

# **THE COMBUSTION INSTITUTE**

## **(British Section)**



# **NEWSLETTER**

**Autumn 2014**

Digital version of this and past newsletters: <http://www.combustion.org.uk>

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### Combustion Institute, British Section

#### Benefits:

- travel grants to Combustion Symposia and other meetings
- reduced fees at Section-sponsored meetings
- reduced subscriptions to several combustion journals
- Section's Newsletter
- and a chance to meet like-minded people

Please encourage associates to join the Section, especially research students recruited at the start of this academic year

Details from the Membership Secretary Dr Kevin Hughes.

E-mail: [K.J.Hughes@leeds.ac.uk](mailto:K.J.Hughes@leeds.ac.uk)

or download application forms from

<http://www.combustion.org.uk/membership.html>

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### Committee Members, from Sep 2013

Name	Affiliation	Term
Prof. P. Bowen	Cardiff University	(2013-2016)
Prof. R. S. Cant	University of Cambridge	(2012-2015)
Prof. Y. Hardalupas	Imperial College	(2009 – 2012),(2012 – 2015) Secretary
Prof. A N. Hayhurst	University of Cambridge	Honorary life member
Prof. S. Hochgreb	University of Cambridge	Newsletter editor, co-opted (2013,2014)
Dr. K. J. Hughes	Leeds University	Membership secretary, co-opted (2013)
Prof. W. P. Jones	Imperial College	Chair (2011-2016)
Prof. R. P. Lindstedt	Imperial College	Director, Combustion Institute (co-opted)
Prof. E. Mastorakos	University of Cambridge	Associate Editor of C&F (co-opted)
Mr. J. Moran	Rolls-Royce plc	(2012-2015)
Dr. N. Morgan	Shell Global Solutions	(2011-2014, 2014-2017) Treasurer
Dr. G. Bulat	Siemens	(2014-2017)
Dr Y. Wu	University of Sheffield	(2013-2016)

## EDITORIAL

We have managed yet another edition of the newsletter this year – this time all electronic. I hope you will enjoy the change, which will save paper, time, but mostly, stamp licking effort, and hopefully provide all the information on a more timely basis. However, it may be the case that you really like paper – the one bit of rest your tired eyes get from a day at the screens. We are hoping to integrate it with a revamped website in the near future. We would like to hear your opinion whichever way it goes.

**Simone Hochgreb, editor**  
**Email: [simone.hochgreb@eng.cam.ac.uk](mailto:simone.hochgreb@eng.cam.ac.uk)**

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## COMBUSTION INSTITUTE UPDATES

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As the next step in providing an increased service and optimum flow of information from the CI office to all members (not only voting members), everyone is strongly encouraged to register at the CI home page (followed by check with the corresponding Section). Most of you will know by now that The Combustion Institute has also changed its procedures for selecting board members – for the better. Now there is an electronic election process, where the members are nominated by the sections around the world and a roster compiled with twice the number of available slots for the election. In order to vote, however, you must register at the Institute website (<http://www.combustioninstitute.org>), as the British Section is not allowed to share the member database due to data protection laws. The next elections are close to the next Symposium in 2016, and we encourage all to participate.

The next deadline for arranging an ICISS (Summer/winter school) is Jan 1, 2015. Visit [https://www.combustioninstitute.org/upload\\_resources/resource716.pdf](https://www.combustioninstitute.org/upload_resources/resource716.pdf) for detailed information and guidelines.

There seems to be an increased interest in creating Regional Sections beyond individual countries (or perhaps as large as an European section?). Please let someone in the committee know your views.

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## RECENT COMBUSTION INSTITUTE MEETINGS

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### Joint Meeting of the British and Scandinavian-Nordic Sections

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The Joint Meeting of the British and Scandinavian-Nordic Sections of the Combustion Institute, held in Cambridge on the 27th and 28th of March, was innovative in more than one aspect. First of all, it was for the first time held jointly by the British and Scandinavian-Nordic Sections, which provided the opportunity for an overview of research carried out by both communities and considerably enlarged the amount of material presented. Secondly, presentations from PhD students were encouraged from the outset, and thus the meeting provided an excellent vehicle for many research students to present their work and gain valuable experience, as well as get a 'first taste' - for many - of participation in a conference. In fact, the meeting had the character of a mini-symposium, with two parallel sessions running at all times. This format proved very successful and valuable for students and should be considered for future meetings.

