New Lab for Promising Polymer Research

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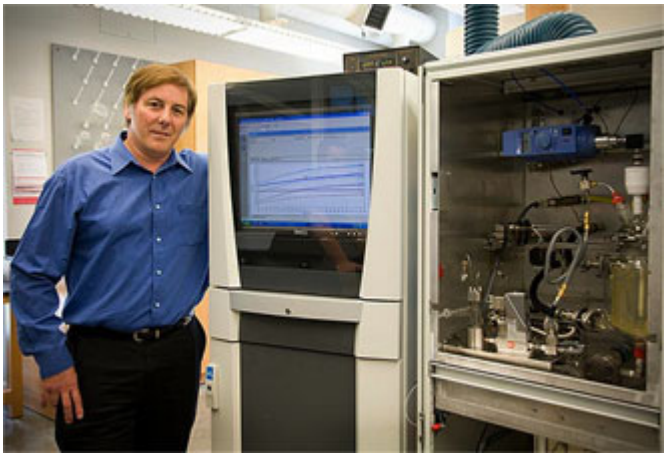
The Department of Physics in the School of Science and Engineering has a new lab where students at the undergraduate, graduate and postdoctoral levels have the opportunity to work in collaboration with professors and private companies to study polymers chains of chemically connected molecules often referred to as macromolecules.



Physics professor Wayne Reed is founder and director of the new Tulane Center for Polymer Reaction Monitoring and Characterization in the School of Science and Engineering. (Photo by George Long)

Wayne Reed, professor of physics and founder and director of the new Tulane Center for Polymer Reaction Monitoring and Characterization, is optimistic that the research conducted in the Tulane lab will have great financial impact for Louisiana.

He says that while humans began synthesizing polymers in the 19th century, nature beat humankind to polymerization reactions by hundreds of millions of years.

"The major families of biological molecules nucleic acids like DNA, proteins, and polysaccharides are all macromolecules, often called biopolymers. Most of these

biopolymers are 'intelligent,' in that through evolution they have stored vast amounts of biological information in the form of a genetic code," explains Reed.

Some familiar synthetic polymers include nylon, Teflon, Plexiglas and latexes. The uses for synthetic polymers are vast and include pharmaceuticals, medical materials, building materials, agricultural products, paints, cosmetics, coatings, adhesives, water treatment products, inks, oil recovery agents, and much more.

Despite their versatility, explains Reed, human-created polymers are extremely simple and primitive compared to biopolymers that occur in nature.

"The 21st century promises a revolution in 'smart' polymers that will be used for many types of applications, such as encapsulating and delivering drugs, producing self-healing materials, environmental, biological, and industrial sensors, nanomaterials for electronics, optics and more," says Reed.

The new lab will accelerate Tulane's research and development of new polymeric materials in physics, inventing and developing new instruments, analyses and tools that will allows chemists to monitor and quantitatively analyze their new reactions and resulting products. Some of Reed's inventions already have been licensed by Tulane to industry and are in production. Growing private-sector collaborations are a crucial component of the lab's strategy as it goes forward, Reed says.

Advisory board members for the new polymer lab are, from left, Dan BornÃ©, Ronald Evans, Hyuk Yu, William Bottoms, Walther Tscharnuter and John McConville. In the front row from right are lab team members Michael Drenski, professor Wayne

Reed and Alina Alb. (Photo by Kathryn Hobgood)

"We have a very ambitious goal to be able to produce highly sophisticated polymers with desired properties 'on command.' This would represent a major breakthrough in polymer science and industry," he adds.

"For over 20 years my group has had global contacts and collaborations, yet we have never had significant contact with the gigantic Louisiana chemical industry, a world-class titan in the area of polymer production," says Reed, who is excited to have three outstanding businessmen from Louisiana on the lab's advisory board.

"Our hope is to carry out a series of Louisiana initiatives, including outreach to students, educating them about the great career opportunities that exist for them in Louisiana, offering partnerships with industries for R&D, problem solving, and high-level analysis services, and forming a task force on polymerization reaction monitoring."

Integral to the lab's success are Alina M. Alb, associate director for research, and Michael Drenski, associate director for instrumentation, according to Reed.

"Both of these individuals have made continuous, fundamental contributions to our state-of-the-art developments for the past eight years," Reed says.