

Pulp Digest

November 2014

Meritorious Achievement Award



James Olson, UBC Applied Science associate dean and professor, accepting the 2014 APEGBC Meritorious Achievement Award from President Michael Bapty, P.Eng., FEC.
Photo: Andrea Sunderland.

At APEGBC's October 24th President's Award Gala, Professor James Olson, P.Eng, received the 2014 Meritorious Achievement Award for his outstanding technical achievements and leadership in advancing BC's pulp and paper industry. An industry leading expert in the application of physics and fluid mechanics, Olson's research has led to revolutionary developments in the pulp and paper industry.

"Instead of just making solid wood pulp and paper, there are opportunities for making a wide variety of bio-based energy fuel chemicals and materials which can be used in virtually all products," says Olson.

He currently leads a five-year university-industry collaborative research program (www.energyreduction.ppc.ubc.ca) through the National Sciences and Engineering Research Council of Canada that brings together BC Hydro, FPInnovations, along with mechanical pulp mills and their key suppliers in BC, Alberta, and recently expanded to include mills in Sweden, New Zealand and United States.

"James was influential in unifying the voice of the industry to leverage government research grants. He put together a

partnership of fourteen companies. The industry can share the risks while obtaining all the benefits of the research results," says Markus Zeller of BC Hydro.

The goal of the program is to reduce energy consumption. The research demonstrated a potential of 20% energy savings through the development of several innovative technologies.

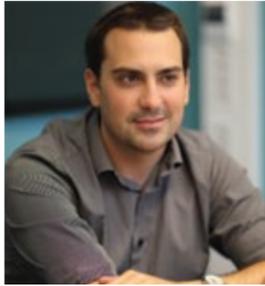
Olson is also the lead researcher on the development and commercialization of the Fibre Quality Analyzer (FQA), a device that measures the physical properties of pulp fibres in suspension, and has become the accepted world standard for measuring key fibre properties. More recently, Olson has revolutionized pulp screen rotor technology. More than 100 mills in Canada and around the world are now employing this new technology which Olson predicts could save BC \$20 million per year.

Visit ppc.ubc.ca to watch APEGBC's President's Awards video of Professor Olson.



New Faces

Please join us in welcoming some new faces to the Pulp and Paper Centre:



Mathias

Mathias Kvick

Postdoctoral Research Fellow in Chemical and Biological Engineering working with Professor Mark Martinez. His current research project will aim to develop a new experimental method to investigate the effect of embossing pattern on the absorption rate in a paper sheet.

Mathias received his MSc in Vehicle Engineering (2009) and recently finished his PhD in Engineering Mechanics (2014), both from Royal Institute of Technology (KTH), Stockholm, Sweden. His PhD investigated the effect of cellulose nano fibrils on laminar/turbulent transition.

Q&A with Hannes Vomhoff

Hannes Vomhoff, Research Manager, Paper Technology Group at Innventia AB, will visit the Pulp and Paper Centre on November 7th to give a seminar on an "Overview on stock preparation and tissue research at Innventia". *View page 6 for full bio and abstract.* We took this opportunity to talk with Hannes about industry, novel products, and even asked for career advice.

Is it true you were a summer student at the PPC in the '90s?

Yes that is correct, I worked during the summer of 1990 for 5 months under the supervision of Prof. Richard Kerekes. At that time, I was studying paper technology in the M. Eng. program at the University of Darmstadt, Germany. I was simulating the time-dependent variation in contact area between two refiner plates in a refiner. To be honest, the stay in Vancouver was the best time, not only professionally as I learnt a lot, but also the new friends I made and I even learned to sail at the UBC sailing club (I still remember eating a hamburger on the veranda of the UBC sailing club on Jericho beach after the sailing lessons).

Do you think the methods of stock preparation and tissue research have changed over the last 15+ years?

Yes. For example, in respect to stock preparation research, the industrial introduction of a novel design of refining segments have made a big change. Furthermore, fractionation equipment, for example hydrocyclones, have improved the material- and energy-efficiency in the paper industry. In addition, all CNF processes that have been developed in recent years have also improved the understanding of the present stock preparation processes. In respect to tissue research, several new production processes have been introduced by the machine suppliers, and it is very interesting to follow how the properties of these products compare to the properties of the established products.