The program kicked off strongly with an invited lecture by S. Starikovskaya illustrating the link between combustion kinetics and plasma kinetics, an unusual and refreshing topic for the combustion community. A second invited lecture by H. Pitsch covered the more familiar topic of combustion LES and DNS, addressing in particular how DNS can be utilised in the context of LES combustion model development. In view of the increasing amount of work and data generated by DNS, this is a question that has become highly relevant. The lecture was flanked by a number of presentations on LES-based combustion modelling, which proposed a range of solutions for the turbulence-chemistry interaction – from complex models to no modelling – indicating the current interest and intense activity in this area. The whole spectrum of combustion topics was well represented in the meeting: from theoretical topics such as laminar and turbulent flames, sprays and chemical kinetics, to more applied topics such as engines, while the presenters were a nice mix of PhD students at various stages through their project, early career and experienced researchers. The organisation of the meeting by both British and Scandinavian-Nordic sections was also excellent. Overall the meeting was very successful and encouraged the occasional adoption of the mini-symposium format in the future.

Stelios Rigopoulos  
May 2014

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## International Combustion Symposium, San Francisco, August 2014

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The 35<sup>th</sup> International Combustion Symposium was held on 3-8<sup>th</sup> August in San Francisco, USA. A great location, with many opportunities to meet colleagues, and enjoy the fantastic views. Two of our own held Keynote Talks (Gautam Kalghatgi and Dame Ann Dowling), in a meeting marking a new phase of the Combustion Institute, with a new president and fresh ideas. The British section contributed £450 to 22 contributors from members. Excerpts from reports of some of the contributors can be found below. We hope to have interesting comments from *all* recipients next time – you know who you are!

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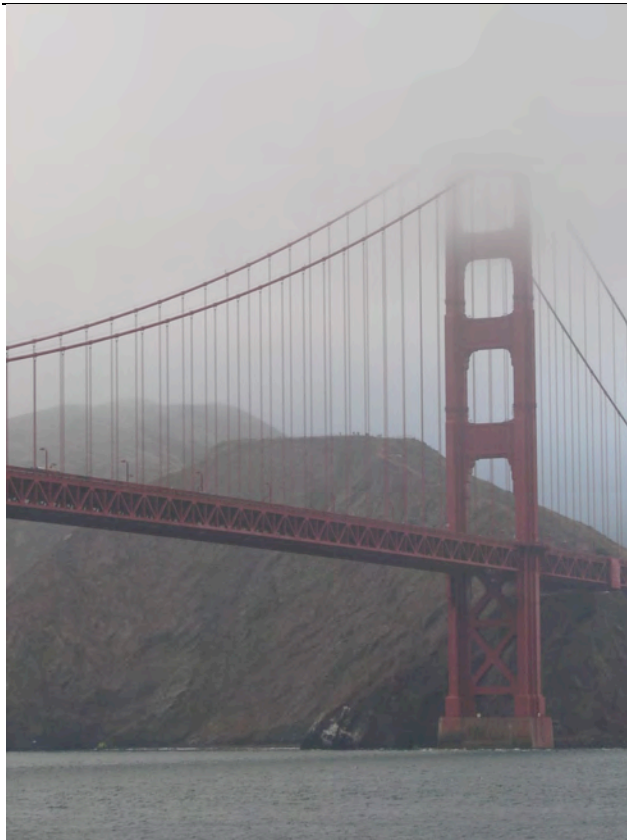


Photo by Alexander Snegirev, St. Petersburg Polytechnic, Russia.

