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Formal Aspects of  
Computing Science  
Specialist Group

The Newsletter of the  
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(FACS) Specialist Group

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## About *FACS FACTS*

*FACS FACTS* [ISSN: 0950-1231] is the newsletter of the BCS Specialist Group on Formal Aspects of Computing Science (FACS). *FACS FACTS* is distributed in electronic form to all FACS members.

Submissions to *FACS FACTS* are always welcome. Please visit the newsletter area of the BCS FACS website for further details [<http://www.bcs.org/category/12461>].

Back issues of *FACS FACTS* are available for download from:

<http://www.bcs.org/content/conWebDoc/33135>

## The *FACS FACTS* Team

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## Contributors to this Issue

Jawed Siddiqi, Margaret West, Jonathan Bowen, Paul Boca, Tim Denvir, John Fitzgerald

If you have any questions about FACS, please send these to Paul Boca [[Paul.Boca@virgin.net](mailto:Paul.Boca@virgin.net)]

## Editorial

Welcome to the 2010 issue of *FACS FACTS*: in October we held our AGM and this issue includes a report from our Chair, Professor Jawed Siddiqi and a report from John Fitzgerald on Joint Activities with Formal Methods Europe and the Safety-Critical Systems Club. We also include some information for FACS authors provided by Tim Denvir.

During the autumn of 2010 we organised three evening seminars and titles, abstracts and links are also provided later in this newsletter. Our first seminar of 2011 is on February 7<sup>th</sup> at the BCS London offices, given by Prof Susan Stepney (University of York), and entitled:

*Wanted: Formalisms for Natural Computing*

Since the AGM we have had our annual planning meeting which involved a discussion about the Academy with Bill Mitchell. It is still early days regarding this proposed institution – we will endeavour to keep you informed.

We apologise for the extreme delay in the appearance of the last newsletter on the BCS-FACS website. It appears now with a response by Adrian Walmsley (BCS Vice President Membership).

*Best Wishes for 2011!*

## **BCS FACS Chair's Annual Report 2009–2010**

**Jawed Siddiqi**

Last year we set out with the two main goals:

1. To continue to operate specialist group primarily through the evening seminar series and possibly one or two selective conferences.
2. To try to have a greater influence on the direction the BCS is heading.

One achievement towards the first goal saw the launch of the book based on the evening seminar series:

*Paul P. Boca, Jonathan P. Bowen, Jawed I. Siddiqi (editors),  
Formal Methods: State of the Art and New Directions,  
Springer-Verlag, London, 2010*

[\[http://formalmethods.wikia.com/FMSAND\]](http://formalmethods.wikia.com/FMSAND)

Continuing with our first goal FACS has organized three evening seminars (one jointly with the Critical Systems Club). Two further seminars are arranged for this year:

Our joint event with the London Mathematical Society at de Morgan House is to be given by Professor Peter O'Hearn: *Reasoning about Programs Using a Scientific Method*.

The *Landin Semantics Seminar* is to be given by Professor John Reynolds in memory of Peter Landin.

Last year we continued to operate in the same manner as before in that our evening seminars were available to the membership for free so as to continue to promote Formal Methods and BCS. To that end FACS spent £1,755.31, mainly on expenses for the evening seminars. There was no income. For the year 2010–11, we have budgeted £2750.00, again mainly to support the evening seminars. We have assumed no income in the budget for this coming year too.

In relation to the second goal Committee members participated in the debate surrounding the EGM and some were involved in an attempt to reform the BCS. We had different views and this led to different causes of action. We also saw the emergence of the BCS Computing Academy and it is our goal to collaborate with the academy.

Finally at our AGM the Chair (Jawed Siddiqi) Secretary (Paul Boca) and Treasurer (Jonathan Bowen) were elected unanimously and the remaining committee agreed to carry on their responsibilities. It was agreed to hold our annual planning meeting in November to produce a plan for the year involving a series of evening seminars and establish a working relationship with the Academy.