Since there has been a significant decrease in paper production for publication, what novel products from paper products/fibres do you foresee in the next 10-20 years?

When it comes to standard paper grades, highly-extensible

paper grades will open up new opportunities in packaging. Another one is chemical pulp for tissue products, where the global demand is growing. However, one has to remember, that present producers of these materials are not sleeping. Entering a new market is always a challenge. Pulp fibre-based products have to have a unique feature, for example the environmental profile or design features, in order to convince a packaging producer to take the step towards testing a new product. One aspect in this context can be environmental legislation that can change the boundary conditions of a market and force producers to change their raw material.

What applications do you see using pulp and paper fibres in the future?

I have no particular product in my mind, but I am sure that there will be some advanced niche-products based on pulp and paper fibres. The main question for the pulp and paper industry is if these products will be large in terms of tons of pulp. My guess regarding the future is that most of the turn-over will still be generated with traditional products, which is why the pulp, paper and board producers should not forget to keep improving these products and their production process.

What do you like best about working for Innventia?

Having a lot of freedom regarding the research topics, however under the responsibility to generate financing of research projects. Good working atmosphere among the colleagues. The balance of working with the industry and the university. Innventia being located in Stockholm, which is a very nice city.

Do you have any advice for graduate students currently looking for jobs in industry/research?

If you are interested in working with advanced and complex technology, try to find a job in the pulp and paper industry. There are still plenty of opportunities and unsolved technical problems, it is just important to learn the language and the boundary conditions of the industry. I would also say don't be afraid to test new things and try to see different mills.

Awards & Achievements



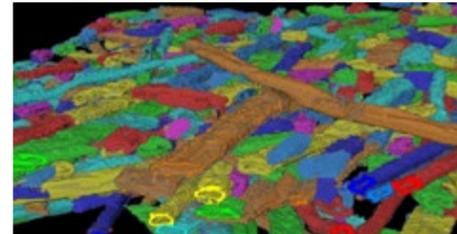
Meritorious Achievement Award

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TEDx RenfrewCollingwood

On Saturday October 25th in front of an audience of several hundred delegates, PPC researcher Ata Sina gave a TEDx talk on "The Power of Paper". The event marks another milestone in his research on complex self-folding 3D paper products which he hopes will one day provide a sustainable alternative to non-renewable resources. A video of the talk will be available on the TEDx YouTube channel soon.



Journal Cover

Appearing on the cover of November's issue of **Analytical Methods**, a scientific journal, is Yash Sharma's image of 1000 papermaking fibres, identified uniquely, within a 1mm x 1mm section of paper handsheet. Sharma is a MASc candidate in Mechanical Engineering, Okanagan, under the supervision of Dr. Andre Phillion and Dr. Mark Martinez.

United Way - Turkey 2k Trot



PPC team: Solmaz Talebipour, Hoda Ahmadi, Negar Mirvakili, Sima Motiee & Subashini Vashisth

Engineering student David Slade won the second annual Applied Science Turkey 2K Trot and raised \$1,202.48 for the United Way of the Lower Mainland. His donation was matched by UBC President Arvind Gupta and Applied Science Dean Marc Parlange.

The Turkey 2K Trot raised \$9,000 for the United Way and brought together 200 students, faculty and staff from across UBC, more than tripling donations and participation from 2013.

"I'm delighted to see the increasing enthusiasm within Applied Science and across campus for the Turkey 2K," says Dean Parlange. "One of our true strengths at UBC is our ability to bring people—students, faculty and staff—together to address challenges. Usually we effect change through learning and research, but today it was about engaging our communities to raise money for a great cause."

The Centre had an all-female team at the race, with several other researchers coming out to cheer on the sidelines.