*"It was a long, busy and very fruitful week in San Francisco for me. On the Friday before the main Symposium I attended the Rapid Compression Machine workshop. It was interesting to hear people share thoughts on how to improve measurement strategies for ignition data, and perhaps a little more worrying to learn what might be required to model the complex inhomogeneous processes that could be occurring within an RCM. Over the weekend, the Flame Chemistry Workshop was held and will hopefully have lasting consequences in terms of future developments in collaborative working. From a kinetics point of view a number of new and interesting ideas were presented here and at the Symposium proper on non-Boltzmann kinetics, on combining theory and experiment and on developing appropriate surrogate mechanisms for alternative fuels. Fred Dryer's*

*plenary was extremely valuable in terms of discussing the latter. It was thought provoking and perhaps highlighted that we need to do more to make our fundamental research of real value to those facing the challenges of designing more efficient, clean and thus sustainable practical combustors. Following breakout discussions at the FC workshop, a position paper on developing Combustion Chemistry Cyberinfrastructure has been prepared. The aim is to facilitate cloud based strategies for collaborative working in combustion which will more effectively bring together experimental and modelling communities to improve the practical applicability of our models. If successful this could lead to a step change in way we share data, models and software. I hope to keep you informed!"*

Alison Tomlin, University of Sheffield

*"Attendance at the Symposium gave me an opportunity to meet and interact with many experts in the field of combustion, especially two-phase flows. I also had a chance to communicate with other research students through well-organised events, e.g. young researcher mixer. I would therefore like to thank the Combustion Institute (British Section) for travel grants that allowed me to attend this excellent meeting."*

Dongwon Noh, Imperial College London

*"I attended the 35th International Symposium on combustion from the 3rd to the 8th of August in San Francisco, California. My presentation and poster prompted discussions of how we can proceed in future. The talks at the conference were informative and inspired me a lot. A new project has been started based on the discussion with one of the presenters. The travel grant is highly appreciated."*

Dongping Chen, University of Cambridge

*"One of the important roles of any symposium or conference is to observe the latest developments of the research community and meet old and new*

colleagues with whom you share similar research interests. Personally I have benefited greatly. San Francisco is a fantastic place. The downside were the difficulties in finding suitable accommodation and the expense, especially for those who made a late decision to attend or were hindered by the visa application."

Yang Zhang, University of Sheffield

"The 35th Combustion Symposium in San Francisco was my sixth symposium. Even by the high standards set by the previous ones I attended, this one did not disappoint - on the contrary. I was pleased to see a healthy number of contributions in the field of soot formation - one area I find particularly interesting. Several papers as well as posters focused on the as yet unsolved mystery of how new particles are incepted. A thoroughly enjoyable new feature was the short-film summary at the end of the conference. Well done."

Sebastian Mosbach, University of Cambridge

"It was my honour to attend and give an oral presentation on thermo acoustic instability of stratified flames in the 35th International Combustion Symposium. The Symposium was a great chance to share the ideas and progress in combustion science and engineering. I was especially impressed by the sections on 'Flame dynamics' and 'Instabilities in Swirled flames'. The work by CNRS on thermal acoustic instability analysis on swirled spray combustor and the approach to propagation of disturbances on harmonically forced non-premixed flames by GIT were quite impressive. These presentations reflect the frontline research on thermoacoustic instability, which we should stay focus on."

Zhiyi (Henry) Han, University of Cambridge

"My experience at the 35th International Symposium on Combustion was very positive. The work presented in the oral and poster sessions was of a very high quality and covered a wide range of the latest research efforts in the combustion field. I was able to engage with both young and experienced researchers, and over the course of many interesting conversations, I developed a clearer vision of the future direction that I intend to direct my research efforts. The opportunity to share my research on an international platform was a key part of the rewarding experience."

James Kariuki, University of Cambridge

"The Symposium provided a good place to talk and discuss diverse physical phenomena in combustion-related field with experts. All plenary lectures were of a high quality, providing unresolved problems and potential solutions in combustion-related field. Although 5 days were quite short to enjoy the symposium, I could spend my time effectively due to well-organized program. It was the best symposium I have ever attended."

Yangkyun Kim, University of Ulster



Bill Jones, Gautam Galghatgi and his wife Sue enjoying the picnic cruise

"As usual, the Symposium was overall a wonderful experience, both on a scientific and a social level, and the travel grant from the Combustion Institute assisted greatly in funding this quite expensive trip. I am grateful for the award.

This time, the number of papers seemed a little greater than usual and the number of attendees similarly felt greater. The decision to hold the meeting in a hotel was excellent. The parallel sessions were closer together geographically and the spaces between them were of a quality that increased the opportunity for discussions. A significant number of people would hence be seen talking outside the session rooms. Although this might have disappointed some speakers, I think that overall the interactions between delegates were promoted and this is good news for the future of the Symposium.

