



Photo Chemical Machining Institute

# **Program Booklet**

## **Fall International Conference**

**Shagri-La Hotel**

**Toronto, Cananda**

**October 11 - 15, 2015**

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October 11, 2015

Greetings PCMI Conference Attendees,

On behalf of the PCMI Board of Directors and Conference Committee, I would like to welcome you to Toronto for the Fall International Technical Conference.

The program has been organized to give you the chance to hear about new technologies, share ideas to enhance your business, reconnect with colleagues from around the globe and learn about what is new in the pcm industry.

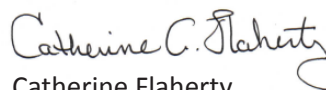
Special thanks are due to the Toronto Conference Committee. They have worked tirelessly to ensure that the educational and technical presentations are responsive to your interests and relevant to your business.

Special thanks to our host Switzer. We thank them for their help in organizing the technical sessions and tour as well as the upcoming visit to Niagara Falls.

I would also like to thank each of you for taking the time to travel to and participate in the PCMI Fall Conference. All PCMI conference participants bring an expertise to the conference and as industry leaders, your vision, knowledge and experience help pave our way into the future.

Enjoy the Fall Conference!

Best Regards,



Catherine Flaherty  
Executive Director

PS: Mark your calendar for the PCMI Spring Conference to be held in Stuttgart, Germany from May 7 - 12, 2016.

**Photo Chemical Machining Institute**

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## Toronto Conference Committee

David Allen, Cranfield University  
Joseph Dunlop, Switzer  
Bill Fox, Conard Corp.  
Philip Greiner, Photofabrication Engineering, Inc. (PEI)  
Mike Lynch, United Western Enterprises, Inc.  
Mike Soble, Chemcut Corporation



**SWITZER**  
Precision. Crafted. Metal.

**Platinum Sponsor | Tour**

*For the Switzer tour on Thursday morning, October 15, you will need your passport to travel to the United States. If you are traveling from a country that requires you to obtain a Visa to enter the United States, please make sure you have that as well.*

#### **About Switzer**

Over 25 years ago, the Switzer family proudly started a company with a focus on manufacturing precision metal parts. Continuing that tradition today, they realized the name Precision Manufacturing Group did not say enough about why the business exists and what it stands for. That is why, this past February, the company's name was changed to Switzer – to have the family name and values behind each part made, and to begin a new chapter in the way they do business.

#### **Custom Metal Parts**

You need precision metal parts. We make precision metal parts. But it's not just about how we make challenging parts seem so simple — it's about our honest, straightforward approach to everything we do.

#### **Your Project**

We start with your concept and build a production plan. Whether your project is designed in CAD or sketched on a napkin, Switzer quotes and manufactures with your goals in mind.

#### **Our Expertise**

We determine the best manufacturing approach based on your requirements and leverage the collective capability of our extensive and reliable value stream.

#### **Finished Pieces**

World-class precision metal parts and assemblies are delivered to your doorstep with the care and attention they deserve.



**Gold Sponsor | Dinner Wine**

Chemcut Corporation manufactures wet processing equipment for the photo chemical milling and printed wiring board industries. Equipment is available for the following applications: cleaning, developing, etching, resist stripping and drying. Special equipment for special applications for other processes can be custom designed and manufactured.


**Bronze Sponsor | Refreshment Breaks**

Dow Electronic Materials supplies a variety of photolithography and metallization materials including: Liquid/Dry Film Photoresist, Dry Film Soldermask, Ink Jet Etch Resists, Developers, Resist Strippers, Cleaners, and a variety Electrolytic and Electroless Plating Chemistries (Au, Cu, Sn, SnPb, Ni).


**Bronze Sponsor | Refreshment Breaks**

As a leading supplier of sensors, measuring systems, laser markers, microscopes, and machine vision systems worldwide, KEYENCE is at the forefront of factory automation. We strive to develop innovative and reliable products to meet the needs of our customers in every manufacturing industry.

In addition to our world-class products, KEYENCE offers a full range of services to further assist our customers. Our technically trained direct sales force is able to solve tough applications and answer technical questions about our products. We also provide fast shipping so customers can improve their processes as quickly as possible. KEYENCE is dedicated to adding value to our customers by combining superior technology with unparalleled support.

