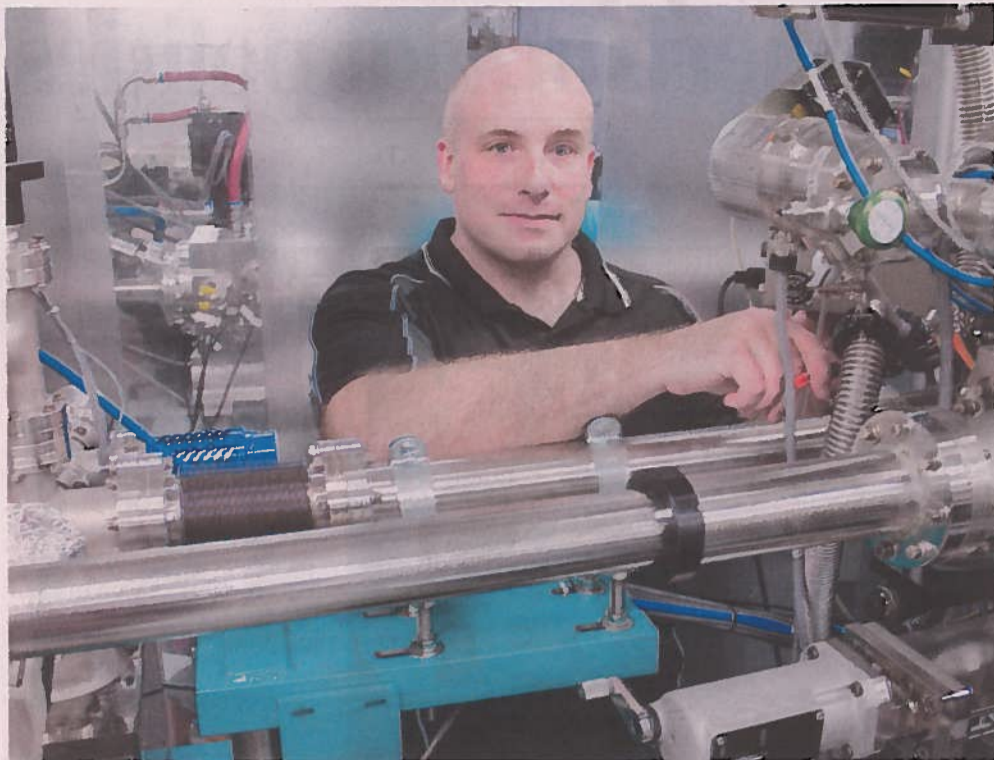


YOUNG INNOVATORS



MARK FERGUSON/The University of Saskatchewan

University of Saskatchewan student Adrian Hunt is using the Canadian Light Source synchrotron to study graphene, which is flexible like rubber, a better conductor than copper, and 100 times stronger than steel.

# Student sees the light in world's thinnest material

THOMAS ONION  
FOR THE STARPHOENIX

With \$105,000 in federal research funding, University of Saskatchewan physics student Adrian Hunt is using the Canadian Light Source synchrotron to study a new material that's been causing a stir in the scientific world.

The material, called graphene, is the world's first 2D crystal. Scientists first created it less than a decade ago by making the mineral graphite as thin as physically possible: a layer one atom thick.

Despite being so thin, graphene is flexible like rubber, a better conductor than copper, and 100 times stronger than steel — special properties that could make it ideal for use in everything from artificial muscles to futuristic foldable computer display screens.

"Graphene is arguably one of the most promising materials in materials science today," says Alexander Moewes, Hunt's supervisor and U of S Canada Research Chair (CRC).

But to use it for the technologies of the future, scientists need to more fully understand the material. Using the synchrotron at the U of S, PhD student Hunt has revealed a number of graphene's previously unknown properties, focusing on graphene's potential to improve solar energy cells.

"I am driven by one goal

alone: cheap and clean energy for all," says the father of three, who returned to the university after three years working in industry.

"We need to come up with ways to supply energy that allow people to live the advanced lifestyle they have, but also doesn't destroy the planet or harm the economy."

