



The Ames Laboratory is home to a range of “best in class” scientific research projects, and it also applies the highest levels of scientific expertise to developing solutions for today’s great challenges — including the development of the next generation of world-class scientists.

Nuclear magnetic resonance or, NMR, has been used to study the structures of materials for many decades. It is a mature tool, so you can buy a pretty sophisticated NMR spectrometer right “off the shelf” and get some very nice results almost at the push of a button. But Ames Lab researchers are involved at a different level. We have developed solid-state NMR techniques that push the extremes of the method in several different directions: the world’s fastest sample rotation (as well as strategies to overcome the limitations of

*Welcome to Ames Laboratory,
home of “world-leading science”*

finite speed!), the coldest samples, and the most sophisticated experimental strategies to make non-routine or seemingly impossible analyses routine at the Ames Laboratory.

Our researchers are defining the future of solid-state NMR as a tool for materials analysis. This advanced work helps us to apply NMR to problems of real importance in areas such as fuel-cell membranes and thermoelectrics.

In this issue of *Inquiry*, you will find some stories that focus on our world-leading, solid-state NMR research and on other fundamental science, such as the Casimir effect in metamaterials. You will also be able to see how our science is helping to extract energy from the wind and deliver it through an advanced electrical grid, and read about an exciting program that helps teachers inspire young minds about science.

Read on, and be inspired!

A handwritten signature in black ink that reads "Alex King". The signature is written in a cursive, flowing style. Below the signature, there is a long, thin horizontal line that extends to the right and then curves downwards.

Alex King, Director