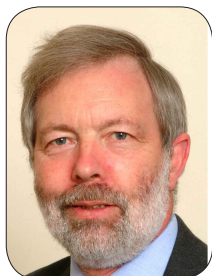

**Bronze Sponsor | Refreshment Breaks**

Tech-Etch performs a wide variety of services and this single-source capability enables us to assume total responsibility for the quality and delivery of our precision products: thin metal flat and formed parts, EMI/RFI shielding, and flexible printed circuits. In-plant services include photoetching, stamping from coil stock and forming from etched blanks, tool and die making, production heat treating, flexible circuit design and production, welding and soldering, metal finishing, plating, and laser cutting. Secondary operations such as soldering joints to seal seams, spot welding, and the application of pressure sensitive tapes and insulation materials are also available.

Time	Sunday, October 11, 2015	Location
9:00 am - 4:00 pm	Pre Conference Tour Hop On Hop Off Toronto City Tour	
	<b>Monday, October 12, 2015</b>	
9:00 am - 3:00 pm	<b>Short Course</b> Reducing the Costs of PCM through Etchant Regeneration  David Allen   Emeritus Professor   Cranfield University   UK	University Room
9:00 am - 4:00 pm	<b>PCMI Board of Directors Meeting</b>	King Room
6:00 pm - 9:00 pm	<b>PCMI Board of Directors Dinner Meeting</b>	Harbour 60
	<b>Tuesday, October 13, 2015</b>	
8:00 am - 9:00 am	<b>Conference Registration</b>	Museum \ Lobby
9:00 am - 9:15 am	<b>Welcome, Introductions</b>  Bill Fox   PCMI President   Conard Corp.   US	Museum Room
9:15 am - 10:00 am	<b>Electrochemical Etching for Micro- and Nano-Structuring</b>  Dr. Monika Saumer   University of Applied Sciences   DE	Museum Room
10:00 am - 10:45 am	<b>The Influence of Byproducts on Etching Metals with Ferric Chloride Etchant</b>  David Allen   Emeritus Professor   Cranfield University   UK	Museum Room
10:45 am - 11:00 am	<b>Networking and Refreshment Break</b>	Rosedale Room
11:00 am - 11:45 am	<b>Enterprise Software Planning Systems</b>  Shawn Coultice   Territory Manager   Shoptech Industrial Software   US	Museum Room
11:45 am - 12:30 pm	<b>Ideas Exchange Panel   Workforce Development</b>  Jan Kilen   President   HP Etch ABL   NL Joe Dunlop   Vice President   Switzer   US Ken Marino   President   Orbel Corp.   US	Museum Room
12:30 pm - 1:30 pm	<b>Lunch</b>	Rosedale Room
1:30 pm - 2:00 pm	<b>New Product and Services Showcase</b>  Inkjettable Etch Resists   Krishna Balantrapu   Senior Chemist   The Dow Chemical Company   US	Museum Room
2:00 pm - 2:45 pm	<b>Wastewater Recycling Technologies</b>  Tom Belmont   Owner   LT Technologies   US	Museum Room
2:45 pm - 3:00 pm	<b>Networking and Refreshment Break</b>	Rosedale Room

