



# Photo Chemical Machining Institute

Spring International Conference  
Cranfield University, England | May 21 - 27 2011



**The Photo Chemical Machining Institute (PCMI) is pleased to invite you to attend the Spring International Conference to be held at Cranfield University in England from May 21 - 27, 2011.**



The International Spring Conference will offer an expanded agenda, which will give you the opportunity to attend and learn from a full array of [technical sessions](#) and a [Short Course](#), plus participate in a [PCM Design Workshop](#). The workshop has been created to translate technical capability into market differentiation aided by

practical, “hands-on” group sessions of resolving design challenges to explore design strategies and brand development.

The Conference will also give you the chance to attend the [Duxford Air Show](#), visit the [Centre for Industrial Photonics](#) and dine at the historic [University of Cambridge](#). Plus, the PCMI International Conference will provide plenty of time for you to visit many of the [area’s famous landmarks](#). You will also have the opportunity to tour [Precision Micro](#), one of the largest specialist metal component manufacturers in Europe, innovating, developing and utilizing a unique combination of manufacturing processes to meet the needs of customers worldwide.

In order to obtain the lowest rate available PCMI has reserved a block of rooms at the Cranfield University Conference Centre. Up until April 15th PCMI will make your room reservation for you.

After April 15th you will have to make your own room reservation, but because of space limitations, there will be no guarantee of room availability.

**Hotel reservation deadline is April 15, 2011 -- Register early, hotel space is limited.**

[Click here to register now.](#)

### PCMI Sponsorship - It's Good For Business!



Vendors can demonstrate their support for PCMI and increase their visibility in the industry by becoming a PCMI Conference Sponsor.

Current Sponsors

<b>Platinum Sponsor</b>	<b>\$1,000</b>	
Cocktail Reception		
Design Workshop		ChemArt, US
Technical Sessions		Stork Veco and Tecan
<b>Gold Sponsor</b>	<b>\$750</b>	
Banquet Dinner Wine		Chemcut Corp.
Design Workshop		Datum Alloys Ltd, UK
		JD Photo-Tools, UK
<b>Silver Sponsor</b>	<b>\$500</b>	
Lunch and Breaks		PrecisionMicro, UK
<b>Bronze Sponsor</b>	<b>\$300</b>	
		Registration

### Why Be a Sponsor?

- To support PCMI in its efforts to service and provide benefits to the photo chemical machining industry through education, publications, technical information and assistance, networking, mentoring, business referrals and industry trends;
- To have the opportunity to promote your company's products or services during the conference at a tabletop display;
- To gain access to key photo chemical machining industry leaders at one time and in one place;
- To have your company name on the PCMI website front page, linked to your company website;
- To obtain special recognition during the conference, in the marketing materials and in the Program Booklet.

### Cranfield University:

College Road, Cranfield  
Bedfordshire, MK43 0AL



Cranfield has a global reputation for inspirational teaching and research, industrial-scale facilities and superior links with industry and commerce.

As a wholly postgraduate institution, Cranfield is the first choice for ambitious and skilled individuals wishing to enroll in Masters', Doctorate and professional development programs.

The school's area of expertise includes - aerospace, automotive, defence, energy, environment, healthcare, management, manufacturing and security. Situated mid-way between Oxford and Cambridge, it is close to thriving Milton Keynes, a new town with one of the largest covered shopping centres in Europe, and the historic riverside town of Bedford.



On Monday, May 23, 2011, the technical sessions, lunch and grand banquet will be held at the Cranfield Management Development Center.

On Tuesday, May 24, 2011, The Design Workshop for PCM will be held at the Centre for Competitive Creative Design (C4D). Lunch will be served in the Development Center.



### Hotel: Cranfield Management Development Centre



All bedrooms offer the best in comfort and contemporary design to create a home away from home. Each room has

been designed to suit the needs of the business executive, including complimentary broadband internet connection and a spacious desk area. All rooms have a double bed. The room fees includes breakfast.

[www.cmdc.info/accommodation](http://www.cmdc.info/accommodation)

[Directions](#)

### The Weather/What To Bring and Wear:

The weather in England can be quite unpredictable. You should pack a lightweight raincoat as May gets a bit of rain. For May, the average high is 66°F (19°C). The average low: 48°F (9°C).

The dress for the conference technical sessions is business casual.

### Transportation:

To arrange for transportation to and from Heathrow, Birmingham or London Luton airports, please contact Debbie at Cranfield Transport. International travellers can fly into Heathrow or Birmingham. European travellers can also fly into London Luton, depending on your choice of airline.



