This SEEDS project fostered scientific collaboration between Dr. Zuo and Dr. Michael Sohn from the Lawrence Berkeley National Laboratory (LBNL). The SEEDs fund was mainly used to support two research exchange activities:

- Dr. Sohn’s visit to the UM (1/29-2/1/2014)
  1. Dr. Sohn gave a guest lecture in CAE560 “Sustainable Construction” about his research in building energy measurement and verification, as well as the DOE’s high performance building database. About 25 students and faculties attended the guest lecture and there was a long discussion after the lecture.
  2. Dr. Zuo's students presented their research in building energy efficiency to Dr. Sohn. Dr. Sohn provided valuable comments on their research.
  3. Drs. Zuo and Sohn had multiple meetings to discuss ideas and papers on chiller plant optimization, fault detection and diagnostics for buildings, and fast indoor airflow simulation, and other related topics.
  4. Dr. Sohn had individual discussions with other UM faculties, such as Drs. Englehardt, Trussoni, Wang and Onyango, for possible research collaborations.

- Dr. Zuo’s visit to the LBNL (7/20-7/25/2014)
  1. Drs. Zuo and Sohn had a series of discussions on various research ideas and papers on chiller plant optimization, fault detection and diagnostics, fast indoor environment simulation, and other research related building energy efficiency.
  2. Dr. Zuo had meetings with some LBNL’s scientists, such as Drs. Wetter, Mary Ann, Lee and Feng, for possible research collaborations.

The original SEEDS proposal was to concentrate the research collaboration on Fault Detection and Diagnostics. Through the brainstorm and discussion, we extended the scope to broader areas of building energy efficiency, such as model-based building optimization, big data for buildings, and fast indoor airflow simulation. The outcomes of the project are summarized as follows:

1. Inspired by Dr. Sohn’s guest lecture in DOE’s High Performance Building Database, Dr. Zuo (PI) developed a NSF proposal titled “NRT-DESE: Big Data for Better Buildings” in June 2014. This is a jointed proposal with Dr. Sohn (Co-PI). The proposal is for 5 years with a budget of $3 million. This proposal is currently under review.
2. Drs. Sohn and Zuo are planning to develop another joint proposal to the Department of Energy’s Buildings University Innovators and Leaders Development (BUILD) program.
DOE has released a Notice of Intent to Issue Funding Opportunity Announcement and we are waiting for the official RFP.

3. One of Dr. Zuo’s Ph.D. students has been closely working with LBNL to implement a model-based optimization and fault detection and diagnostic for the operation of chiller plants since March 2014. We expect to get a few journal publications through this collaboration.

4. Drs. Sohn and Zuo are working on two joint journal papers now. One is a literature review paper for coupled simulation of indoor environment and building energy system. The other is about model-based optimization for chiller plant operations. We plan to submit these papers by the end of this year.