3:00 pm - 3:45 pm	<b>Metals for the PCM Process</b> Andrew Mays   Product Manager   Ulbrich Stainless Steel & Special Metals, US	Museum Room
6:00 pm - 8:30 pm	<b>Annual Banquet</b>	Rosedale Room
	<b>Wednesday, October 14, 2015</b>	
9:00 am - 9:45 am	<b>Educator's Committee Project Update</b> David Allen   Emeritus Professor   Cranfield University   UK	Museum Room
9:45 am - 10:30 am	<b>BarCode Reading</b> Anton Sawatzky   BC Sales Engineer   Cognex Corporation   CA	Museum Room
10:30 am - 10:45 am	Networking and Refreshment Break	Rosedale Room
10:45 am - 11:30 am	<b>How Multisensor Metrology Cuts Manufacturing Costs</b> Tom Groff   North American Sales Manager   Optical Gaging Products (OGP)   CA	Museum Room
11:30 am - 12:00 pm	<b>Industry Trends Analysis   Significant Findings Over a Multi- Year Timeframe</b> Phil Grenier   Tooling Manager   Photofabrication Engineering, Inc.   US Kirk Lauver   Marketing and Customer Lab Manager   Chemcut Corporation   US	Museum Room
12:00 pm - 1:00 pm	Lunch	Rosedale Room
1:00 pm - 1:45 pm	<b>Automated Measuring and Inspection</b> Andrew Craig   Instant Measurement Specialist   Keyence Canada   CA	Museum Room
1:45 pm - 2:30 pm	<b>Promoting PCM   Locally   Nationally   Internationally   Group Discussion</b>	Museum Room
2:30 pm - 2:45 pm	<b>Networking and Refreshment Break</b>	Rosedale Room
2:45 pm - 3:30 pm	<b>Changes in ISO 900   ITAR</b> Murray Milton   Systems & Services Certification Technical Manager   SGS Canada Inc.   CA	Museum Room
3:30 pm - 4:15 pm	<b>Process Issues   Cleaning, Coating and Imaging</b> Bill Wilson   Sr. Technical Specialist   DuPont Electronics & Communications   US	Museum Room
4:30 pm - 5:30 pm	<b>PCMI Board Wrap Up Meeting</b>	Museum Room
6:30 pm - 9:00 pm	<b>Group Dinner</b>	CNN Tower 360
	<b>Thursday, October 15, 2015</b>	
7:30 am - 6:00 pm	<b>Switzer Tour, Lunch and Niagara Falls Visit</b>	





David Allen | Emeritus Professor of Microengineering | Cranfield University

Presentations: Short Course: Reducing the Costs of PCM through Etchant Regeneration

Educator's Committee Project Update

The Influence of Byproducts on Etching Metals with Ferric Chloride Etchant

Emeritus Professor David Allen started his career as a chemist (BSc, 1968) and moved into photochemistry research (PhD, 1972) while studying at Cardiff University. Following post-doctoral research at Warwick University and imaging technology development in the industry, David joined Cranfield University in 1976.

David was appointed as a Technical Liaison Member to the Photo Chemical Machining Institute (PCMI) in 1981. He is currently on the Board of Directors of PCMI. David became Professor of Microengineering at Cranfield University in 1998 and was elected as a Fellow of The International Academy for Production Engineering in 2006.

David has published:

- the only PCM book written in English: The Principles and Practice of Photochemical Machining and Photoetching
- three book chapters on non-conventional machining
- seven confidential industrial PCM consortium reports and
- more than 180 journal and conference papers.

David retired in 2011 and he now carries out consultancy and staff training in photochemical machining companies across the world. David was awarded the higher doctoral degree of DSc from Cranfield University for his thesis entitled "Contributions to Photochemical Machining and Photoelectroforming."



Krishna Balantrapu | Senior Chemist | Dow Chemical Company

Presentation: New Product and Services Showcase: Inkjettable Etch Resists

Dr. Krishna Balantrapu is currently the Product Manager for the Interconnect technologies division of the Dow Electronic Materials. He has over 8 years of experience in the areas of colloids, dispersions, and ink formulations for printable electronics. At Dow, he developed several new processes and formulations for a variety of electronic applications. The most notable were the LITHOJET™ inkjet inks which resulted in a number of patents. Dr. Balantrapu also has published a number of articles in peer reviewed journals & conferences. Prior to joining Dow, Dr. Balantrapu worked as a Post-doctoral Visiting Scientist in Xerox, Webster NY identifying new materials and methods for improving the efficiency of organic solar cells.

Dr. Balantrapu holds a Ph.D degree in Chemistry from Clarkson University, NY and a Bachelor's degree in Pharmaceutical Sciences from Kakatiya University, India.



Tom Belmont | Owner | LT Technologies

Presentation: Wastewater Recycling Technologies

Thomas Belmont is the President and owner of LT Technologies Inc., a design and Engineering firm with over 40 years of experience in both water and wastewater purification systems.

