

Annual Report 2014



Building for the new
Pulp and Paper community



www.paptac.ca



PAPTAC IN BRIEF



The Association now has over 3500 men and women as its members. Most are employed in paper mills, in private or publicly supported research organizations, in universities, government departments, consulting firms, and in companies which supply the industry. Membership is also open to students and librarians and persons who have retired from careers in the industry. Approximately 80% of these members are located in Canada; the remainder is found in many other pulp and paper producing countries.

The organization was founded in 1915 as the Technical Section of the Canadian Pulp and Paper Association. On September 30, 1998 it was incorporated under the name of Pulp and Paper Technical Association of Canada (PAPTAC) as an independent not-for-profit association.

PAPTAC is a wide and well-organized network of individuals and represents a world of information exchange and experience for the benefit of the professional development of its members and the pulp and paper industry. We are inviting you to get actively involved in our industry by joining our technical communities, by attending conferences and presenting papers, and by participating in our TECH courses and Webinars. The benefits of your involvement and participation will provide value back to you, your company and to the industry.

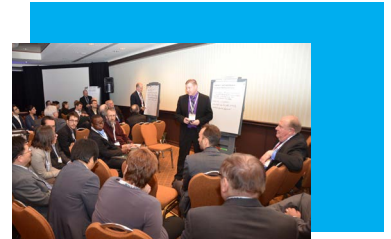
KNOWLEDGE CONNECTIONS

PAPTAC is a Canadian-based non-profit organization, dedicated to improving the technical and professional capabilities of its members worldwide, and to the advancement of the pulp and paper industry.

PAPTAC carries out its mission by providing forums in which members may identify present and future technical issues of importance to the industry. These matters are dealt with through the Association's technical communities, conferences, courses, webinars, technical publications and, as appropriate, in collaboration with other organizations.

Key Objectives:

- To provide means for the interchange of knowledge and expertise among its members;
- To improve the skill levels and effectiveness of present and future employees through training and education;
- To provide technical and practical information on pulp and paper manufacture and use;
- To further the application of the sciences in the pulp and paper industry;
- To assist in the solution of problems confronting the industry;
- To encourage and assist innovation;
- To promote the efficient stewardship of natural resources.



PAPTAC LEADERS



The PAPTAC Executive Council, The Branch and Community Chairmen, as well as, the Staff are actively working on the advancement of PAPTAC's objectives as our industry continues to reshape itself. We are more than ever committed to providing you and your company with pertinent tools to face today's challenges and to be your partner in keeping you connected with your industry.

As PAPTAC leaders, they are working to keep the Association as relevant as possible by developing the most valuable benefits for its members.

Executive Council

The 2014 Executive Council was chaired by **Daniel Archambault**, Executive Vice President, Kruger Inc.



Daniel Archambault
Kruger Inc.
Vice Président
Exécutif



Eric Ashby
Domtar Windsor
VP & Mill Manager



Tom Paisley
Irving Paper
Mill Manager



Patrice Mangin
CRML UQTR
Professor



Jean Hamel
FPIInnovations
Vice Président



Carlo Dal Monte
Catalyst Paper
Corporate Energy Director



Tom Johnstone
Buckman
Senior Consultant



Robert Dufresne
Resolute Forest Products
Vice President



Kim Madsen
Stowe / Weavexx
Technical Sales



Greg Hay
PAPTAC
Executive Director

PAPTAC Staff



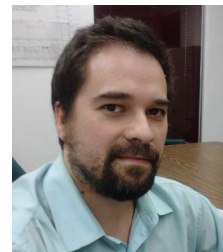
Carmie Lato
Project Manager



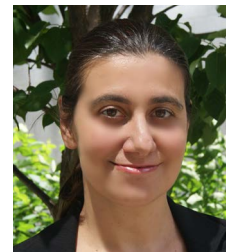
Greg Hay
Executive Director



Sylvie Veilleux
Administrative
Assistant -
Services &
Accounting



Thomas Perichaud
Communications
Specialist - Design,
Production & Web



Cristina Murciano
Development
Lead



2014 Branch & Community Chairmen

PAPTAC's technical communities play a central role in problem solving, the exchange of technical information and the organization of the Annual Meeting's Technical Program. Our sincere thanks to the following community chairmen for their involvement and leadership throughout the year 2014.



