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Shape-shifters to the Rescue

An interview with Professor Eugenia Kumacheva
Materials Chemist, University of Toronto

What is soft matter?

In most general terms, I'm working on material science of soft matter, which means that I work on everything that is soft and everything that we can use for particular applications. We work on materials that are self-shaping. For example, under a particular trigger that can be light or temperature, they acquire a particular shape; and they actually select the shape that is most energy-saving and space-saving. So we conceptualize and design and synthesize and fabricate these materials and we encode in them a particular program that will help them to acquire a particular shape. We are learning from nature how plants, for example, acquire a particular shape that allows them to acquire a lot of sun energy. And these materials are called soft-robotics materials. So basically they will be used to actuate a particular function, a particular motion. They can be used in bioengineering, in tissue engineering, in sensing, and for security purposes, as well.

What are the specific applications of your research?

I believe that in 5 years or 10 years, people will start making these materials and will target specific applications. For example, being used in cardiovascular treatment or in sensing, or in implants. So I believe this is the future – mostly biomedical applications. This is a good field because you can use both fundamental science and target a particular application, so you can actually see the end of your project or research, see that it really makes a difference. We are always thinking, we are always inventing, we are always creating – so it never leaves us. We are like artists.