Reviewed by PPC Faculty Associate Dr. Richard Branion, Professor Emeritus, Chemical & Biological Engineering, UBC

“THE PAPER TRAIL, AN UNEXPECTED HISTORY OF THE WORLD’S GREATEST INVENTION”

by Alexander Monro, published by Allen Lane an Imprint of Penguin Books, 2014

When I purchased this book I was hoping to find a history of papermaking from its earliest beginnings in China to the latest developments in papermaking machinery. In it there is not much of the latter but plenty of the former. The history of the papermaking process as covered in this book essentially ends at the end of the 18th century. Also included is a brief discussion of the increasing incursion of electronic transmission of information into the realm of its transmission by paper. If you are interested in history in general and of paper in particular, you should find this book interesting.

The author is not a papermaking technologist but is a journalist, at times a resident of China, specializing in Chinese affairs including Chinese history, hence the emphasis on the early history of papermaking. The book not only includes information on the early papermaking processes and its raw materials, but contains a discussion of the various uses of paper products and their impact on art, politics, literacy, education, science, religion, music, poetry, literature, etc.

In addition to being a history of the papermaking process this book is also a history of the development of writing and printing and their role in capturing ideas, images and information contributing to their longevity and dissemination. Early materials on which writing was recorded included stone, clay tablets, papyrus made from reed strips, parchment made from animal skins, bamboo strips, and turtle shells. All of these had serious deficiencies compare to paper in one way or another, in terms of portability, fragility and/or cost. In comparison paper was cheap, portable and fairly durable; shreds of paper from the 2nd century BC have been discovered still hanging together.

Below are listed a few items, that interested me, gleaned from this book:

Factoid 1: In 1919, at the end of WW1, there was a debate to determine what kind of paper to use for the final copy of The Treaty of Versailles. Paper of Japanese manufacture was chosen.

Factoid 2: In WW2 Japan constructed 1000s of paper balloons filled with hydrogen and carrying a load of explosives which it was hoped would follow the jet stream to North America, and blow up. Some reached BC. A few people were killed in

Oregon. LATE NOTE: One was just discovered (October 2014) and detonated by the military in the Okanagan where it had landed in a forest some 70 years ago!

Factoid 3: As far back as the eleventh century there were shops in Japan selling recycled paper. It was not deinked and grey in colour.

Factoid 4: In 767 AD so much loot was taken by invaders of China’s capital that officials had to resort to clothes made of paper

Factoid 5: Printing on paper began in the 8th century in China.

Factoid 6: Early Chinese paper sheets were dyed with a yellow dye that inhibited insect attack on the paper.

Factoid 7: Timur (aka Tamarlane), a Central Asian emperor (ruled 1370-1405), had produced a copy of the Koran on sheets of paper in which each page measured 5 feet by 7 feet, requiring some 29,000 square feet of paper. He also had made a sheet of paper 50 feet long, this being handmade paper before the advent of the papermachine.

Factoid 8: When Martin Luther was on trial for alleged defamation, via his widely disseminated books and pamphlets printed on paper, of the Roman Catholic Church and its Pope and was likely to be found guilty, he was kidnapped by a concerned German nobleman and stashed away in his castle for Luther’s own protection.

Factoid 9: In 1680 the Hollander beater (the precursor of the modern pulp refiner) was created. It could process more pulp in an hour than its predecessor stamp mills could produce in a day.

Factoid 10: The Fourdrinier papermachine was first patented in France in 1799. It permitted production of a continuous sheet of paper in contrast to the earlier batch processes. Fourdrinier machines are still in use today although much modified from the original.

Is paper really the world’s greatest invention? Who knows; like all other contests one has to define the criteria for winning. Nevertheless its impact on the development of human society has been tremendous. It’s hard to believe that humanity could have improved as much and as quickly as it has, without paper.

Newsletter

The **Energy Reduction in Mechanical Pulping Research Group** released their latest newsletter as a means of communicating research highlights, successes, progress and upcoming events. Visit EnergyReduction.ppc.ubc.ca/publications to view current and past issues.

Journals

R.J. Kerekes “A theoretical analysis of recirculation in pulp refiners”, TAPPI Journal, April 2014, Vol. 13, No. 4

Abstract: Expressions have been developed to describe the influence of recirculation on the energy distribution on pulp in refiners. It was shown that for constant pulp flow to downstream operations, the average energy expenditure on pulp does not change with recirculation, but the energy expended on components of the pulp flow varies widely. In the case of reduced fiber flow, the recirculation to maintain constant flow and the power to maintain constant average specific energy produces a change in both the energy distribution on pulp and refining intensity. The implications of these findings to pulp refining are discussed in this work.

