ABSTRACT:
Nucleic acids, DNA and RNA, are well-known for their coding roles within a cell, but in recent years, new roles for nucleic acids have been discovered. Of particular interest are nucleic acids with binding abilities (called aptamers) and nucleic acids with catalytic abilities (called ribozymes and deoxyribozymes). While DNA and RNA are both capable of binding and catalysis, the superior stability and lower production costs of DNA make it the preferred functional nucleic acid in non-cellular applications. Our goal is to explore the catalytic potential of DNA by identifying new deoxyribozymes, but with an emphasis on catalytic activities that will be useful in practical applications. Our work is focused in two main areas: the development of deoxyribozyme-based small molecule sensors and the identification of deoxyribozymes that can replace protein enzymes in biofuel cells. We are also interested in using deoxyribozymes to form DNA structures that could be used for controlled biomolecule placement on surfaces. Our progress in these areas will be discussed.

BIOGRAPHICAL:
Dr. Dana A. Baum received her B.A. in Chemistry with a concentration in Biochemistry from Washington University in St. Louis (1999). She then worked on the Human Genome Project as a senior lab technician at Washington University School of Medicine’s Genome Sequencing Center (1999 – 2000). Dr. Baum pursued her graduate studies working in the research group of Dr. Stephen M. Testa at the University of Kentucky, receiving her Ph.D. in Chemistry in 2005. She was then awarded an NIH Postdoctoral Research Fellowship for her work in the lab of Dr. Scott K. Silverman at the University of Illinois at Urbana-Champaign. In 2008, Dr. Baum joined the Department of Chemistry at Saint Louis University as an Assistant Professor. Her research group explores the binding and catalytic properties of nucleic acids, particularly DNA, for use in a variety of applications, including sensors and biofuel cells.