+44 1234 754774 [d.tomlinson@cranfield.ac.uk](mailto:d.tomlinson@cranfield.ac.uk)

### Sunday, May 22, 2011



### Duxford Imperial War Museum:

The premier aviation museum in Europe, this former Battle of Britain fighter station features an unrivalled display of historic aircraft, equipment and vehicles, from the Spitfire and Flying Fortress to Concorde with major flying displays during the summer. [www.iwm.org.uk](http://www.iwm.org.uk)

This visit has been chosen as a Sunday activity because it is one of the few flying display days in 2011 when the aircraft will be seen at their best. This is a great opportunity not to be missed!

### Thursday, May 26, 2011

### Centre for Photonics in the Institute for Manufacturing, University of Cambridge:

In the morning you can see the incredible range of lasers managed by Dr. Bill O'Neill (Centre Director and one of the lecturers invited to give a presentation in the Monday technical program). In the afternoon you are free to wander around the delightful centre of Cambridge. There you can visit Kings College Chapel, Fitzwilliam Museum and/or Cambridge University Botanic Gardens, shop, punt on the River Cam, browse the bookshops and take English tea.



[www.ifm.eng.cam.ac](http://www.ifm.eng.cam.ac)

**Kings College Chapel:** Kings College Chapel is the grandest and most instantly recognisable building in Cambridge, and ranks among the finest examples of late Gothic architecture. This is home to Kings College choir – as well as Rubens’ Adoration of the Magi, which hangs above the altar – and the famous Festival of Nine Lessons and Carols which has been broadcast from here since 1928. Building work on the chapel took over 100 years to complete and was presided over by five kings of England, including Henry VI, VII and VIII. [www.kings.cam.ac.uk/chapel/](http://www.kings.cam.ac.uk/chapel/)



Tours during the technical sessions on Monday, Tuesday and Friday can also be arranged for significant others and colleagues to the following locations if numbers permit:

For more information please contact Professor David Allen [d.allen@cranfield.ac.uk](mailto:d.allen@cranfield.ac.uk)

**Anglesey Abbey:** Faithfully restored 16th century house built on the ruins of an Augustinian abbey and set in 98 acres of landscaped gardens. The house boasts a diverse collection of clocks, paintings and other works of art. [www.nationaltrust.org](http://www.nationaltrust.org)



**Fitzwilliam Museum:** has an outstanding and amazingly diverse collection of art and artefacts, and has been called ‘the finest small museum in the world’ – though don’t be fooled by the word ‘small’. The collection of prints and paintings alone is huge and includes works by Monet, Renoir and Van Gogh. There are also major collections of Classical and Egyptian antiquities, as well as ceramics, armour and regularly changing temporary exhibitions. The courtyard extension houses a shop and café. [www.fitzmuseum.cam.ac.uk](http://www.fitzmuseum.cam.ac.uk)



**Wimpole Hall and Home Farm:** Cambridgeshire’s most spectacular country manor house set in landscaped parkland offering long walks and idyllic views. The Home Farm is a hands-on adventure for children featuring rare breeds. [www.wimpole.org](http://www.wimpole.org)



**Woburn Abbey:** Woburn Abbey has been the home of the Dukes of Bedford for nearly 400 years. As such, it is steeped in a vast amount of history. It is not just the antique furniture and art that is an attraction; many of the previous residents of Woburn have extremely interesting and colourful pasts. [www.woburn.co.uk/abbey](http://www.woburn.co.uk/abbey)



**Cambridge University Botanic Gardens:** This huge collection of plants in beautifully landscaped and tranquil gardens provides another true oasis of calm. Rolling lawns, ponds, trees and shrubs are augmented by rock gardens and glasshouses containing rare plants from all over the world. [www.botanic.cam.ac.uk](http://www.botanic.cam.ac.uk)



**Shopping:** Milton Keynes is famous for its shopping and is one of the major retail areas in the region. The vast range of shops, markets and superstores makes a visit to the shops an experience not to be missed. [www.mkweb.co.uk/shopping](http://www.mkweb.co.uk/shopping)



**London Links:** [Dining](#)  
[London Tours](#)



A Drinks Reception and Dinner are going to be taken in **Downing College** – a unique dining experience at a Cambridge University College. [www.dow.cam.ac.uk/](http://www.dow.cam.ac.uk/)



# Photo Chemical Machining Institute Conference Agenda

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## Saturday, May 21, 2011

9:00 am - 4:00 pm      PCMI Board of Directors Meeting

## Sunday, May 22, 2011

10:00 am - 6:00 pm      Spring Air Show at Duxford  
*Celebrating Women in Aviation*

