

Ideas

April, 2011

Updates: Pollutants to Products Initiative

Weixing Tan and his research team at Grande Prairie Regional College, continue to pursue several applied research projects that aim to not only reduce pollutants and carbon emissions but to turn pollutants into products.

First, the newest addition to the initiative is a project for oil sands, wetland reclamation. In this project Tan and his team are experimenting with the winter planting of black spruce seedlings. By planting in the winter months, the wetlands are accessible on the frost with far less disturbance and hopefully a higher seedling survival rate and therefore higher CO₂ capture rates.

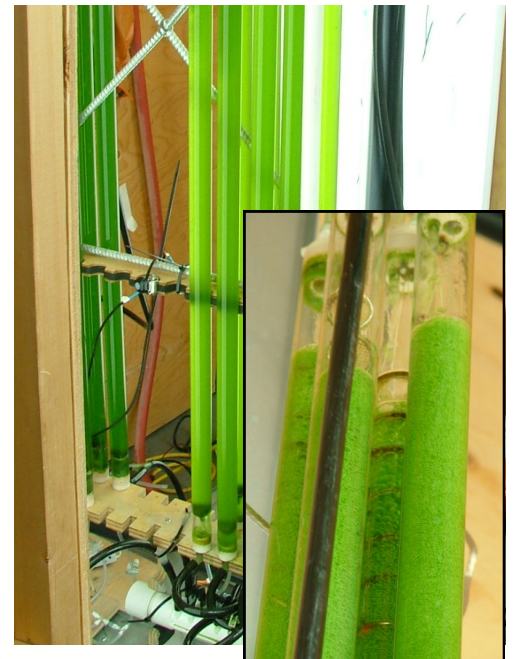
Next, the carbon bio-capture using microalgae project will soon have a new home. A solarium is presently under construction in the Trades Building at GPRC. The new solarium is scheduled to be ready to house the scaled-up version of the project by this June.

The project utilizes the natural cleaning talent of single-cell microalgae to bio-capture CO₂ and other air pollutants. An added benefit of this process is that it also produces micro-algae products such as food/nutrients, industrial fiber and animal feed which are all very commercially viable.

New signage for the Training Forest will be going up along highway 43 just east of the Forestry Trunk Road. This forest is designed to improve reforestation technology and increase CO₂ conversion to industrial wood fiber.

A new information sign will also be erected at the Effluent to Fiber Project site in Clairmont where they are converting effluent and bio-solids to industrial wood fiber.

And finally, Pollutants to Products has an official logo and soon, an official website. Be sure to check out www.pollutantstoproducts.com in the next few weeks.



DI Rocked GPRC

March 18, 2011 Grande Prairie Regional College played host to 245 participants in the Destination ImagiNation Tournament. 160 of Grande Prairie's brightest and best students from grades one to nine in the Gifted Child Program from three different school districts, met to compete along with their managers, teachers, parents and volunteers.

Destination ImagiNation (www.idodi.org) is an international not-for-profit organization dedicated to fostering creativity, problem solving and team building in students around the world.

A first for the Peace Region, the tournament was also only the second to be held in the province. Therefore, winners from this tournament will represent not only Grande Prairie but Alberta and Canada at the Global Competition in Knoxville, Tennessee.

"The display of creativity, problem solving, and enthusiasm for learning from all students was incredibly impressive! Students are not likely to remember those thrilling lessons they received this week on lowest common denominators, but I wager most of them will remember the teamwork, integration of engineering and creativity, etc. forever," remarked Sandy McDonald, Director of Educational Technology, Grande Prairie Public School District.

"Engaged, ethical, and entrepreneurial students were out in force at GPRC on Friday!"

CCUVS-NW

The Canadian Centre for Unmanned Vehicle Systems - Northwest is open for business with an office in GPRC's Fairview campus.

Ever since their opening, the pace has been fast and furious with presentations to the Canadian Owners and Pilots Associations, Fairview Town Council, at the Peace Agri-Classic, to the Honourable Hector Goudreau, Minister of Municipal Affairs and to the Alberta Emergency Management Agency. Each of these presentations has been to spread the word on how unmanned vehicles can be utilized in a variety of situations and the message is not only being heard but acted upon.

At present, CCUVS-NW has requested \$189,000 for a regional pilot project to create a centralized unmanned vehicle emergency response command center.

"We're proposing to pilot the project regionally with the goal of eventually expanding Provincially," said Lloyd Sherk, Project Manager CCUVS-NW.

Unmanned vehicles are perfect for jobs that are too dull, dirty or dangerous for human response in the air, on land or on or below the surface of the water. These situations tend to be quite commonplace when it comes to emergency response and are then perfect for UVS.

For more information on CCUVS-NW call: 780-835-6621 or email: ccuvsnw@gprc.ab.ca.

Affordable 3D Printers

Edited and reprinted from itbusiness.ca, March/11

Today's 3D printers can print out robots, eyeglass frames, foods, tools, toys, and more. But what's really making news is their plummeting prices that make these printers more affordable for small businesses and consumers.

3D printing is a form of additive manufacturing technology where a three-dimensional object is created by laying down successive layers of material.

The layers are defined by software that takes a series of digital slices through a computer-aided design. Each slice is then printed one on top of the other to create the 3D object.