Application: Paper mill engineers and technologists can use the equations derived in this work to calculate key features of recirculation, providing them with a tool for correlating observed pulp property changes to recirculation in refiners.

R.J. Kerekes, E.M. McDonald, J.D. McDonald “Decreasing Permeability Model of Wet Pressing: Extension to Equilibrium Conditions”, J-FOR, 2013, Vol. 3, No. 2

Abstract: The Decreasing Permeability Model of wet pressing has been extended to the near-equilibrium conditions found in many modern press sections. This has been accomplished by incorporating a limiting moisture term, which assumes importance as equilibrium is approached. The resulting model equation covers the full range of wet pressing. However, most cases of wet pressing fall into regimes where the original simplified version of the model may be used. These regimes and their corresponding limits are described.

J.D. McDonald, E.M. McDonald, **R.J. Kerekes**, “The Impact of Press Felt Design On Paper Machine Press Dewatering”, J-FOR, 2013, Vol. 3, No. 2

Abstract: Using data from a pilot press and an extended Decreasing Permeability Model (DPM) of wet pressing, the effect of press felt structure on moisture content after pressing has been explored. The model enables separation of the effects of in-nip dewatering, equilibrium moisture, and rewet on final moisture, where rewet is considered to be water expelled from the web but remaining with it upon separation from the press felt. It was found that differences in press felt structure for a given furnish had no significant effect on the model coefficients for dewatering, but a significant effect on rewet. This led to the conclusion that differences in moisture after pressing caused by press felts in rolling nip pressing of lightweight grades arise largely from rewet, not from local pressure differences during pressing that affect dewatering.

Conference Proceeding

Ata Sina was one of eight UBC graduate students to present at *CHBE Research Day 2014* on October 1st. He gave a riveting talk on “Origami Engineering: Advanced Converting for Novel Paper Products” to an audience that included keynote speakers Dr. Michael Hoffman of CalTech and Dr. Roger Gaudreault of Cascades Canada.

“OVERVIEW ON STOCK PREPARATION AND TISSUE RESEARCH AT INNVENTIA”

HANNES VOMHOFF, Research Manager, Paper Technology Group, Innventia AB



WHEN: Friday, November 7, 2014
TIME: 11:00-12:00 pm
WHERE: Pulp & Paper Centre, Room 101
WHO: Open to students, faculty & industry

ABSTRACT:

An overview on the on-going activities in the field of stock preparation and tissue research at Innventia (formerly STFI) in Stockholm (Sweden) will be given.

The present work in traditional stock preparation, i.e. non-CNF related topics, focuses on pulp characterization, fractionation and pulp treatment. Pulp characterization is performed on a novel particle characterization instrument. Fractionation using hydrocyclones is used to separate fibers based on their flexibility and degree of fibrillation. Fractionation based on size using micro-perforated screen baskets is used to produce a strength agent that has a fines content exceeding 60%. Research in low-consistency refining focuses on the energy-efficient production of fines. A large share of the stock preparation research is performed in the unique stock preparation pilot plant at Innventia.

Research within the tissue area deals mainly with strength and absorption properties of the base sheet and the final products. Regarding strength issue, the influence of grammage and pulp type on the strength properties of low grammage sheets is the main interest. The dynamic absorption properties and the out-of-plane mechanical properties of converted tissue products is analyzed using novel characterization methods.

SPEAKER BIO:

Hannes Vomhoff is the Research Manager of the Paper Technology Group at Innventia, and the Principal Scientist for the research areas “fibre knowledge and stock preparation” and “tissue”. He received his education at the Technical University in Darmstadt, Germany (Dipl.-Ing. in paper manufacturing) and the Royal Institute in Technology in Stockholm, Sweden (PhD in paper technology). He has spent the past 15 years on research within the areas of stock fractionation, multi-layer sheet forming, dewatering, drying, paper making process analysis, and sheet structure characterization.

