Zachary Pace Smith

Graduate Institution: University of Texas at Austin

Graduate Discipline: Chemical Engineering

Hometown: Camp Hill, PA

Relevant SC Research: Basic Energy Sciences

Research Interest:

Polymer membranes are an emerging unit operation in gas separations. Since membranes use a pressure driving force for separation, there is little energy loss compared with conventional, thermally driven processes such as cryogenic distillation and adsorption. Several important types of separations have been identified: nitrogen/oxygen from air, carbon dioxide from natural gas, and olefins from paraffins. Each of these separations currently occurs via distillation or adsorption. If properly designed, membranes could accomplish the same types of separations at lower energy costs.

My research focuses on addressing three challenges that currently limit polymer membranes: (1) achieving high permeability, (2) achieving high selectivity, and (3) designing membranes that are stable in aggressive environments. By using a novel family of polymers, known as thermally rearranged (TR) polymers, I synthesize new materials, tailor permeability and selectivity, and investigate membrane stability.

About Me:

My ultimate career goal is to become a professor in Chemical Engineering and work in the field of membrane research. The fundamental use of chemistry and physics to design materials which facilitate transport at a molecular level has always fascinated me. I have been very fortunate to be awarded the DOE Office of Science Graduate Fellowship, as it has allowed me to present my research at conferences across the country and has allowed me to establish collaborations with research groups from San Francisco to Melbourne, Australia.

Besides research, I am actively involved with science outreach programs for high school students, I play guitar and piano, and I coach an intramural soccer team. I also enjoy distance running and have completed 6 marathons.