Dinner TBD

## Monday, May 23, 2011

8:30 am - 5:00 pm      Technical Program and Lectures

“Welcome and Introductions”  
*Presented by: Jerry Williams, United Western Enterprises, US, PCMI President*

“EMC spring gaskets for mobile phones”  
*Presented by: Lars Traberg, Etch A/S, DK*

“35 Years of PCM Research at Cranfield”  
*Presented by: Professor David Allen, Cranfield University, UK*

“Environment-friendly etching of titanium and its alloys”  
*Presented by: Dominika Gastol, Dr. Heather Almond,  
Professor David Allen, Cranfield University, UK and  
Dr. Peter Jefferies, Datum Developments, UK*

“Solid state laser deposition of metals”  
*Presented by: Dr. Bill O’Neill, Institute for Manufacturing, Cambridge, UK*

“Simple DOE”  
*Presented by: Dr. Georgi Pjuskjulev, Bulgarian Academy of Sciences, BG*

“Patterning a PCM photoresist by laser ablation”  
*Presented By: Diethard Kapp-Schwoerer, HTP, CH*

“Designing and specifying wet processing equipment”  
*Presented By: Lawson Lightfoot, RENA GmbH, DE*

“The ten most important lessons learnt in running a PCM facility”  
*Presented By: Winfried Hormes, Senior PCMI Member*

Platinum Sponsor  
Design Workshop



Platinum Sponsor  
Technical Sessions



Gold Sponsors  
Design Workshop



Gold Sponsor  
Banquet Dinner Wine



Silver Sponsor  
Wednesday Lunch





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“Ink jet printing of resists: state of the art”

*Presented By: Dr Steve Jones, Printed Electronics Ltd., UK*

“Photoetch quality stainless steels” (*Short Presentation*)

*Presented By: Dr. Peter Jefferies, Datum Alloys Ltd, UK*

**6:30 pm - 9:00 pm                      Cocktail Reception and Grand Banquet**

**Tuesday, May 24, 2011**

**8:30 am - 4:00 pm                      Design Workshop for PCM**

*Presented By: Professor Simon Bolton, Cranfield University, UK*

Introductory Remarks & PCMI Finance Report

*Presented by: William Fox, President, The Conard Corp., US, PCMI Treasurer*

Project Introduction

Phase 1 -- Ideation and Concept Generation

Phase 2 -- Concept Development

Phase 3 -- 3D Card Prototyping

Phase 4 -- Evaluation review and critique

**4:00 pm - 4:30 pm                      Closing General Session/  
Informational Planning Exchange**

**6:30 pm - 9:00 pm                      Group Dinner TBA**

**Wednesday, May 25, 2011                      Design Workshop for PCM Wrap up**

**9:00 am - 10:00 am**                      Moving Forward - How to Grow Your Business Through Design --  
Rebranding and Marketing PCM for the 21st Century

*Presented By: Professor Simon Bolton, Cranfield University, UK*

**10:00 am - 2:30 pm                      Travel to and Tour of [PrecisionMicro](#), Birmingham**

Lunch Sponsored by PrecisionMicro

**6:30 pm - 9:30 pm                      Evening Open for Dinner with Your Colleagues**



**Thursday, May 26, 2011**

[Centre for Industrial Photonics](#), Institute for Manufacturing  
University of Cambridge

9:00 am - 12:30 pm

**Centre for Industrial Photonics (Visit to the laser laboratory)**  
Institute for Manufacturing, University of Cambridge

12:30 pm - 6:30 pm

**Lunch On Your Own With Recommended Tours**

Tour [Kings College Chapel](#), Cambridge  
Shopping and Siteseeing

6:30 pm - 9:30 pm

**Reception and Dinner, The Hall, [Downing College](#)**  
University of Cambridge

**Friday, May 27, 2011**

**Short Course**

9:00 am - 4:30 pm

**Photochemical Machining of Stainless Steels**

*Presented By: Professor David Allen (Cranfield University, UK)*

*Demonstrator: Dr Heather Almond (Cranfield University, UK)*

## Short Course: Photochemical Machining of Stainless Steels

Tutor: Professor David Allen (Cranfield University, UK)  
 Demonstrator: Dr. Heather Almond (Cranfield University, UK)

### Syllabus

Photochemical Machining (PCM) is a multi-stage process involving photoresist imaging and chemical etching technology that requires strict control at all stages for the manufacturing of high quality products at competitive prices. This one-day short course considers how to etch stainless steels, cleanly (i.e. without the appearance of smut deposits in the half-etch) and efficiently, using photoresists compatible with ferric chloride-based etchants. Particular attention is paid to quality control of ferric chloride-based formulations and the industrial etchant regeneration methods used to reduce process costs and comply with environmental legislation.

