Relaxor ferroelectrics are playing an increasingly important technological role –PZN with 4.5% $PbTiO_3$ for example displaying the largest known piezo-electric coefficient. Dr. Xu's work links these properties to unique field dependent atomic scale bulk and surface structure. His experiments have poised this field of research and development for a breakthrough in understanding and designing improved relaxor ferroelectrics.

Dr. Guangyong Xu received his PhD in 1999 from Johns Hopkins University and joined Brookhaven National Laboratory in 2002. Dr. Xu is currently a Tenured Physicist at Brookhaven National Laboratory.

Dr. Claire White

Los Alamos National Laboratory

is the recipient of the

2012 Prize for Outstanding Student Research

of the Neutron Scattering Society of America (NSSA) with the citation

"For pioneering a new methodology to elucidate accurate structural representations of complex materials by combining neutron diffraction and computational chemistry"

Dr. Claire White

The Neutron Scattering Society of America (NSSA) established the Prize for Outstanding Student Research to recognize *outstanding accomplishments in the general area of neutron scattering by graduate or undergraduate students who have performed much of their work at North American neutron facilities.* The prize was established in 2011 and will be awarded for the first time.

The nominations were reviewed by a committee of experts in the field of neutron science and the NSSA is pleased to announce that the recipient of the 2012 Prize for Outstanding Student Research is **Dr. Claire White** of the Los Alamos National Laboratory. The prize and $1000 honorarium will be awarded at the 2012 ACNS in Washington, DC, June 24-28, 2012 (http://www.mrs.org/acns-2012/).

Ordinary Portland cement-based (OPC) concrete is the most used building material world-wide and is the 2nd most used resource, after water. However, concrete is the 3rd highest CO_2 emitter, accounting for 5-8% of all man-made emissions, and therefore there is massive scope for technological development of alternative concretes. During her graduate studies Dr. White pioneered a new methodology to elucidate accurate structural representations of complex materials by combining neutron diffraction and computational chemistry. She used the disordered aluminosilicate material, metakaolin, an alternative cement precursor, as the case study, with the methodology revealing the existence of III-coordinated aluminum, which has never before been shown to exist in this material. This research exemplified the power of

combining local structural data (i.e., neutron pair distribution function analysis) with first-principles calculations for amorphous materials, especially when used in an iterative manner to maintain thermodynamic feasibility and agreement with experimental data.

Dr. White has also been heavily involved in technique development with respect to incoherent scattering and neutron pair distribution function analysis. For hydrogen and other incoherent scattering elements, the neutron pair distribution function technique is greatly affected, reducing the ability to obtain high quality PDFs. During her graduate studies, including the 8 months spent at the Lujan Neutron Scattering Center in 2009, Dr White participated extensively in the development of new tools capable of subtracting out the incoherent scattering component of total scattering data.

Dr. White graduated from The University of Melbourne in November 2010, and is currently a Director's Postdoctoral Fellow at Los Alamos National Laboratory with a joint appointment involving the Lujan Neutron Scattering Center and the Theoretical Division. Her research involves combining theoretical and experimental techniques to advance the understanding of low CO_2 cements (geopolymers) and associated materials. Furthermore, she is active in the area of technique development and is constructing novel methodologies combining experimental data and simulations.