The social programme was well conceived and was quite effective in bringing people together, despite some occasional hiccups. The activities to target the younger delegates also seemed to be very effective and hopefully managed to instill the same fascination with the Symposium that the more seasoned attendees have developed over the years.



*Congratulations to the CI and to the local members for the organisation and thanks to the British Section for the travel grant.*

Epaminondas Mastorakos,  
University of Cambridge

*It was only through this support that I was able to present and discuss my work in an international setting with worldwide leaders on the subject; a unique environment only accessible through attendance at the symposium. Beyond the forum provided formally through the conference, the diversity of learning opportunities spanning networking activities, social outings, and plenary lectures, two of which were delivered by outstanding female combustion scientists, was invaluable.*

Jenni Sidey  
University of Cambridge

*It is a real challenge indeed to get invited to give a talk for the Combustion symposium. The very*

*hard week included full working days from Monday to Friday, excellent plenaries, 8 parallel sections, about 400 talks plus even more posters to choose from. To feel the voltage generated, just imagine fifteen hundreds delegates from dozens and dozens of countries throughout the globe. Perfect management, friendly atmosphere, great opportunity to share ideas and develop collaborative links, let alone amazing social program. The number of young people including presenters was equally impressive. It does seem that the beauty of combustion science is indeed attractive, and substantial financial support by organizers (student presenters were exempt of the registration fee and were also given the travel grants) is worthy of special thanks. My only regret is that the movie about the Symposium demonstrated at the very last plenary session has not been made available via the Symposium website. Clearly, it is not yet too late to do so.*

Alexander Snegirev, St. Petersburg, Russia

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## COMBUSTION LINKS AND CALENDAR

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<http://www.combustioninstitute.org.uk>

<http://www.combustioninstitute.org>

<http://www.afm.asso.fr>

<http://ukelg.ps.ic.ac.uk>

<http://www.iop.org/activity/groups/subject/comb/calendar/index.html>

<http://www.see.ed.ac.uk/fire/conferences.html>

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## 2015

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The Seventh **European Combustion Meeting will be held in Budapest, Hungary**, on March 30-Apr 2, 2015. The abstract submission deadline is 14 November, 2014. <http://www.ecm2015.hu>.

The **Fifteenth International Conference on Numerical Combustion** will be held in Avignon (France), April 19-22, 2015. Deadline for papers until October 31st, 2014. <http://www.nc15.ecp.fr/lang/en/nc15/participate/contribution>.

25th **International Colloquium on the Dynamics of Explosions and Reactive Systems (ICDERS)** will be held in Leeds in 2015 on 2-7 August, 2015 The deadline for submission of papers is Monday 15 December 2014 <http://www.icders2015.org>.

The Ninth **Mediterranean Combustion Symposium** will take place in Rhodes on 7-11 June, 2015. <http://www.mcs-2015.org/welcome.cfm>.

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## SECTION AWARDS

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### Hinshelwood Prize



The 2013 Hinshelwood Prize for meritorious work by a younger member of the Section was awarded to Dr Edward S. Richardson, Associate Professor at the University of Southampton. The panel awarding the prize was chaired by Stewart Cant, with assistance from Bill Jones and Neal Morgan.

### Sugden Award

The Sugden Prize for the best paper by a UK contributor during 2013 was awarded to a paper co-authored by Chrystie R.S.M., Burns I.S. and Kaminski C.F. "Temperature response of an acoustically-forced turbulent lean premixed flame: A quantitative experimental determination", published in *Combustion Science & Technology*, Vol. 185, pages 180-199, (2013). The Sugden Panel was chaired by Guillermo Rein, with assistance from Nondas Mastorakos and Yajue Wu.



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## PEOPLE

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### Honour for Brian Spalding, FRS, FEng



Professor Brian Spalding, a long time combustion researcher who has made groundbreaking contributions to the field, was awarded an Honorary Degree of Doctor of Science (Engineering) by Imperial College in May 2014. The citation reads: "Professor Brian Spalding's links with Imperial date back to 1954 when he joined the College as Reader in Applied Heat Transfer, becoming Professor of Heat Transfer four years later. He was subsequently Head of the College's Computational Fluid Dynamics Unit: a position he held until his retirement in 1988 – loyal service that was only interrupted by occasional visiting professorships at leading peer-institutions such as MIT and Berkeley. Professor Spalding's outstanding work on thermodynamics, combustion, heat transfer, boundary-layer theory and, most notably, computational fluid dynamics had a deep impact. His development of accurate computer models for fluid analysis is widely recognised as groundbreaking. His commitment to translating the fruits of that research led to the founding of Concentration Heat and Momentum Limited (CHAM) where Professor Spalding still serves as Managing Director. After seven decades in the field, it is a pleasure to see this great teacher and researcher continue to contribute so much to the engineering sciences."



