

Tulane team invents new instrument to study complex molecules

January 30, 2014 10:00 AM Barri Bronston

bbronst@tulane.edu

504-314-7444

Tulane University chemistry professor [Igor Rubtsov](#) and a team of graduate students can lay claim to inventing an important new scientific instrument – the world's first fully automated dual-frequency, two-dimensional infrared spectrometer.

Known as 2DIR for short, the instrument boasts vast research and commercial uses. It gives scientists a powerful new method to study DNA and other complex molecules by measuring distances and angles between molecular substructures, thus unraveling three-dimensional molecular structures while tracking changes at an ultra-fast time scale.

No such instrument is currently available on the market and the spectrometer developed at Tulane will be used as a prototype for commercialization. The superior sensitivity and ease of operation of the instrument make the 2DIR method accessible for researchers in various areas of science.

Funded with grants from the National Science Foundation and the Louisiana Board of Regents, the instrument will be made available to a broad group of researchers across the country, including those at universities, national laboratories and corporations. Among the universities collaborating with Rubtsov's lab and incorporating the 2DIR spectrometer in their research are the University of Texas at Austin, Georgia Institute of Technology, Duke University, Xavier University, Scripps Research Institute and the University of Colorado – Denver.

"We are confident that our current and future collaborators will benefit from the instrument," Rubtsov said. The students who built the instrument, Joel Leger, Clara Nyby and others, will provide onsite training for visiting collaborators.

"Due to its dual-frequency capabilities and user-friendly nature, the 2DIR spectrometer will be capable of performing structural measurements for a variety of

molecular systems addressing a diversity of research questions,” Rubtsov said. “There is no doubt that there will be applications in organic and inorganic chemistry, and we also anticipate applications in biochemistry, biophysics and materials science.”