Maintenance
André Murphy
Tolko



Environment
Pierre Martel
FPInnovations



Standard Methods
Wayne Bichard
FPInnovations



Paperboard Packaging
David Jones
Buckman



Papermaking Technology
Louis Morimanno
Omya



Energy Cost Saving
Eric Gingras
Natural Resources
Canada



Atlantic Branch
Suzanne Hohmann
Irving Paper



Bleaching
Doug Reid
Akzo Nobel



Finishing, Shipping and Warehousing
Richard Gravel
Kruger - Bromptonville



Mill Managers
Eric Ashby
Domtar Windsor



Mechanical Pulping
Zhirun Yuan
FPInnovations



Research
Yonghao Ni
University of
New-Brunswick

FINANCIAL RESULTS, THREE-YEAR RECORD

During 2014 the Association had revenues of \$883 725 and expenditures of \$846 950. The net result for the year was a surplus of \$36 775 (preliminary).

YEAR	REVENUE	EXPENSES	NET
2014	883 725 \$	846 950 \$	36 775 \$
2013	913 820 \$	885 694 \$	28 126 \$
2012	546 530 \$	625 990 \$	- 79 460 \$

ANNOUNCEMENTS

Two new members joined the PAPTAC Executive Council:



Tom Paisley

Tom Paisley joined J.D. Irving, Limited in September of 2012, as Director of Operations Pulp and Paper Division. He moved into his current role as Mill Manager at Irving Paper in June of 2013. Tom has a Bachelor's degree in Science from Mount Allison University and a Bachelor's degree in Electrical Engineering from the University of New Brunswick.



Jean Hamel

Jean has been Vice President of FPIInnovations since 2009. He joined the Pulp and Paper Research Institute of Canada (Paprican) in 1985 as a Research Engineer. Since the beginning of his professional career in the forest products industry, Jean has actively participated in numerous PAPTAC activities and responsibilities, such as Chairman of the Paper Machine Technology Committee (2002-2004).

3 New Technical Community chairmen have been appointed:

Eric Gingras - Chairman of the Energy Community

Eric Gingras was appointed new chairman of the PAPTAC Energy Community. Eric is a senior industry specialist for the Industry and Transportation Division of the Office of Energy Efficiency of Natural Resources Canada.



Eric Ashby took over the Mill Managers' Community

Mr. Eric Ashby took over the Mill Managers' Community. Mr. Ashby, currently the General Mill Manager of Domtar – Windsor, has a rich career within the pulp and paper industry. Due to his vast experience in people management, developing strategic plans, and implementing maintenance and operation processes in order to meet varied goals, he is the ideal candidate to lead the Mill Managers' Community.

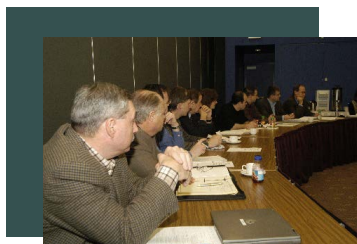


Doug Reid - new chairman of the Bleaching Community

Mr. Doug Reid, Sr. Process Engineer Bleaching Chemicals within AkzoNobel took over the leadership of the PAPTAC Bleaching Community. Mr. Reid succeeded Mr. Paul Earl, a remarkable chairman who contributed to keep this Community one of the most fruitful and active among the other PAPTAC technical communities.



Updated Membership Directory



PAPTAC has developed a new and more efficient membership directory. PAPTAC is aware of the high importance members give to this kind of material, therefore to maximize the benefits of this tool, we asked our members to update their info by themselves in order to avoid misinformation and any kind of errors.

The membership directory is definitely a very practical tool to help members connect as per their areas of interest and take full advantage of the PAPTAC Network.

The complete updated Membership directory is available on the PAPTAC website. As a member simply log in and search under Membership tab.