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## OBITUARIES

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### **Professor Philip Humphrey Thomas**

It is with the great sadness that we have learnt of the sudden death on 14th January 2014 of the eminent fire scientist, Professor Philip Humphrey Thomas, aged 87.

Philip graduated with First Class Honours in Mechanical Engineering from Cambridge University in 1945 obtaining in 1950 a PhD from research on Rubbing Solids in the Physical Chemistry Department. After a year as a special research trainee at the Metropolitan Vickers Company in Manchester he joined the Fire Research Station (FRS) in 1951.

He was promoted rapidly to Principal Scientific Officer by the age of 30 and awarded Special Merit Senior Principal Scientific Officer status in 1962. He started his work in the section at FRS concerned with extinction of fires, later to become its head studying the ignition and growth of fire, examining the use of models, flame behaviour and roof venting. A paper published in 1963 describing the venting of smoke from pre-flashover fires was the predecessor of current two zone smoke models.

In 1966 he spent a one year sabbatical at the Building Research Institute of Japan developing very close link with that country and was also, later, Visiting Professor at the University of California, Berkeley in 1980, the Science University of Tokyo, 1982, the Technical University of Denmark in 1987 and the University of Lund, Sweden from 1984 to 1990.

Throughout his career at the Fire Research Station from 1951 to 1986 he published much of the key seminal research that has provided us with our scientific understanding of fire. Ranging through contributions on self-heating, thermal explosion theory, through fire extinction and buoyant diffusion flame theory to the modelling of forest and building fires, his name is dominant in author citation indexes in the field.

During his time as Springer Professor at Berkeley in 1980 a Symposium was held in his honour. To celebrate his retirement from FRS, the UK Building Research Station published a special collection of some of his papers. He continued to contribute well after his retirement from FRS and was still publishing scientific papers as late as 2010.

In addition to his research, Philip was Co-ordinator of the Fire Commission of the Conseil International du Batiment (CIB W14) from 1974-1994 and Chairman of the International Organisation for Standardisation Fire Safety Committee ISO TC92 from 1976 to 1995.

He was the founding father of the International Association for Fire Safety Science. It was he, along with like-minded researchers from across the world, who made the first moves in 1983 to establish a new international association for fire researchers. They had recognised that, whilst there were several organisations then in existence that embraced some special aspects of fire there was no single institution that covered the full diversity of topics that constituted fire safety science.

Phil drove the initiative forward, establishing it at the very successful First International Symposium on Fire Safety Science hosted in the US in 1985 by NIST (then the National Bureau of Standards). At that Symposium he was elected the Association's first Chairman and served in that capacity from 1985 to 1991.

At that time the world was far more fragmented than it is now but Phil's rigorous commitment to internationalism ensured the enduring success of the Association.

He took the lead from the Combustion Institute and the Royal Society in seeking to establish charitable status for the IAFSS, which was achieved in 1988.

He was particularly animated about the need for high standards in fire research and it is particularly fitting that the IAFSS now names its award for best paper at its Symposia as the Philip Thomas award.

Phil will be sadly missed by many friends and colleagues from across the world, not only for his unique contribution to our field, but for his warmth, wisdom and his analytical insight.

**Geoff Cox**

### ***Professor John Barnard***

Many readers will be saddened to learn that John Barnard died on 28 October 2014. He was a very efficient, approachable and friendly Secretary of The British Section from 1976 – 81. His career of research, teaching and administration was mainly based in the Departments of Chemical Engineering at University College London and Sheffield University, where he succeeded J.M. Béer as Head of Department. Our condolences go to his wife, Audrey, and his family. A full tribute and obituary will appear in the next Newsletter.

**Allan Hayhurst**

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## PUBLICATIONS BY SECTION MEMBERS 2013-2014

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