Thomas received a B.S. in Chemical Engineering from Northeastern University in Boston MA.

He helped to develop the first industrial pre-treatment system in the City of Boston while at the Gillette Company in 1973.

Tom is a member of NASF, American Military Engineers, and the Water Pollution Control Federation. He has authored many articles in industrial wastewater for MIT Technology Review.



Shawn Coultice | Territory Manager | Shoptech Industrial Software

Presentation: Enterprise Software Planning Systems

Shawn Coultice has been working in the manufacturing industry for the past 7 years. The first three he spent at a manufacturing company, Moulding and Millwork. There he help set up their ERP system, specifically for inventory management. While at M&M he received training on Lean manufacturing and is Yellow belt certified.

This experience lent itself well to working in the manufacturing ERP sector for the past 4 years. Working with Shoptech to grow their business in Canada through the implementation of the E2 Shop System provided tremendous experience in Manufacturing and Shop Management Software.



Andrew Craig | Instant Measurement Specialist | Keyence Corporation of America

Presentation: Automated Measuring and Inspection

Andrew Craig joined the Keyence team and launched the Instant Measurement Device into the Canadian market just over 2 years ago. He is now working with many different industries to improve quality, save time and ultimately increase productivity in many different manufacturing environments.

The accuracy of measurements, repeatability and ease of use is something that concerns customers about the IM series from Keyence. Whether the intent is to have a rapid PPAP's produced in the matter of minutes, 1st offs done in a matter of seconds or a shop floor worthy hard gage that can generate statistical controls, Andrew personally ensures the IM-series accomplishes what is needed.



Joseph Dunlop | VP Business Development | Switzer

Presentation: Ideas Exchange Panel | Workforce Development

Joseph Dunlop was elected to serve on the PCMI Board of Directors at the 2014 Spring Conference. Since June 2013, Joseph has served as the Vice President, Sales & Marketing at Precision Manufacturing Group in Buffalo, NY. In this position, Joseph is responsible for cross-functional leadership with emphasis on business development and strategic growth.

Prior to joining Precision Manufacturing Group, Joseph was employed at Calspan Corporation from 2008 – 2013, serving first as a Director, then as VP Transportation and then as Senior Director, Business Development. From 1997 to 2008, Joseph worked at Delphi, first as a Systems Engineer then as a Product Line Manager and finally as Sales Manager. Joseph has a BS degree from and a M.B.A from the University of Notre Dame.



Bill Fox | President | Conard Corp. | US

Presentation: Welcome Remarks

Bill Fox is the President of the PCMI and is the President and owner of Conard Corp. in Glastonbury, Connecticut. Conard is primarily involved with the industrial applications of PCM and electroforming with a specialty in etching aluminum. He acquired Conard in 1997 and has since been an active member of PCMI.

Conard was founded in 1965 and is one of the oldest companies in the PCM industry operating as a contract manufacturer of PCM and electroformed parts and components.

Since 1984 Bill managed FOX Financial Corp's involvement in financial services, management consulting and development of commercial real estate. Previously he was a Senior Vice President and Director of Diversified Holdings Corp. a national real estate investment firm in New York City and was a Manager in the Management Consulting Department of Price Waterhouse in New York City. Bill is a CPA and received BA and MBA degrees from Iona College.



Phil Greiner | Tooling Manager | Photofabrication Engineering, Inc.

Presentation: Industry Trends Analysis | Significant Findings Over a Multi- Year Timeframe

Philip Greiner has been with Photofabrication Engineering, Inc. for 25 years and is currently their chief engineer. Prior to his involvement with PEI he was with Graphic Services Inc. in San Francisco, later to become Kem-Mil Co.

Phil has been a member of PCMI since 1975 and currently serves as PCMI's secretary.



Tom Groff | North American Sales Manager | Optical Gaging Products

Presentation: How Multisensor Metrology Cuts Manufacturing Costs

Tom Groff's professional education includes a degree in Aerospace Engineering from Embry-Riddle Aeronautical University, as well as an MBA with an emphasis in technology management from the University of Phoenix. Tom also holds a Black Belt certification in Lean/Six Sigma.