“NANOMEDICINE: ADVANCED NANOSTRUCTURED MATERIALS”

DR. ROBERT BURRELL, Professor and Chair of Biomedical Engineering
University of Alberta

WHEN: Tuesday, November 4, 2014
TIME: 1:00-2:00 pm
WHERE: Chemical & Biological Engineering, Room 202 (2360 East Mall)

ABSTRACT:

Pasteur presented his “Germ Theory of Disease” in the 1870s which identified bacteria as a cause of disease. A few short years later, Crede was using 1% silver nitrate solutions to treat and prevent eye infections in newborns. Ninety years later physicians such as Moyer, Monafó and Burke started using 0.5% silver nitrate solutions to treat and prevent burn wound infections. In 1967 Fox introduced 1% silver sulfadiazine cream for the treatment of burns. This had advantages over silver nitrate in that it had better controlled release properties for silver ions. This became the main first line defense against infections in burns units world-wide for 40 years. The drawback to these materials is that they simply release silver ions while having some negative effects on wound healing.

The innovation discussed here is a radically different approach to the use of silver in wound healing: it utilizes nanocrystalline silver which releases not only Ag⁺ ions but new species of silver. They increase the rate of kill of microorganisms by orders of magnitude and equally, if not more importantly, provide potent anti-inflammatory activity. Both of these properties are essential for wound healing. The first commercial applications of this technology are antimicrobial wound dressings marketed under the Acticoat™ nanocrystalline silver brand by Smith and Nephew Plc. These dressings are the world's first commercial application of a therapeutic nanotechnology. In this presentation, Dr. Burrell will discuss the development of these advanced nanostructured materials. The discussion will begin with the fundamental bench science that led to the synthesis and characterization of the nanomaterials used and will end with the clinical research that established their value in medicine

SPEAKER BIO:

Dr. Robert E. Burrell is currently a Canada Research Chair in Nanostructured Biomaterials and a Professor and Chair of Biomedical Engineering in the Faculties of Engineering and Medicine & Dentistry at the University of Alberta. He is one of the world's leading experts on the use of advanced metallic films for therapeutic applications including; 1) the control of microbial growth on a wide range of devices and 2) control of the inflammatory response after injury analysis, and sheet structure characterization.

Technical Industry Training Courses

As part of the Pulp and Paper Centre's Professional Development Series, Engineering Co-op students now have an opportunity to enroll in a 3-day, hands-on course which will provide an orientation of the workshop, safety training, and an overview of:

- Safe Operation of Machine Shop Tools
- Hand tools
- Precision Measurement and Layout
- Pipe and Tube fittings
- Pumps and Valves
- Swagelok Fluid System Components

Comprised of theoretical lectures, demonstrations and videos, learning will be reinforced by building a project from start to finish using industry standard tools and methods. The course Instructor is a Certified Machinist and Engineering Technician.

Once completed you will have a competitive edge over others. Your employer will directly benefit from the focused, comprehensive safety and technical training you received from a reputable University. You now have hands-on experience using hand tools as well as technical skills and knowledge relevant to a career in industry.

Not a co-op student but interested in the course?
Contact Anna at anna.jamroz@ubc.ca

November 24-26, 2014
Cost of 3-day course is \$300/student.
Limited availability
Register* at: www.ubcengcore.com

For more information visit:
www.ppc.ubc.ca/ProfessionalDevelopment

*Registration opens in October after final intake is complete

Upcoming Events

UBC Thrive Week

November 3-7, across UBC campus

Thrive is both a mindset and a week-long series of events focused on building positive mental health for UBC students, faculty, and staff. Check thrive.ubc.ca for details.

MECH Seminar

November 6, 12:30 pm, DMP 301

Dr. Hongshen Ma, Assistant Professor in Mechanical Engineering, will give a seminar on "How to Defeat Reversibility in Low-Reynolds Number Flow and Make a Better Filter - Adventures in Cell Sorting"

Annual Remembrance Day Ceremony at UBC

November 11, 10:45-12:00 pm, War Memorial Gym, UBC

Veterans' Week is November 5-11. Everyone is welcome to attend this annual ceremony on Nov. 11 - doors open at 10:00 a.m. The ceremony will commence at 10:45 a.m., and will include short readings, remarks and music.