PAPERWEEK CANADA 2014



This 2014 PaperWeek edition marked the 100th Anniversary of the event, the longest running annual meeting of the industry globally. Under the theme 'Innovation in Motion', the Program Committee shaped up a strong program providing new technical and management tracks to meet the needs of our fast-evolving industry.

A Record attendance was registered. Over 1100 took part in the event, which represented a record attendance over the past 6 years, confirming the continued growth of the premier annual gathering of the industry. Over 250 participants from mills registered for the conference, making the event one of the best in the industry worldwide. The PaperWeek tradeshow was also sold out with close to 50 exhibitors present to showcase their services and technology.



Three documents have been published around this PaperWeek edition:

- The *Unrolled*, which was published in an online format before the event and giving an overall preview of the event.
- The printed *Access* magazine containing the detailed program as well as token from the key leaders involved in this PaperWeek edition.
- The *Official PaperWeek Review* including exclusive interviews with participating CEOs and industry leaders, videos, session reviews, editorials, and highlights of the 100th edition of the Annual Conference of the Canadian Pulp and Papers Industry.

For complete details, visit: <http://issuu.com/paptac/docs/review-pwc2014?e=8061923/7656399>

During PaperWeek several activities were organized.

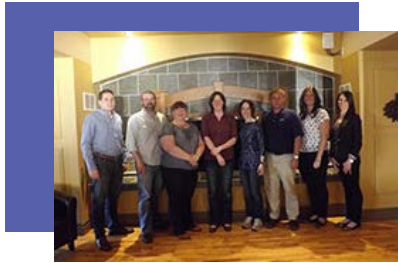


A new feature for **FIBRE**, was the FIBRE Commercialization Forum. This was the second opportunity for the Networks to present under the umbrella of FIBRE, and showcase the progress and forthcoming innovative technologies highly important for industry transformation. The format for the FIBRE Commercialization Forum was a five-minute pitch format, a great opportunity to support the Network's Tech Transfer/Commercialization efforts. Networks showcased platforms, processes, products and/or technologies that could be commercialized in the next future.

The **Forest Biorefinery Symposium** was another example of activity organized by an international committee in conjunction with PaperWeek Canada, hosted by PAPTAC. For two days key players from the forest, bio economy and chemical sectors had the occasion to share and exchange their experience with the audience. Governments, academia and research institutes were represented as well.



CONFERENCES



PAPTAC Atlantic Branch Conference - May 14-16, 2014



PAPTAC's Atlantic Branch held its Annual Conference in May 14-16, 2014, in Port Hawkesbury at the Paper/Dundee Resort & Golf Club, Nova Scotia. The presentations took place on Thursday, May 15th, with a welcoming reception the night prior, a banquet the evening of, and a tour of Port Hawkesbury Paper on Friday, May 16th. There was a \$500 scholarship award for the best presentation at the conference.

The launch reception, which officially kicked off this year's PAPTAC Atlantic Branch Conference, was preceded by the Executive Committee Meeting which met to open dialogue from 5:00-6:00 p.m. They reviewed and recapped past meetings and conferences, discussed current operations, financial status, ways to increase membership, future convention planning, as well as the Branch's honorary life membership and coveted bursary. Following the meeting, they congregated at the Welcoming Reception to enjoy complimentary hors d'oeuvres and a cash bar while networking with other conference participants. Close to 50 attendees arrived at the Dundee, situated on the shores of the beautiful Bras D'Or Lake.



2nd FIBRE Network Conference

PAPTAC actively participated at the 2nd FIBRE Network conference by providing the official coverage of the event. The second edition of the FIBRE (Forest Innovation by Research and Education) Network conference, May 12-15, 2014, was held in the beautiful surroundings and facilities of The University of British Columbia.

PAPTAC, in collaboration with Paper Advance and Le Maître Papetier, brought the official coverage of the second FIBRE Network Conference, showcasing the largest university-led forest research meeting in the world. FIBRE participants from the eight participating networks and delegates from industry, government, invited guests and conference registrants partook in an exciting four-day program.