**Jawed Siddiqi**

**Chair, BCS-FACS**

## ***Joint Activities with Formal Methods Europe and the Safety-Critical Systems Club in 2010***

**Report: John Fitzgerald**

FACS has memoranda of understanding with Formal Methods Europe (FME) and the UK Safety Critical Systems Club (SCSC) that provide a basis for collaboration on a range of activities. We organise at least one joint evening seminar in London each year. In the 2010 seminar held on 13 September Jan Broenink of the University of Twente discussed, from the engineer's viewpoint, the potential and challenges of applying formal techniques to the development of embedded and robotic systems.

FME ([www.fmeurope.org](http://www.fmeurope.org)) organises the well regarded "FM" series of Symposia which are held every 18 months and provide many opportunities for collaborative activities. At the 2009 Symposium in Eindhoven, the FME Education SIG held a well-supported workshop with the FACS-supported 2<sup>nd</sup> International Conference on Teaching Formal Methods, and FACS also supported the 2009 Refinement Workshop, part of the same week's events. An important future opportunity for joint activity is the FM 2011 Symposium ([www.lero.ie/fm2011](http://www.lero.ie/fm2011)) at Lero, Limerick, Ireland on 20–24 June 2011. The 2012 symposium will be held in the autumn of that year at the Conservatoire National des Arts et Métiers in Paris.

The main activity with the SCSC this year was the joint evening seminar held at Birkbeck College London on 14 April 2010. In a very well-attended lecture, Prof. Robin Bloomfield (City University and Adelard) spoke on Interdependencies and Resilient Infrastructure, emphasising the range of models that can be brought to bear in analysing complex interactions between infrastructure elements. We again propose to continue the SCSC collaboration in 2011.

Members with ideas for activities that would benefit from the involvement of FME (giving an international dimension and the possibility of sponsorship) or the SCSC (linking to the safety critical systems community) are most welcome to contact [John.Fitzgerald@ncl.ac.uk](mailto:John.Fitzgerald@ncl.ac.uk).

## **FACS Authors – Join ALCS**

**Tim Denvir**

Back in September 2008 in these columns, I urged FACS authors to assert their rights by joining PLR, the Public Lending Right organisation ([www.plr.uk.com](http://www.plr.uk.com)). Doing so can generate an income, usually fairly small, based on loans from libraries. There is no membership fee. Another organisation, ALCS, the Authors' Licensing and Collecting Society ([www.alcs.co.uk](http://www.alcs.co.uk)), is based in the UK. There is a one-off joining fee of £25, but you don't have to pay it! At least, not at first. They charge you only when some copying income is due to you, and deduct it from the first payment. Also, and this is *most important*, ALCS has a jolly party every year to which all members are invited. These bashes alternate between London and Edinburgh and take place in August, so attending the northern ones can be combined with a visit to the Edinburgh collect royalties on books and published papers based on photocopies that are made in libraries and such like places. I was surprised and gratified to be sent over £100 last year, and by comparison with many other FACS members my publications are not prolific. I have enjoyed the last two Edinburgh events and I must say, they have been most convivial occasions. Most of the members of ALCS seem to be academic or factual authors rather than fiction writers, and on reflection this is not surprising; there is probably far more demand for copying extracts from an academic work than from a novel. An extraordinary variety of occupations, some rather intriguing, are represented.

One does not have to own the copyright of a book for it to be eligible for these royalties; being the author is sufficient, it seems. Papers that have been published in journals over the last three years can be registered (but the website ([www.alcs.co.uk](http://www.alcs.co.uk)) says since January 2007, so is not quite clear on this exact point). If you are the successor to the estate of someone who was an author, you can register as a member. UK based authors can now claim payments from PLR in the Ireland, and ALCS can arrange payments to those living abroad.

