

For whom it may concern:

I have an open position of **graduate student** in my group at our university (South Dakota School of Mines & Technology, SDSM&T, <https://www.sdsmt.edu/>) for a talented candidate. Potential candidate needs to be accepted as a graduate student to **Biomedical Engineering Program** <https://www.sdsmt.edu/BME/> . The program started as a continuation of bio and now moving toward mostly engineering program. More information about BME Ph.D. degree can be found at <https://www.sdsmt.edu/Academics/Departments/Biomedical-Engineering/Graduate-Education/> . This is an ideal program for anyone who got (or soon getting) B.S. or M.S. degree in science (e.g. chemistry, biology, physics or any other related field), but who desire to pursue career in engineering, fast-growing and generally speaking lucrative field.

Background and Prospective Projects. Parahydrogen (pH₂) based hyperpolarization (HP) is an exciting frontier of organic, analytical and physical chemistry. This revolutionary HP technique radically alters the “landscape” of Magnetic Resonance (MR) increasing MR signal by up to tens of million folds hence enabling molecular imaging on the proton and other (e.g. ¹³C, ¹⁵N and ¹⁹F) nuclei. The development of the technology encompasses both chemical and engineering projects. For instance, organic synthesis of tracers enriched with magnetically active stable isotopes is required in order to generate sufficient hyperpolarization payload (the product of the number of hyperpolarized nuclei and their NMR polarization). The production and observation of HP requires a system, which consists of pH₂ generator, reaction chamber, purification filter and MR visualization components. Also, it is expected that the final system will be fully automated. An engineering graduate student would be expected to engage in such projects starting from the basics and eventually tackling more challenging engineering problems. For example, recently developed by my group inexpensive, high throughput pH₂ generator is an example of a basic engineering project with an overarching goal of building robust and affordable hyperpolarization system. If elected, student can also focus his or her research on the testing of custom HP p-H₂ equipment. However, the student is still expected to tackle some of the purely engineering subprojects.

Location. Rapid City (SD, USA) is safe and very affordable with the cost of living <50% of any major metropolitan area of USA. It is located near famous Rushmore monument <https://www.nps.gov/moru/index.htm> . Thus, it has unusually large airport for this size of a town. Due to the combination of the mountain chains and winds pattern, the weather in Rapid City is substantially warmer than most of the locations with similar latitude. Also, the weather in this part of South Dakota is dry and really sunny most of the year.

Financial Details. The graduate student will receive complete compensation of his/her tuition and ~\$25,000/year stipend (~\$20,000 cash + benefits).

P.S. Please feel free to pass this information to whoever (you feel) is a good match for the position.

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