View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by North Georgia College & State University: Digital Commons

**GURC Conference – Deadline: 9/21/2018**

# MCNP Modeling of a Molten Salt Reactor

**David Wall and Chris Berry**

**Mentors:**
**Dr. Andrew Hummel**
**Dr. Tien Mun Yee**
**Dr. Jungkyu Park**
**Dr. Eduardo B. Farfán**

**Draft: 9/21/2018**

A variety of national and international companies are looking into innovative and nontraditional nuclear reactor systems, known as Generation IV reactors. Recently, there has been an increased interest in a reactor type that uses molten salts of various compositions as nuclear fuel because of its economic and technological advantages. This research study is an exploratory exercise of the nuclear attributes of molten salt fuels in Molten Salt Reactors (MSRs); particularly, fluoride-based thorium salts and the feasibility of their use in nuclear reactors. A scoping analysis is performed to look at the behavior of molten salts in simple reactor core geometric configurations, such as a cylindrical core of various dimensions and core arrangement in a repeated lattice structure. The investigation was conducted by means of a probabilistic computer simulation through the Monte Carlo N-Particle Transport Code (MCNP) developed by the Los Alamos National Laboratory. In conjunction with other Kennesaw State University students' research, this study is part of an effort to provide integral data for the completion of a comprehensive study of MSRs, their fuels, and the potential part they play for the future of the nuclear power industry.