**Tim Denvir** ([www.timdenvir.me.uk](http://www.timdenvir.me.uk))

## FACS Evening Seminar Series 2010–2011

**Spring 2011:**  
*Wanted: Formalisms for Natural Computing*  
Prof. Susan Stepney (University of York)

The talk will take place on 7<sup>th</sup> February 2011 at the BCS London offices in Southampton Street. The abstract is below

### Abstract

Classical computing has well-established formalisms for specifying, refining, composing, proving, and otherwise reasoning about computations.

Natural Computing uses novel kinds of substrates – such as chemicals, biomolecules, even slime moulds – to perform computations that don't conform to the classical model. Although these substrates can often be "tortured" to perform classical computation, this is not how they "naturally" compute. But our ability to exploit natural computation is hampered by a lack of corresponding formalisms: we need models for building, composing, and reasoning about programs that execute in these substrates.

What does, say, a slime mould programming language look like? Here I discuss some of the issues, from the perspective of a user who wants a principled programming approach for these systems.

## Talks from Autumn 2010

### *Embedded Control Software Design with Formal Methods and Engineering Models*

**Prof. Jan Broenink  
(University of Twente, The Netherlands)**

**13<sup>th</sup> September 2010**

The seminar took place on 13<sup>th</sup> September 2010 and was joint with FME. It took place at the BCS London offices in Southampton Street: the abstract is given below.

#### **Abstract**

The speaker discussed the combination of formal methods and engineering models for the model-driven design of embedded control software (ECS). Since the dynamic behaviour of these systems determines the timing behaviour of the ECS, both approaches are needed. A design method using CSP process algebra and bond graphs (engineering models) will be presented, including a discussion of its application to a case study (a production cell experimental setup), in which continuous-time and discrete-event control decisions are combined.

The slides will appear at [www.fmeurope.org/?p=388](http://www.fmeurope.org/?p=388).

## ***Reasoning about Programs Using a Scientific Method***

**Prof. Peter O'Hearn  
(Queen Mary, University of London)**

**16<sup>th</sup> November 2010**

The seminar took place on 16<sup>th</sup> November 2010 and was held jointly with the London Mathematical Society. It took place at the LMS headquarters in De Morgan House, Russell Square, London. The abstract and a link to the slides are given below.

### **Abstract**

Reasoning about programs has traditionally been done using deductive reasoning, where mathematical logic is used to make proofs that connect programs with specifications. In this talk Professor O'Hearn describes an approach where an automated reasoning tool approaches program code as a scientist would in the natural world. Instead of just deductive logic, versions of abductive reasoning (generation of new hypotheses) and inductive generalization are used in an iterative fashion to discover specifications that describe what programs do, starting from bare code. The resulting specifications are partial or conservative, but the inference/discovery aspect makes it much easier to approach large code bases, quickly, than with the traditional deductive-only approach. Professor O'Hearn reports on experience using a software tool – Abductor, which automates the method – on large open-source code bases, and he speculates on the potential role of automated scientific method in program verification and design. This talk is based on joint work with Cristiano Calcagno, Dino Distefano and Hongseok Yang.

### **Slides**

[www.eecs.qmul.ac.uk/~ohearn/papers/scientific-method-talk.pdf](http://www.eecs.qmul.ac.uk/~ohearn/papers/scientific-method-talk.pdf)

## Peter Landin Annual Semantics Seminar

Peter Landin (1930–2009) was a pioneer whose ideas underpin modern computing. In the the 1950s and 1960s, Landin showed that programs could be defined in terms of mathematical functions, translated into functional expressions in the lambda calculus, and their meaning calculated with an abstract mathematical machine. Compiler writers and designers of modern-day programming languages alike owe much to Landin's pioneering work.

Each year, a leading figure in the area of semantics will pay tribute to Landin's contribution to computing through a public seminar. The first such seminar took place on 6<sup>th</sup> December 2010 and was delivered by Professor John Reynolds (Queen Mary, University of London, Imperial College and Carnegie Mellon University, <http://www.cs.cmu.edu/~jcr/>).

Professor Cliff Jones (Newcastle University) introduced and chaired the seminar.