Tom was previously the Co-Owner/Metrology Products Manager for Rosco Precision Machinery LLC in Auburn, Washington. While with his current employer, Optical Gaging Products Inc. (OGP®), he has held the positions of Corporate Accounts Manager, Corporate Product Manager, and Director of Quality. Presently, Tom is the North American Sales Manager for OGP, and is responsible for OGP sales in the United States, Canada, and Mexico.



Jan Kilén | President | HP Etch ABL | NL

Presentation: Ideas Exchange Panel | Workforce Development

Jan Kilén began his career at IBM in 1972, in production as an operator for mechanical volume manufacturing of complicated parts for IBM printers in the IBM factory in Jarfalla, Sweden.

In 1974, Jan was moved over to Process Engineering. In 1981, he went to Endicott NY USA for 1.5 year assignment starting to learn how to manufacture IBM Print Bands with etching as a part of the process, for EMEA's need of Print Bands. Jan was at this point responsible for the Process to manufacturing Print band outside USA. During 1982 - 1989 Jan was working as a process engineer for all new Print Band products. From 1989 to 1995 Jan was the Manager of the Process engineering working with etching. In 1995, IBM closed the plant in Sweden and Jan started HP Etch, and is the President of the company. Jan has been involved with PCMI since mid 80's.



Kirk Lauver | Marketing and Customer Lab Manager | Chemcut Corporation

Presentation: Industry Trends Analysis | Significant Findings Over a Multi- Year Timeframe

Kirk Lauver is the marketing and customer lab manager at Chemcut in State College, Pennsylvania. He began working with photochemical milling in 1974 when he joined Chemcut as a customer service engineer. Over his 37 years at Chemcut, he has held various marketing and customer support positions. Besides Chemcut, Kirk has also worked at Photofabrication Engineering in Milford, Massachusetts.

Kirk attended his first meeting in 1985. Over the years he has participated in various PCMI committees, served on the PCMI board of directors and is a past president of PCMI.



Mike Lynch  
Vice President of Operations | United Western Enterprises | US

Presentations: Speaker Introductions

Mike Lynch is the Vice President of Operations at United Western Enterprises in Camarillo CA. Mike received his BA in Economics from UCLA in 1978 and a MA from Fordham University in New York in 1981.

Mike taught High School in the Bronx, New York for 5 years after which he came to United Western as the Operations Manager.

He has participated in short courses at Cranfield University as well as courses on lean manufacturing and quality from Boeing approved sources.

Mike has served on PCMI's Board of Directors since 2013 and on several PCMI committees.

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Ken Marino | President | Orbel Corp. | US

Presentation: Ideas Exchange Panel | Workforce Development

Ken Marino is President and Owner of Orbel Corporation. He has been involved with the company since 1984 participating in every aspect of the operation. Throughout Ken's career he has always been engaged in growing and developing manufacturing operations.

His area of specialty is producing products for the aerospace, military, medical and automotive markets. The emphasis is custom engineered EMI / RFI solutions to assure the reliability of critical components. Ken holds a BS from Saint Joseph's College of Maine in business management. He served on St. Joseph's board of governors' becoming the head of the Trustee Committee in 2007. Since 1988 he has been a member of Kiwanis Club of Palmer Township and is a past president of the club. Ken also currently serves on the board of BIP.

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Andrew Mays | Product Manager | Ulbrich Stainless Steel & Special Metals

Presentation: Metals for the PCM Process

Andrew Mays received a Bachelor of Engineering in Materials Science and Engineering in 2001, from Youngstown State University. He worked for Thomas Steel, Duferco Farrell, and Detroit Cold Rolling before coming to Ulbrich Specialty Strip Mill.

He started at Ulbrich as a Process Metallurgist for 7 years before accepting the position of Product Manager UltraLite Foil in July of 2011.

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Murray Milton | Systems & Services Certification Technical Manager | SGS Canada Inc.

Presentation: Changes in ISO 900 | ITAR

Murray Milton has 32 years of inspection/auditing related experience in both management and non-management roles. He has spent 13 years in inspections for a wide range of products including a review of quality assurance manuals and/or engineering reports when applicable, verifying product compliance to national and international standards.