Click the link here below to see the full coverage. <http://www.fibrenetworkconference.com/>



PACWEST 2014



Under the theme "Improving Mill Results - Keys for Success", PACWEST 2014 took place on May 28-31 at the Fairmont Jasper Park Lodge, AB. PAPTAC, once again, actively participated to the event by providing a live coverage of the PACWEST 2014 conference, featuring exclusive interviews, session's reviews and a complete overview of the event's highlights.

Official review available at: http://issuu.com/paptac/docs/pacwest2014_review?e=8061923/8617117

ECBLRBAC

The Eastern Canadian Black Liquor Recovery Boiler Advisory Committee (ECBLRBAC) Fall Meeting for 2014 took place Nov. 17-20 in Ottawa ON / Thurso QC. The meeting featured Key Topics for Kraft Mill Operations as well as Non Kraft Operations including Power Boiler Steam and Power Operations. Also scheduled was a visit to the Fortress Thurso Mill to observe the New Biomass Co-Generation Facility. PAPTAC was present at the event to underline the importance of supporting different activities (41 participants). ECBLRBAC operates under the secretariat of PAPTAC.



Launch of the world's first cellulose filament (CF) demonstration plant at Kruger's Trois Rivières Mill



Kruger Inc. together with FPIInnovations unveiled on 18th of June the world's first cellulose filament (CF) demonstration plant at Kruger's Trois -Rivières Mill. PAPTAC was among the invited guests at this successful ceremony, which was attended by a hundred participants representing the media and other industry players. Eminent dignitaries honored the ceremony: Mr. Laurent Lessard, Minister of Forests, Wildlife and Parks; Mr. Jean-Denis Girard, Deputy Member for Trois-Rivières, Minister for Small and Medium Enterprises; Mr. Dave Peterson, B.C's Chief Forester and Assistant Deputy Minister, Tenures, Competitiveness and Innovations, Ministry of Forests, Lands and Natural Resource Operations; Mr. Pierre Lapointe, President and CEO of FPIInnovations; and Mr. Daniel Archambault, Executive Vice President and COO of Kruger's Industrial Products Division and Chairman of PAPTAC.

Finishing/Shipping/Warehousing Meeting in Quebec City

A one day and a half roundtable dedicated to Finishing/Shipping/Warehousing superintendents was held in Quebec City at the Classic hotel, September 25-26, 2014. There was a first roundtable on Thursday afternoon with presentations on best practices in supply wagons, trucks and containers; on the Domtar Windsor approach to Health / Safety; and on the major challenges in terms of labor and knowledge transfer. The meeting was followed by a reception and a group diner. The roundtable resumed on Friday with continental breakfast and lunch provided.



Bleaching Community meetings



The PAPTAC Bleaching Community organized two F2F meetings in 2014. The Spring meeting held in Starkville, Mississippi on June 2-4, 2014, was hosted by Weyerhaeuser Columbus mill. The technical session theme for this meeting was "Non-Process Elements (NPE's), Resin, and Scale"; a broad theme, which gave the opportunity to a lot of mill people to present their works!

The Fall meeting took place in Kimberley, BC on October 6-8. Hosted by the Paper Excellence Skookumchuck mill, it revolved around the broad technical session theme: "Bleaching Chemistry." Both events were attended by many bleaching experts and had a great success as usual.

COMMUNITIES



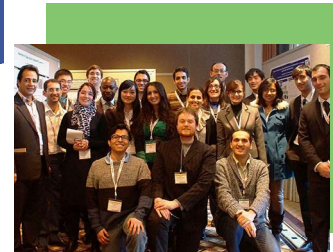
PMTTC broadens its scope to cover Papermaking

The Paper Machine Technology Community, one of the strongest communities within the PAPTAC family, made a subtle change to their name and are now known as the Papermaking Technology Community in keeping with its refreshed mandate to encompass a broader base of topics and disciplines and dealing with papermaking as a whole rather than limiting its scope to the paper machine operations.

