To improve educational and research opportunities in the Hispanic serving (~70% Hispanic student body) New Mexico Highlands University (NMHU) collaborative project between NMHU and Ohio State University (OSU) was developed.

**Educational Goals**

This multi-institutional and multidisciplinary project allows for achieving a higher level of understanding of materials design in areas of electronic, optical and magnetic properties. Faculty in physics, engineering, chemistry and geology with strong expertise in a broad area of materials science will be able to assist students, especially from underrepresented groups, to enter into state-of-the-art materials research via research related education. The NMHU-OSU partnership will systematically impact undergraduate, graduate, postgraduate students and faculty at all partner institutions. In New Mexico, at the high school level, PREM will use the dual credit and Achieving in Research, Mathematics and Science (ARMAS) Center to encourage and engage students in science education programs at the High Schools. At NMHU in collaboration with OSU, two new materials science courses devoted to an in-depth understanding of materials structure and magnetic properties of materials will be designed. OSU experts will visit to deliver guest lectures and special community high-tech seminars accompanied by lively PREM receptions to encourage mixing of high school and university students and faculty. Undergraduates from NMHU will be invited to perform hands-on research projects at OSU Research Experience for Undergraduate (REU) summer program. For masters level students one semester of study at OSU will be offered to promote their future admission into PhD programs at OSU or other research universities. The existing PREM and OSU partnership with Los Alamos and Argonne National Laboratory will allow for NMHU student summer internships. It is in New Mexico's and the nation's best interests to train young residents to qualify for home-grown jobs that require expertise in various fields of technology.

**Research Goals**

The main goals of the proposed partnership led by Prof. Timofeeva (NMHU) and Prof. Johnston-Halperin (OSU) will include understanding the principles of materials design, synthesis, and applications in areas of materials with electronic, optical and magnetic properties. A new approach to materials design and crystal engineering will allow for the combination of two or more components in one crystalline material which brings significant alteration of electronic properties of multi-component systems. Construction of new porous metalorganic frameworks, which can be doped with magnetic particles, will allow for creation of new sensors, drug delivery systems, magnetic-based cooling systems, and other applications. Collaboration with OSU will allow NMHU researchers and students to start new for NMHU area of materials science related to 2D graphene and its varieties, modified by absorbed metal nanoparticles. These fundamental studies will suggest pathways for future applications of such materials. Collaborative use OSU and NMHU existing research facilities will broaden opportunities for multidisciplinary research training. The research results of the NMHU-OSU PREM partnership will be disseminated via publications in peer reviewed journals and presented at domestic and international conferences. PREM will open the door for young people interested in gaining a foothold in areas of study that are directly relevant to the research interests and needs of the state and nation.