Alumni UBC Achievement Awards

November 19, Four Seasons Hotel, Vancouver

UBC alumni are capable of amazing things. This November, at the alumni UBC Achievement Awards, we will honour seven inspiring members of the UBC community who, through their extraordinary activities, have connected the university with communities both near and far to create positive change. Visit alumni.ubc.ca/events/awards for more information.

Graduation

November 26-28, Chan Centre, UBC

Fall Graduation 2014 Vancouver Campus ceremonies are around the corner. Join the conversation by tweeting, posting and sharing your #UBCgrad stories.

Recent Event: Fire Drill

The annual fire drill and evacuation occurred on October 16th. The building was evacuated in 3 minutes and 35 seconds, well below the 4 minute limit set for the size of this building. Co-op South received a prize for evacuating the area first.

If you are interested in serving on the PPC Safety Committee, please contact George Soong.

Social Media



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Like us on Facebook /ubcPPC

Visit us online: www.ppc.ubc.ca

Thanks for all your TWITTER support. Below we share a few of our recent tweets:

UBC Pulp & Paper Centre @ubcPPC 28 OCT
Prof. James Olson received @APEGBC Meritorious Achievement Award.
View video here: http://youtu.be/8Mmr_zJ37ZE @ubcengineering (video)

UBC Pulp & Paper Centre @ubcPPC 25 OCT
"Paper is a sustainable product" @_atasina_ @TEDxRCW #TEDxRCW

Arvind Gupta @ArvindUBC 23 OCT
#UBC students are learning to support each other as part of first in Canada peer wellness-coaching program <http://ow.ly/Desre>

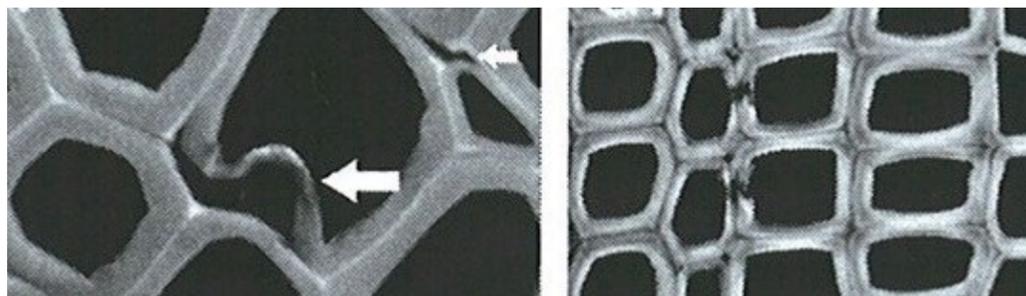
UBC Forestry @ubcforestry 18 OCT
Thus Oct 23, 8pm @SallyNAitken is on #TNOT on @CBCdocs discussing how tree diversity could save the planet <http://bit.ly/1sLbatL>

UBC Pulp & Paper Centre @ubcPPC 8 OCT
Congratulations Faculty of Applied Science for winning the #turkey2k participation award! @ubcappsience (photo)

UBC Pulp & Paper Centre @ubcPPC 1 OCT
Three decades of fundamental and innovative applied research by Roger Gaudreault, Cascades #ResearchDay2014 (photo)

Guess the Photo

Can you guess what the image below is? We will reveal the answer in next month's issue of PPC's Pulp Digest.



September:



Left: A mixture of magnetic (black) and non-magnetic (white) high density polyethylenes (PE). The current study involves PE's with different colors that are employed in an investigation of particles intermixing in a dual-slot rectangular spouted bed. These different colors' PE's have the same physical properties. Effects of gas velocity, static bed height, and slot width are experimentally investigated.

Photo c/o Anna Jamroz

Contact

To submit items to PPC's Pulp Digest or to join our mailing list, please contact Anna Jamroz, PPC Communications Coordinator at: anna.jamroz@ubc.ca