PAPTAC Launches National Student Community

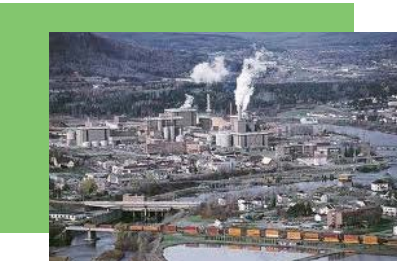


After the initiative of PAPTAC to provide free membership to students launched by the end of 2013, PAPTAC decided, as a second step, to create a Student Community to promote networking in the future workforce of our industry, as students are more and more involved in setting up several PAPTAC activities (J-FOR- Student posters session at PaperWeek, etc.)



A few universities already responded positively to this new initiative and a board was put in place with Eric Jin, University of Toronto, as the Chairman of the Community. Other members of the Student Executive (Co-chairs) are: Laboni Ahsan, University of New Brunswick, Amit Chowdhury, UNB, Joseph Alexander Mosseler, UNB, Abbas Nikbakht, UBC, Naz Orang, Univ. Toronto, Krista Singh, UofT, François Zasieczny, École Polytechnique de Montréal, Stéphanie Jean, École Polytechnique de Montréal.

In order to facilitate interactions among Canadian students and abroad, PAPTAC opened a Student Community page on Facebook as well, convinced that this platform should make a perfect match with the new generation of workers to help promotion and networking.



Fall Paperboard Packaging Community Meeting

The PAPTAC Paperboard Packaging Community held a meeting in Saint John, NB, October 1st and 2nd, 2014. The meeting included two mill tours: tour of Lake Utopia Paper and tour of Irving Paper. A technical session featured 3 interesting presentations which gave the opportunity to discuss about Paperboard Packaging most recent innovations. Once again the PAPTAC Paperboard Packaging Community brought together people from paper making operations, research and suppliers to share pertinent experience and information. PAPTAC took the opportunity to remind the importance of its technical communities which are opened to all PAPTAC members and is easy to join.

WEBINARS

Among the activities of PAPTAC, Webinars are still the most highly considered and successful Community benefit. This year the following webinars took place:

Energy Cost Management Webinar

The Mechanical Pulping Community organized a webinar entitled "Energy Cost Management in Pulp & Paper Industry" on May 1, 2014. The presentation covered ANC experience, hurdles towards energy conservation, results and major projects. This webinar was presented by Surendra Singh, Alberta Newsprint Company. (23 participants).



Webinar on Steam Joints, Syphons, and Dryer Bars



The PAPTAC Papermaking Technology Community (PMTc) organized a webinar entitled "Dryer steam syphon and spoiler bars best practices" on Friday May 30, 2014 - 13:00.

Mike Soucy from Kadant Canada gave a presentation covering the best practices in managing modern paper machines (24 participants).

Webinar on Press Fabric Best Practices

The PAPTAC Papermaking Technology Community (PMTc) hosted a webinar entitled "Press Fabric Best Practices" on Friday July 18, 2014 - 13:00.

Joe Stahon from Voith gave a presentation covering the best practices in press fabrics (41 participants).



Human Performance Improvement Webinar



The Mill Managers Community held a Webinar entitled "Human Performance Improvement Managing Risk" featuring Eric Ashby, General Mill Manager with Domtar Windsor. This webinar was presented on September 23, 2014 13:00-14:00 ET and it had a great success! (18 participants).

Maintenance Webinar: Intro to 5 S and its application in Pulp and Paper

The PAPTAC Maintenance Community presented on October 7 a Webinar entitled "Intro to 5 S and its application in Pulp and Paper" featuring Kate Kerrigan, Operations Director, Allied Reliability Group.

This session gave an overview of 5S and how it could be applied in the Pulp and Paper industry to improve overall efficiency and reliability (28 participants).



Reeling & Winding Best Practices Webinar



The PAPTAC Papermaking Technology Community held a webinar entitled "Reeling & Winding Best Practices" on November 21, 2014 - 13:00-13:45 ET.

This webinar was presented by Frederic Parent, Research leader, FPInnovations. (47 participants).

Pressure Screening – Operations Review Webinar

The PAPTAC Paperboard Packaging Community held a webinar entitled "Pressure Screening – Operations Review" on November 27, 2014 - 13:00-14:00 ET.

