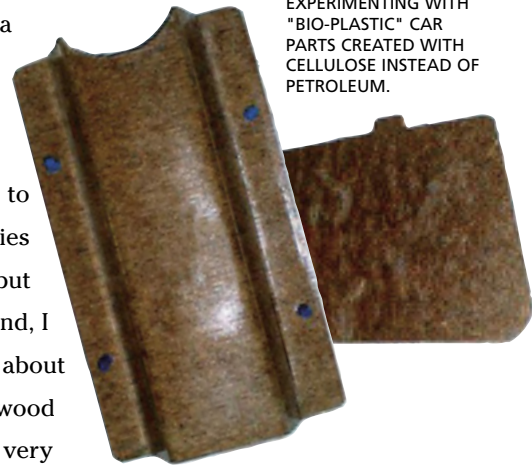


Ideas on the Edge



anything but. Dr. Sain's research focuses on "bioplastics"—materials that share key characteristics with petroleum based plastic, but are made from plant fibre sources like corn, soybean, hemp and wood pulp.

The University of Toronto scientist got his start working as a polymer-processing engineer in the pulp and paper industry. "My primary job was to improve the properties of paper," he says, "but in the back of my mind, I was always thinking about alternative uses for wood products." From the very beginning, Dr. Sain saw the potential for microscopic strands of plant fibre as a replacement for glass fibres to



UNIVERSITY OF TORONTO RESEARCHERS ARE EXPERIMENTING WITH "BIO-PLASTIC" CAR PARTS CREATED WITH CELLULOSE INSTEAD OF PETROLEUM.

Forget Plastics. The Future Is Pulp.

CAR PARTS FROM TREES? UNIVERSITY OF TORONTO RESEARCHER MOHINI SAIN IS CLOSE TO MAKING IT HAPPEN.

It's been over 40 years since a family friend gave young Benjamin Braddock a famous one-word heads-up in the movie *The Graduate*. Back in 1967, plastics were indeed the future—especially for cars. But today, Ben's would-be mentor might choose another word: pulp.

Car parts from the same stuff we use to make paper? The idea seems...well, quaint at best. But to Dr. Mohini Sain, it's



MOHINI SAIN

RESEARCH THAT MATTERS
 REAL-WORLD BENEFITS FOR ONTARIANS:

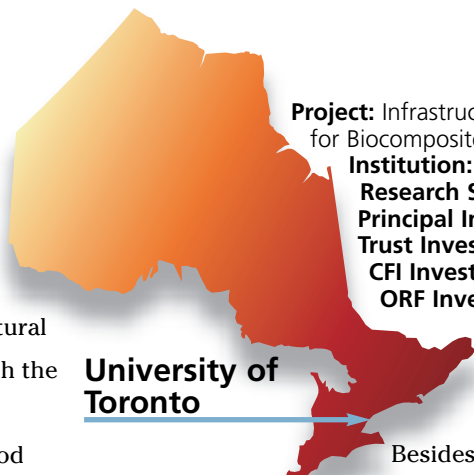
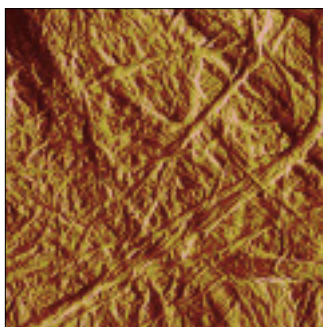
- lighter, greener cars
- leadership for Ontario in the emerging bio-composites industry

strengthen plastics, and in the late 1990s, he began to focus his research efforts exclusively in this area.

He's since spun off a company to make the natural-fibre and plastic

composites. And now he's pushing the concept even further—with a little help on the equipment side from the Ontario Innovation Trust. His new goal is to create plastic-like materials made exclusively from natural fibre—no petroleum at all—but with the strength of steel. Bumpers, interior panels and other car parts from wood pulp may be just around the corner.

Like most materials scientists, Dr. Sain is working at the nano-scale—a nanometre being one-billionth of a metre. Using complex chemical and heat processes, he teases long cellulose fibres only a few nanometres thick from the larger bundles in which they naturally occur, then disperses them evenly in a natural resin. The result is a light, resilient and easy-to-form bioplastic with a very green pedigree.



University of Toronto

Project: Infrastructure Facility for Centre for Biocomposites and Biomaterials Processing
Institution: University of Toronto
Research Sector: Engineering
Principal Investigator: Mohini Sain
Trust Investment: \$1,562,571
CFI Investment: \$2,267,553
ORF Investment: \$704,982
Total research investment from all sources: \$5,762,281

Besides being petroleum-free, the new composites would take less energy to make than steel and regular plastic—think less greenhouse gas release. And they'd be completely recyclable.

But there are even broader environmental implications. As the controversy over ethanol has shown, even “green” technologies can have a down-side, especially when they divert raw materials like corn, soy and sugar from the world's food supply—a fact that hasn't escaped Dr. Sain. “We have to come up with an industrial crop,” he says, “that will enable us to make these materials independent of the food chain.”

And it just so happens that nobody nibbles on wood pulp.



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Infrastructure for Innovation About the Ontario Innovation Trust

The Ontario Innovation Trust was created in 1999 by the Government of Ontario to invest in research equipment and facilities at Ontario's universities, colleges, hospitals and other non-profit research institutions. The Trust is governed by a volunteer Board of Directors, according to the terms of a Trust agreement established by the Ontario government. A small permanent staff looks after day-to-day operations.

Since its inception, the Trust has committed almost \$843 million to strengthen Ontario's position in the global marketplace of ideas. This represents more than a third of the \$2.44 billion in total funding that has been invested in Trust-supported projects.