Though the process has been around since the early 1990's, it had a relatively low profile until recently. In part this was due to the five or six figure prices that early 3D printers commanded, and in part it reflected the relatively low quality of the objects the printers produced. In the past few years, however, the prices of 3D printing systems have dropped to a more reasonable level: \$1000 to \$3000 is the normal range.

The printers' greater affordability, along with the increased number of options available for home 3D printing kits, has helped take 3D printing out of specialized industrial use and put it into the hands of geeks and hackers across the country. At the same time, hackers are coming up with components to make the printing process more precise.

Jeff Lipton, the head of Cornell's Fab@Home 3D Printing projects

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says that prices are likely to sink further as 3D printers follow the same path that the personal computer took in its transition from hacker hobby to major tech industry.

"The personal computer revolution moved computers from integrated machines to a combination of standardized components made by dozens of manufacturers," Lipton says. "We need the field to start moving in that direction."

3D printing is still looking for its killer app: an idea with broad enough appeal to capture the attention of the masses. There are, however, a few interesting prospects already on the table.

Lowering prices and offering home 3D printing kits is bringing 3D printing to an ever-growing segment of the population. This seems to be the direction of the MakerBot Industries team, as evidenced by the company's relatively low-cost 3D Printer kits.

In addition to its entry-level Cupcake CNC machine, MakerBot has produced a more-powerful Thing-o-Matic model, which costs just over a grand and allows the user to print larger and more accurate 3D objects than the Cupcake CNC does.

But rather than just resting content with the relatively low cost of its kits, the MakerBot team has also started Thingiverse, a site for sharing useful 3D printable designs. The site already offers tons of useful designs for downloading and printing out on a MakerBot or other 3D printer. The designs range from a

printable pair of glasses to a printable Rubix cube to printable replacement parts and upgrades for the 3D printers themselves.

One of the chief limitations of the MakerBot and most other home 3D printers on the market, involves the



materials they require for printing. Though 3D printing methods permit 3D printing of dozens of different types of materials, ranging from metals to ceramics, 3D printing at home rarely uses anything but plastics. Qualities such as pliability and a low melting point make plastic a great 3D printing material, but those same qualities make it unsuitable for such end products as a hammer or a microwave-safe plate.

The technologies required for non-plastic 3D printing remain out of the reach of average consumers, but various online services have popped up in recent years offering 3D printing of 3D models of anything you upload to them, in various ma-

terials. One of the most prominent of these services is Shapeways, a 3D printing service launched in 2008. In addition to plastics, Shapeways provides 3D printing of models in steel, sandstone, and glass and recently added an option to print your designs in silver. After producing the printed 3D object, Shapeways mails it to you.

Of course, multi-material printing needn't remain beyond the budgets of home users forever.

"Just as the integrated processor was needed before personal computing was feasible, multi-material printing is going to enable the killer app," Lipton says. "If you look at personal computing, the killer app was video games, and no one could have predicted that from the processor."

He continues: "Everyone knows that you will own one or more personal fabricators, but no one knows what you will use them for. You only find out the killer app



once the machine is in enough hands and people start doing cool and weird things that experts would never have predicted."

PeRMA Update

Lloyd Sherk, Project Coordinator for PeRMA is representing the region at the National Buyers/Sellers Forum March 29-31, 2011 in Edmonton where opportunities abound.

This year's theme is "Opportunities Through Innovative Partnerships" and will focus on Alberta's oil sands.

With a huge pipeline of international investment flowing to the oil sands developments, activity levels are expected to set new records by 2012 placing massive demand on North America's industrial and commercial service and supply markets.

To meet this upcoming demand, energy producers (and smart suppliers) will be rethinking the supply chain. The new oil sands supply chain is defined by a series of extensive partnerships that form integrated supply networks to handle growing procurement demands. As a result, suppliers need to re-think how they get business and deliver services. Collaboration will be key to success.

Alberta remains the Canadian gateway to procurement and supply opportunities in the global heavy oil industry. During this time of moderate growth, there remains billions of dollars in major projects in Alberta resulting in countless long-term opportunities for industrial suppliers,

including:

- Maintenance Repair and Operations (MRO) - estimated at \$30 billion for 2010-2011.
- Estimated annual capital investments—\$20 billion per year for 2010-2011.
- The supply chain associated with the implementation of new environmental and energy efficient technologies.

Recent oil sands investments announcements:

- On December 17, 2010, Total and Suncor have agreed to jointly build two new mines and the Voyageur upgrader bitumen upgrader. The two mines will cost roughly \$15.6 billion, while it will cost another \$6 billion or so to complete Voyageur. Combined with what it has already spent to acquire an oil sands stake, that means Total alone will spend \$20 billion on Canadian projects by 2020. The French oil giant will spend the next few years boosting its Alberta work force from its current 250 to 1,400.
- In November 2010, Husky and BP announced the go-ahead for construction of the Sunrise SAGD oil sands project. Phase 1 will cost \$2.5 billion and will produce 60,000 barrels of bitumen per day when completed in early 2015.

Published by

The Centre for Research & Innovation

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Frequent Contributors: Jim Smith, Jim Letersky and Gary Christopherson

Financial support
provided in part by

 **Rural Alberta**
Development Fund
www.radf.ca

The Centre for Research & Innovation (CRI) is a joint project of the Peace Region Economic Development Alliance (PREDA) and Grande Prairie Regional College (GPRC). Financial support for the CRI comes, in part, from the federal, provincial and regional governments and industry.

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