phage therapy, which could replace antibiotics because of their potential to treat bacterial infections using phages because of their potential to give us major insights in this case. "You can see it in a book, but it doesn’t really tell how it is structured or how it interacts," she says. "To see it on the screen in 3-D is completely different. It really expands what they think about these protein complexes."

CHEMISTRY

A Better Solar Cell

A new generation of solar cells, organic solar cells may promise an answer to the energy demands of the future. These cells contain organic semiconductors and are the center of research under way in the laboratory of Mark Chen. Chen, assistant professor of chemistry, studies materials design and has primarily focused on the development of polymers in emerging solar technologies. Organic semiconductors are nonmetallic, carbon-based materials that possess the ability to conduct electrons. Semiconductivity can occur with single molecules, short chains of molecules and long polymer chains, depending on the material. He is investigating ways in which these molecules can be employed to develop a better semiconductor. Chen and his colleagues are designing new compounds with semiconducting properties in the laboratory, and the work has yielded promising results in an effort to achieve power-conversion efficiencies above eight percent.

"In the laboratory, we’re aiming for 10 percent," says Chen. "We currently get six or seven, but about four years ago, the best we were getting was five. It's not efficient. These devices are much thinner, and they could be complementary to commercially available silicon-based solar cells."

Organic photovoltaics (OPVs) continue to attract research attention for their potential to be flexible, lightweight and efficient devices for power generation. OPV devices convert solar energy to electrical energy. A typical OPV device consists of one or several photoactive materials sandwiched between two electrodes. Organic photovoltaic cells are solar cells that use organic polymers and small molecules as the active layer for light absorption and charge transport.

Organic semiconductors are currently employed in technologies such as flat-screen televisions, and Chen says these substances could help make solar technologies less costly. One advantage of OPV technology is that manufacturing costs can be reduced for organic solar cells compared to silicon-based materials.

"If we can use organics, sometimes they can be thinner and more efficient. Our research begins in the actual chemical synthesis, which will be followed by taking these compounds and making electronic devices with them."

The advantages of organic photovoltaic cells include low cost manufacturing technology, low raw material consumption, reduced weight, and the flexibility of the plastic substrates.