Lecture room location on the Cranfield University campus  
 Lecture room details will follow delegate registration via PCMI.

Fees: Fees are payable via PCMI.

Members and First Time Attendees	US \$500.00
Non Members	US \$800.00

### Schedule for Friday, May 27, 2011

9:00 am - 10:30 am	Introduction to PCM principles and stainless steel products Classifications of stainless steels Challenges of etching corrosion-resistant stainless steels and resultant quality issues
10:30 am - 11:00 am	Coffee break
11:00 am - 12:30 pm	How to etch high quality stainless steel products: etchant process variables Etch rate, surface finish and smut dependency on etchant composition and spray pressure Ferric chloride etchant variables and how to monitor them
12:30 pm - 1:30 pm	Luncheon
1:30 pm - 3:00 pm	On-line monitoring of ferric chloride-based etchants Environmental impact of waste ferric chloride etchant Industrial techniques for ferric chloride regeneration and the associated economics
3:00 pm - 3:30 pm	Tea break
3:30 pm - 4:30 pm	Laboratory demonstrations of stainless steel smut elimination, summary and close
7:00 pm --- on	Optional evening meal at a local pub for delegates (at their own expense) and staff



# Photo Chemical Machining Institute Registration Form

[Click here to register online \(credit card required.\)](#)

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<u>Fee Schedule</u>	<u>PCMI Member</u>	<u>NON-Member 1<sup>st</sup> Meeting</u>	<u>NON-Member</u>	<u>Amount</u>
Meeting Registration (Includes breaks and lunch while at Cranfield.)	US \$450.00	US \$450.00	US \$1,100.00	\$ _____
Room Registration (Include breakfast daily.)	_____ Arrival Date _____ Depature Date			
	US \$155 per single room, per night # of nights _____			\$ _____
	Additional person per night = US \$40 # of people _____			
	<b>(Available only until April 15, 2011.)</b>			

After April 15th, you will have to book your own room. There is no guarantee of availability. Please contact the Cranfield University Conference Centre directly. The PCMI reference number is kx4343. The reservation information is +44 01234 752709. The email address is [cmdcsales@cranfield.ac.uk](mailto:cmdcsales@cranfield.ac.uk)

Grand Banquet (Moday)	US \$75.00	US \$75.00	US \$125.00	\$ _____
Group Dinner TBD (Tuesday)	US \$60.00	US \$60.00	US \$100.00	\$ _____
Cambridge Dinner * (Thursday)	US \$100.00	US \$100.00	US \$170.00	\$ _____
Plant Tour *	US \$25.00	US \$25.00	US \$50.00	\$ _____
PCM Short Course	US \$500.00	US \$500.00	US \$800.00	\$ _____

Duxford Air Show *	<input type="checkbox"/> Adult (16-59 years)	US \$115.00	# of tickets _____	\$ _____
	<input type="checkbox"/> Senior (60 years+)	US \$100.00	# of tickets _____	\$ _____

Sponsorship	<input type="checkbox"/> Platinum - US \$1,000.00	<input type="checkbox"/> Gold - US \$750.00	\$ _____
	<input type="checkbox"/> Silver - US \$500.00	<input type="checkbox"/> Bronze - US \$300.00	

\* Includes transportation costs

**Please print clearly.**

**TOTAL FEE** \$ \_\_\_\_\_

Name \_\_\_\_\_ Name for Badge \_\_\_\_\_

Spouse Name \_\_\_\_\_ E-mail address \_\_\_\_\_

Company/Institution \_\_\_\_\_ Is this your first PCMI Conference?  Yes  No

Address \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Country: \_\_\_\_\_

Telephone \_\_\_\_\_ Fax: \_\_\_\_\_

Payment  A check for US \$ \_\_\_\_\_, payable to the PCMI, is enclosed (U.S. bank checks only.)

Please charge US \$ \_\_\_\_\_ to my credit card:



Credit Card # \_\_\_\_\_

Exp. Date: \_\_\_\_\_ / \_\_\_\_\_ Security # \_\_\_\_\_

**Contact PCMI**

11 Robert Toner Blvd., #234  
 North Attleboro, MA 02763  
 Phone: 508-385-0085  
 Fax: 508-232-6005  
 Catherine Flaherty  
[cflaherty@pcmi.org](mailto:cflaherty@pcmi.org)

**Please return registration form and payment by April 15, 2011.**