

University of Northern Colorado Chemistry Professor Receives Cottrell College Science Award

Dr. Robin Macaluso, an Assistant Professor of Chemistry in the College of Natural and Health Sciences, recently received a \$44,648 Cottrell College Science Award from Research Corporation for a project entitled, "Single Crystal Growth & Characterization of $\text{PrAu}_2\text{Si}_{2-x}\text{Ge}_x$: Materials on the Verge of Spin Glass and Magnetic Order." The grant is awarded to early-career academic scientists to support significant research in the advancement of science and to support the development of faculty.

Magnetic materials contribute to many modern applications ranging from computer memory storage to medical X-ray techniques. Because of their unique chemistry, some materials are on the delicate verge of becoming magnetic, and slight changes in structure or pressure can result in dramatic changes in whether or not the material becomes magnetic. Some of these materials, called spin glasses, never become magnetic because of chemical impurities, so it was surprising to the scientific community when an intermetallic compound, PrAu_2Si_2 , displayed spin glass behavior without any impurities.

Previous studies have used polycrystalline samples, while Dr. Macaluso's research will focus on synthesis of single-crystal PrAu_2Si_2 , which will enable physicists to collect data with higher resolution. Dr. Macaluso and her students will synthesize samples where silicon will be substituted with germanium to gain a better understanding of how small modifications drive the material away from spin glass to magnet.

Dr. Macaluso is a chemist who specializes in solid-state materials with interesting structural and magnetic properties. In the past two years, she has built the Single Crystal Growth Laboratory at Argonne National Laboratory and collaborated with physicists and chemists at the Argonne National Laboratory (near Chicago, IL), ISIS Neutron Scattering Facility, and the Rutherford Appleton Laboratory (United Kingdom). She has also recently published an article in *Nature Physics*, an internationally recognized scientific journal. The research award will support laboratory equipment and student research.