This webinar was presented by Neale Fetterly from Kadant. The presentation started with a description of the objectives of the screening processes, followed by an overview of global pressure screen and operations (35 participants).



LC Refining Webinar



The PAPTAC Mechanical Pulping Community held a webinar entitled "LC refining" on November 6th, 2014 - 10:00-10:45 ET.

This webinar was presented by James Olson, Associate Dean, Research & Industrial Partnerships - UBC; and Jens Heymer, Research Engineer – UBC (42 participants).

J-FOR

The Journal of Science & Technology for Forest Products and Processes is PAPTAC's flagship publication, incorporating high-quality peer-reviewed papers dealing with the technology and science of traditional and emerging areas that are pertinent to the forest industry.

PAPTAC launched J-FOR+, an enhanced edition of J-FOR, that includes industry news, editorials, special interviews and market information, as well peer-reviewed papers that focus specifically on mill technology, applications and optimization. J-FOR+ also counts on the collaboration of Paper Advance to publish up-to-date industry news and information.

In 2014, 4 issues of J-FOR as well as 2 issues of the enhanced version J-FOR+ were published and distributed to corporate subscribers and members in over 30 Countries.

All PAPTAC Members have unlimited access to online versions of J-FOR and J-FOR+.

Simply log in to the PAPTAC website at www.paptac.ca with your username and password, go to the Publications tab, then click on J-FOR or J-FOR+ subtabs.

Each Volume is listed by year and includes every issue.

Members can download the complete version of each issue in PDF, or browse article by article and also download single articles in PDF version.



New Leadership at the Helm of J-FOR



Paul Stuart
Chief Scientific Editor

Paul Stuart, École Polytechnique de Montréal, succeeded Honghi Tran as Chief Scientific Editor of J-FOR. Paul Stuart was Deputy Editor of J-FOR under Honghi Tran and ensures a natural leadership progression for the journal. He counts on the collaboration of Patrice Mangin, CRML/UQTR and PAPTAC Councillor, as Deputy Scientific Editor.



Patrice Mangin
Deputy Scientific Editor

JPPS Back Issues now available in digital format



PAPTAC, with the help of students at UBC and UNB, decided to add to its wide bank of resources by digitizing back issues of its previous journal JPPS (Journal of Pulp and Paper Science). A wealth of information, research and knowledge can be found in these issues of the journal which were previously only available in printed format. The years 1985 to 2010 are now available to members as an added benefit at:

www.paptac.ca/jppsbackissues/

NATIONAL AWARDS

The PAPTAC Business Awards recognize excellence in three specific management areas and provide an opportunity to promote the highest levels of business leadership in the Canadian pulp & paper and forest-based industry. This recognition is awarded on the largest National platform during PaperWeek Canada, organized by PAPTAC.



Robert Dufresne & Yvon Pelletier

Safety Leadership Award



This award recognizes a mill's efforts to sustain and continuously improve its safety performance and perpetuate a safety culture in the workplace.

Winner of the 2014 Safety Leadership Award: Resolute Forest Products St-Félicien Mill.

Environmental Strategy of the Year Award



This award aims to recognize and reward a mill that operates under an environmentally sustainable business approach and implements an on-going strategy to provide environmental solutions.

Winner of the 2014 Environmental Strategy of the Year Award: Domtar Windsor Mill.



Patsy Inglis & Glenn Mason

Mill Manager of the Year Award



Blair Rydberg & Daniel Archambault

The Awards are designed to reward mills and individuals involved in the pulp & paper and forest-based industry and are open to participants from across Canada. Winner of the 2014 Mill Manager of the Year Award: Blair Rydberg, Mill Manager, Tolko Manitoba Kraft Paper Mill, The Pas, Manitoba.

