

2012 Summer Undergraduate Research Fellowship Awards

Student Name: Faith Durnford
(2012 Bruce LeVine Mellion '69 SURF Fellowship recipient)
Project Title: Empowering Communities to Decrease Marijuana Use among
Adolescents in the Monadnock Region
Faculty Sponsor: Marjorie Droppa, Health Science
Project Abstract:

In 2011, 14.5% of adolescents in the Monadnock Regional School District used marijuana before the age of 13, nearly twice the state average (7.7%). Moreover, 35% of this population reported using marijuana during the last 30 days compared to 28.4% statewide and 20.8% nationally. The purpose of my proposed study is to use a community-based participatory research model called Appreciative Inquiry (AI) to help Monadnock Regional School District residents identify protective factors in their community and create effective strategies against marijuana use by adolescents. Three hypotheses will be tested. The first is that AI will lead to the discovery and expansion of community protective factors around the perception of risk of marijuana use. The second is that AI will result in the growth and development of a self-determined and empowered social learning community. The third is that as a result of participating in the AI process, the community will construct effective strategies to increase the perception of risk among adolescents around marijuana use. This work would contribute to a new initiative by the New Hampshire Department of Health and Human Services to assess the effectiveness of AI in reducing risky health behaviors. New Hampshire is among the top three states in the U.S. for marijuana use by young adults, while the Monadnock Regional School District has been identified as a high risk community for marijuana use among adolescents. This research would help inform strategies to reduce marijuana use among young adults both regionally and statewide.

Student Name: Lucy Phillips
(2012 KSC SURF Fellowship recipient)
Project Title: Synthesis of Cobalt Nanoparticle for Biomedical Applications
Faculty Sponsor: Steven Harfenist, Physics
Project Abstract:

In our research we explore magnetic cobalt nanoparticles for their possible uses in the medical field, examples being; enhancement of magnetic resonance imaging and alternative options for chemotherapy in cancer patients such as hyperthermic tumor-cell destruction. Nanoparticles are ultrafine objects, approximately 3-20 nanometers in size. A nanoparticle's core is made of a compound with specific physical properties to be exploited (magnetic, optical, luminescent, etc.) A surfactant is a molecule used to protect and "functionalize" a nanoparticle by coating its surface and, further, enable the targeting the nanoparticle to bond to certain biological molecules by choice of the surfactant. Our first step in this research was accomplished last year when we produced cobalt nanoparticles through a thermal decomposition process of dicobalt octacarbonyl in the presence of trioctylphosphine oxide (as the surfactant) and oleic acid in a 1,2-dichlorobenzene solvent. We produced cobalt nanoparticles with a few size ranges: 3-5 nm, ~10 nm and ~20 nm. We now seek to better understand and verify the nature of the surfactant coating through Fourier Transform Infrared Spectroscopy (FTIR) and Nuclear Magnetic Resonance Spectroscopy (NMR). We would like to begin utilizing the process of surfactant exchange post-nanoparticle production and try to synthesize our own surfactant that would eventually lead to the nanoparticle's selectively targeting cancer tumor cells. FTIR and NMR are techniques available to us through the Chemistry Department at KSC and will be invaluable to our understanding of the nanoparticle/ surfactant system.
