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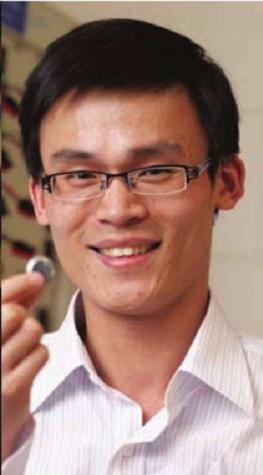
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On the Cover: Paul Paolatto, director of WORLDDiscoveries, the business development arm of London's research network and bridge between invention and industry



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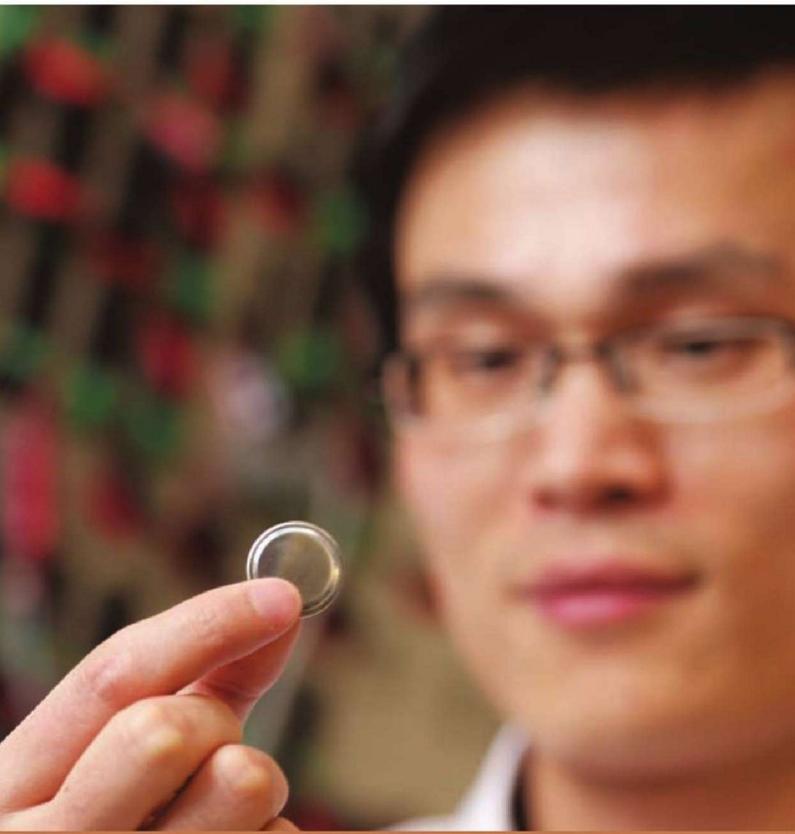
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Lithium-ion battery expert Jiajun Wang holds a developmental battery in which nanotechnology is being employed to create coatings to enhance stability, reduce charging times, and improve performance and safety characteristics

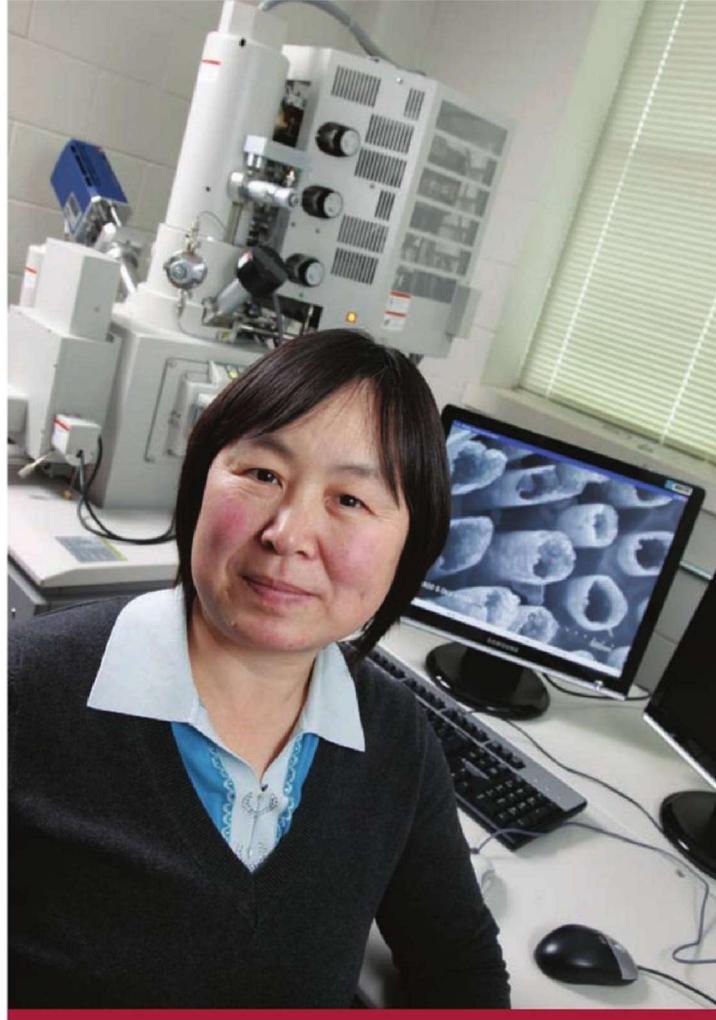
Accelerating automotive technology

Dr. Andrew Hrymak, Western's new dean of engineering, says his faculty will succeed by thinking globally and acting locally. "We have a group of very promising nano-engineers," says Hrymak. "Our scientists are working with General Motors on electric cars that use nanotechnology. If that flies, we are looking at a very big thing."

Nanotechnology is the fabrication and manipulation of matter on a scale of less than 100 nanometers in size. In this environment, the head of a pin looks like a boulder. Nanostructures, such as wires and tubes, are engineered by using chemical vapor deposition on different materials like carbon, titanium, and platinum. To be seen at all, nanostructures need to be viewed under powerful scanning and transmission electron microscopes.

The engineer and professor in charge of the nanotechnology lab and its 19 scientists is Dr. Xueliang Sun. Sun, who also goes by Andy, holds the distinguished Canada Research Chair in the development of nanomaterials for fuel cell applications.

The biggest barrier to the widespread adoption of fuel cell technology is cost. The so-called "noble" catalysts made of platinum in the membrane electrode assembly of



Ruying (Kathy) Li is one of 19 scientists forming the Nano+Energy@Western Group. Working with nanomaterials for fuel cells and sensor electronics, the group has distinguished itself as a leader in nanotechnology and clean energy research

a fuel cell are expensive—often representing up to 50% of its price. Sun's challenge is to reduce that cost by a factor of four.

Since 2005, Sun's nanotechnology lab has worked on fuel cells and batteries with General Motors, B.C.-based Ballard Power Systems, and Lithium Phostech Inc. of Quebec. His group is the first in the world to develop and patent a 3D nanocomposite structure that fuses nanowires to a stable carbon nanotube and adds platinum particles.

"In any new technology, you get the patent first," says Sun. "With GM, we have applied for four patents and three have been awarded. We have a master agreement over IP [intellectual property] issues."

Work on battery technology is taking aim at reducing recharging times. "You can't wait for three days to recharge your car battery," says Jiajun Wang, the team's lithium-ion battery expert. "But short-term charging creates stability problems." They use nanotechnology to create a coating to enhance stability.

Another nanotechnology battery application comes in the area of improved safety. "There are explosions," Wang says matter-of-factly. "The material is safe in computers, but you need to produce much more thermal power for a car."