John S. Bates Memorial Gold Medal

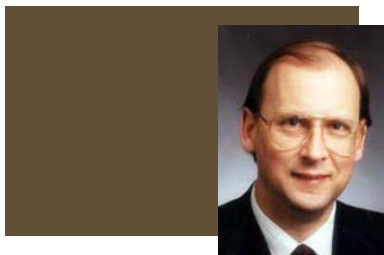
Dr. Honghi Tran, Frank Dottori Professor of Pulp & Paper Engineering, Professor at the Department of Chemical of Chemical Engineering and Applied Chemistry and Director of the Pulp and Paper Centre at the University of Toronto, and Chief Editor of the Journal of Science and Technology for Forest Products & Processes (J-FOR), was presented the 2014 John S. Bates Memorial Gold Medal, in recognition of his long-term contribution to the science and technology of the pulp and paper industry.

The official presentation took place during the Annual General Meeting of the Association at Thursday's PaperWeek Luncheon.



Honghi Tran & Daniel Archambault

Distinction Award



A Distinction Award was presented to Dr. Adriaan van Heiningen, University of Maine, for his outstanding work, leadership and vision to further the science of pulp and paper and the advancement of Forest Biorefinery.

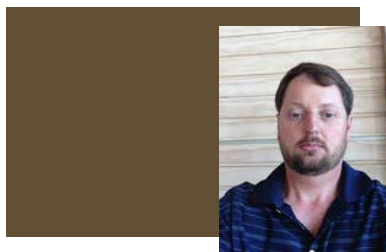


I.H. Weldon Award for Best Overall Paper

The I.H. Weldon Award recognizes the best paper presented by a member or members at any meeting taking place from six months before to six months after the previous Annual Meeting. Derek Gray, McGill University, received the 2014 I.H. Weldon Award for his paper entitled *Iridescent Films from Cellulose nanocrystals: Chiral Nematic or Smectic Multilamellar Structure?*, presented at the 2013 International Symposium on Wood, Fibre and Pulping Chemistry, in Vancouver, Canada.

F.G. Robinson Award

The F.G. Robinson Community Service Award is conferred annually upon a chairman of one of the Technical Communities who has contributed most toward the furtherance of the aims and objectives of the Association and who has shown outstanding leadership and service to his or her community. The 2014 F.G. Robinson Award for exceptional service by a Technical Community Chairman was presented to Paul Earl, Paul Earl Consulting Inc., Chairman of the PAPTAC Bleaching Community.



Howard Rapson Memorial Award for Best Chemical Pulp Bleaching Paper

The Howard Rapson Memorial Award is given to the authors of the best chemical pulp bleaching paper. James Goldman and Michael Summerford, Metso, received the 2014 Howard Rapson Award for their paper entitled *Post D0 Tower Brightness – Useful or Not?*, presented at PACWEST 2013.

IN CLOSING

PAPTAC is actively working on the advancement of its activities and benefits to better respond to the needs of its members through the transformation of our industry. Our number one commitment will be to strengthen our position as an indispensable network and resource centre for all individuals working in the industry.

We wish to thank our many volunteers who keep investing time and energy in making sure PAPTAC continues moving forward – Executive Councillors, Technical Community Chairmen, Paper Reviewers, Speakers, Sessions Moderators, Corporate Sponsors and Mill Champions. Your commitment and passion for the industry is invaluable to the progress of the Association.

Your input as members is always the most efficient sounding board to help us develop and strengthen our programs. Please continue sending us your comments and suggestions on how we can better improve your Association. Be sure to visit www.paptac.ca for all details and recent news on PAPTAC's activities.

Thank you for your continued support of PAPTAC.

Yours sincerely,



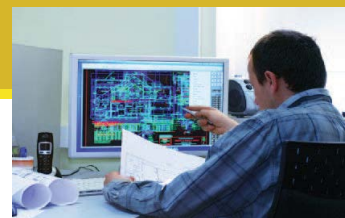
Daniel Archambault
PAPTAC Chairman



Greg M. Hay
Executive Director

Connecting people for the transforming forestry industry

www.paptac.ca



BUILDING FOR THE NEW PULP & PAPER COMMUNITY

M

Membership

TC

Technical
Communities

FW

Future
Workforce

FA

Forest
Advancement

PWC

PaperWeek
Canada

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Operations
Improvements
Resources