Graphene-based solar cells would be both cheaper and more versatile than today's large solar panels. Acting like a 'solar skin' on top of a house, car or electronic device, the graphene-based cell could mould directly to the shape of whatever it powers.

These solar cells could be made with a form of the material called graphene oxide. The added oxygen atoms allow graphene to absorb light much more effectively. However, they also cause the material to break after a short time.

Hunt used the synchrotron to explain precisely what happens on the molecular level to cause that breakage. He then found a way to prepare graphene oxide which prevents the breaking process from happening.

Use of the synchrotron was essential for his findings.

"The synchrotron allows me to see where the electrons are in respect to one another and how they interact," he says.

Hunt examines how synchrotron light interacts

with materials. Each atom, and each atomic bond, interact with light differently. When the frequency is just right, the atom resonates, allowing him to identify a material's molecular structure just as a musician with perfect pitch recognizes a G note when the proper guitar string is played.

Moewes and Hunt collaborated on a publication of this research which earned a nomination for the ENI, an Italian award billed by journalists as the Nobel Prize of green energy.

Scientists are excited about the possibility of using cheap, organic materials such as graphene to replace the expensive, toxic metals used in today's solar panels.

"Currently, organic solar cells are uncommon in the marketplace because they only last half as long," says Hunt.

Research into the durability of graphene oxide is crucial to making the material a viable option for solar energy.

Hunt has made other discoveries that explain how graphene oxide acts as a semiconductor — important knowledge for using graphene in the next generation of computers.

Hunt's research is funded by his three-year grant from the Natural Sciences and Engineering Research Council (NSERC), the CRC program, and the U of S.

Thomas Onion is a graduate student intern in U of S research communications.

CHILD DEATH

# Tensions erupt in courthouse

HEATHER POLISCHUK  
THE LEADER-POST

REGINA — Tensions heated by grief and anger led to yelling and an apparent physical altercation in the hallway at Regina's provincial courthouse on the first day of a preliminary hearing related to the 2012 death of a four-year-old girl.

Kevin Eric Goforth, 38, and Tammy Lynn Goforth, 37, are each charged with manslaughter in the Aug. 2, 2012, death of June Alexis Dawn Goforth and criminal negligence causing bodily harm in relation to June's sister, who was two at the time.

The Goforths — who were said to be husband and wife when charges were laid — were caregivers to the girls in Regina when the alleged offences occurred, but are not the biological parents, police previously said.

Details of evidence heard at the preliminary hearing — set to continue throughout the week — can't be reported because of a court-imposed publication ban. The hearing will determine whether the Crown has sufficient evidence to take the case to trial.

Should the matter go to trial, lawyers for the two ac-



RACHEL PSUTKA/Leader-Post file photo

A preliminary hearing on manslaughter charges has begun.

cused said they want the case heard in front of a Queen's Bench judge sitting without a jury.

Among numerous people who attended court on Monday were supporters of the two accused on one side of the courtroom, while on the other side was the girls' mother, Natasha Goforth, and those present to support her.

The two sides have clashed in the past, and those continuing tensions were evident once again in the afternoon, when court had to be adjourned twice to allow deputy sheriffs and police to contend with people yelling at each other in the hallway outside of the courtroom and, at one point, what sounded to be the beginning of a physical altercation.

Several people reportedly had to be escorted out of the building, and Judge Carol Snell and deputy sheriffs issued stern warnings to those remaining that similar outbursts would result in people being removed and not allowed back in.

According to information previously released by the Regina Police Service, little June was taken to hospital on Aug. 1, 2012. She arrived in an unresponsive state and was revived, but died the following evening. Police had also located her two-year-old sister and brought her to hospital.

Kevin and Tammy Goforth were both previously released from custody and are each subject to conditions while out in the community. hpollschuk@leaderpost.com

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ENVIRONMENT

# Dutch elm disease not spreading

THE STARPHOENIX

diseased trees was up from 2012, the increase is attribut-

burned. Municipalities can designate their own disposal