

The NIST Center for Neutron Research

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The NIST Center for Neutron Research (NCNR) is a national user facility serving over 2,200 research participants from industry, academia, and other government agencies annually. It is one of only four national neutron user facilities in the United States and thus, the neutron measurement capabilities are in high demand. It is essential, therefore, that the facility is operated in a manner that provides maximum benefit to the science and engineering community. These factors lead naturally to a focus on three specific areas to achieve maximum benefit. Space limitations in this article do not permit an extensive description but rather a summary is given.

Ever since its first operations, the focus of the NCNR has been on producing high quality science. This started with hiring excellent scientists to (1) lead world-class research programs at NIST, and (2) attract the best users to the facility. The priority to produce high quality science at the NCNR naturally led to a strong user emphasis because attracting the best outside scientists to carry

out their research is the most cost-effective way to maximize the scientific output of the facility. Allowing scientists to concentrate on science requires a dedicated technical staff whose job is to ensure the success of the users from experiment planning, through sample preparation and characterization in dedicated user laboratories, provision of a diverse suite of sample environment equipment, to data reduction and analysis. The focus on producing excellent science also means that there is a strong emphasis on reliable source and instrument operations. Scientists travel from all over the country to the facility to carry out their measurements and it is imperative that our facility meets their expectations to operate when scheduled to do so. Finally they expect high quality data. This is achieved through a combination of excellent instrument design and expert consultation from our expert staff.

Second, the NCNR has always played to its strengths. At the NCNR, our strength for decades has been in cold neutron measurements. Through the development of a series of high performance cold sources beginning in the 1980's and the subsequent advanced neutron scattering instruments that exploit the long wavelength neutrons on a steady-state reactor-based source, there have been numerous advances in understanding the structure and dynamics of soft condensed matter systems.

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Third, the NCNR has established partnerships that leverage the strengths of all parties involved. Though the NCNR was not originally a user facility in the sense that it is today (NCNR primarily served NIST mission needs), a key partnership with the National Science Foundation permitted this important transition. Moreover, partnerships with industrial organizations have enabled advances to be made in technologically-relevant complex fluids such as fuel additives and opened up new research avenues at NIST. These partnerships have been focused on instrument-specific capabilities (e.g. small-angle neutron scattering) but we are considering alternative models.

A national user facility enables users from the science and engineering community to solve problems of societal relevance. Achieving this requires that the user facility has an unwavering focus on the three items above. HANARO