He has experience with inspections related to international export and spent 16 years conducting process audits focusing on quality management systems.

In the role as the Technical Manager, Murray conducts audit package reviews and approvals and auditor training/calibration sessions on new and existing processes. He approve sales proposals and performs level one audits and level 2 audits to ensure compliance to internal procedures.

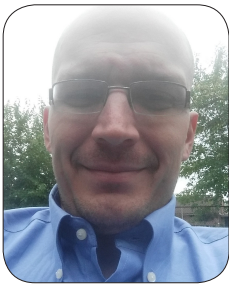


Dr. Monika Saumer | Professor | University of Applied Sciences

Presentation: Electrochemical Etching for Micro- and Nano-Structuring

Monika Saumer did her PhD Thesis at the University of Karlsruhe in 1993. From 1992-1998 she worked as a Scientist at the Institute for Mikrostrukturtechnik (IMT) at Forschungszentrum Karlsruhe Technik und Umwelt, Karlsruhe (DE). Since 1998, she is Professor for Chemical Processes in Microtechnology at the University of Applied Sciences at Zweibrücken, Germany.

Her main R&D areas are electroforming for microtechnology, UV-LIGA for biomedical applications.



Anton Sawatzky | BC Sales Engineer | Cognex Corporation

Presentation: BarCode Reading

Anton Sawatzky has been the ID Technical Sales Representative, Ontario for two and one-half years. In his position, Anton covers barcode-reading applications across all major manufacturing markets such as: automotive, food/beverage, consumer products, medical devices and electronics. Anton also covers non-manufacturing markets including parcel/post, retail distribution centers, and airport baggage handling systems.

Anton previously spent seven years as a Technical Sales Representative for Schaeffler Canada, taking care of the industrial bearings industry across Ontario.

Anton has a Bachelor of Engineering in Aerospace from Carleton University, Ottawa, ON where he specialized in Aerodynamics, Propulsion and Vehicle Performance.

Anton works with customers to provide solutions and guidance. A large part of that is understanding the customer's needs, expectations as well what requirements may be upcoming in the future of the industry.



Bill Wilson | Senior Technical Specialist | DuPont Electronics & Communications

Presentation: Process Issues | Cleaning, Coating and Imaging

Bill Wilson is a mechanical engineer with 40 years of experience supporting DuPont's dry film and flexible laminate products, specializing in on-site customer technical support and new process and product development.

He has been happily associated with PCMI and the chem-milling industry throughout his entire career.

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*Harrie Knol, Manager, R&D*

2015	Spring	Tel Aviv	Israel
	Fall	Toronto	Canada
2014	Spring	La Chaux-de-Fonds	Switzerland
	Fall	San Jose, CA	United States
2013	Spring	Milan	Italy
	Fall	Seattle, WA	United States
2012	Spring	Eindhoven	The Netherlands
	Fall	Santa Monica, CA	United States
2011	Spring	Cranfield University	United Kingdom
	Fall	Boston, MA	United States
2010	Spring	Las Vegas, NV	United States
	Fall	Singapore	Singapore
2009	Spring	Frankfurt	Germany
	Fall	State College, PA	United States
2008	Spring	Hong Kong	Hong Kong
	Fall	San Diego, CA	United States
2007	Spring	Cambridge, MA	United States
	Fall	Stockholm	Sweden
2006	Spring	Cranfield University	United Kingdom
	Fall	Milwaukee, WI	United States
2005	Spring	Anaheim, CA	United States
	Fall	Atlanta, GA	United States
2004	Spring	Anaheim, CA	United States
	Fall	Glasgow	Scotland
2003	Spring	Long Beach, CA	United States
	Fall	Boston, MA	United States
2002	Spring	Long Beach, CA	United States
	Fall	Lago Maggiore	Italy
2001	Spring	Anaheim, CA	United States
	Fall	Orlando, FL	United States

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***Mark  
Your  
Calendar!***

**December 10, 2015**

New England Chapter Dinner

**May 7 - 12, 2016**

International Spring Conference  
Stuttgart, Germany

**October, 2016**

International Fall Conference  
Bethlehem, Pennsylvania, US

**Thanks for supporting the PCMI Conference.**