Immediately before the seminar, a rare film of a lecture Peter Landin gave at the Science Museum in 2001 was replayed.

The talk was entitled ***Toward a Grainless Semantics for Shared-Variable Concurrency***.

### Abstract

Conventional semantics for shared-variable concurrency suffers from the “grain of time” problem, i.e., the necessity of specifying a default level of atomicity. We propose a semantics that avoids such a choice by regarding all interference that is not controlled by explicit synchronization as catastrophic. It is based on three principles:

- Operations have duration and can overlap one another during execution.
- If two overlapping operations touch the same location, the meaning of the program execution is “wrong”.
- If, from a given starting state, execution of a program can give “wrong”, then no other possibilities need be considered.

In our current approach, instead of trace sets, we use trace trees, in which we separate nondeterminism and branching.

## ***FACS FACTS Issues in 2011***

### **Call for Submissions**

**We welcome contributions for the next issue of *FACS FACTS*, in particular:**

- **Letters to the Editor**
- **Conference reports**
- **Reports on funded projects and initiatives**
- **Calls for papers**
- **Workshop announcements**
- **Seminar announcements**
- **Formal methods websites of interest**
- **Abstracts of PhD theses in the formal methods area**
- **Formal methods anecdotes**
- **Formal methods activities around the world**
- **Formal methods success stories**
- **News from formal methods-related organizations**
- **Experiences of using formal methods tools**
- **Novel applications of formal methods**
- **Technical articles**
- **Tutorials**
- **Book announcements**
- **Book reviews**
- **Adverts for upcoming conferences**
- **Job adverts**
- **Puzzles and light-hearted items**

**Please send your submissions (in Microsoft Word, LaTeX or plain text) to Margaret West [[m.m.west@hud.ac.uk](mailto:m.m.west@hud.ac.uk)], the Newsletter Editor.**

**If you would like to be an official *FACS FACTS* reporter or a guest columnist, please contact the Editor.**

## Recent and Forthcoming Events

**BCS FACS Seminars: Unless stated otherwise, these take place at: BCS London Offices, First Floor, The Davidson Building, 5 Southampton Street, London WC2E 7HA.**

Jan Broenink **September 2010**

*Embedded Control Software Design with  
Formal Methods and Engineering Models*

September 13<sup>th</sup> 2010

Joint meeting with FME

Peter O'Hearn **November 2010**

*Reasoning about Programs Using a Scientific Method*

November 16<sup>th</sup> 2010

Joint with LMS at De Morgan House

John Reynolds **December 2010**

*Towards a Grainless Semantics for  
Shared-Variable Concurrency*

November 16<sup>th</sup> 2010

Peter Landin Annual Semantics Seminar

Susan Stepney **February 2011**

*Wanted: Formalisms for Natural Computing*

February 7<sup>th</sup> 2011

Joint meeting with BCS-Women

Philip Wadler **April 2011**

*Formlets*

April 5<sup>th</sup> 2011

For further conference announcements, please visit the Formal Methods Europe (FME) website [[www.fmeurope.org](http://www.fmeurope.org)], the European Association for Theoretical Computer Science website [[www.eatcs.org](http://www.eatcs.org)] and the Formal Methods Wiki Virtual Library [<http://formalmethods.wikia.com/wiki/Meetings>].

## FACS Committee



Formal Aspects of Computing  
Science Specialist Group



**Jawed  
Siddiqi**



**Jonathan Bowen  
FACS Treasurer  
and ZUG Liaison**



**Paul Boca  
Secretary**



**Roger Carsley  
Minutes  
Secretary**



**John Cooke  
FAC Journal Liaison  
and BCS Liaison**



**John Fitzgerald  
FME Liaison and  
SCSC Liaison**



**Margaret West  
Newsletter Editor**



**Rob Hierons  
Chair, Formal  
Methods and Testing**



**John Derrick  
Chair, Refinement  
Subgroup**

## External Liaison



**Tom Melham  
LMS Liaison Officer**

FACS is always interested to hear from its members and keen to recruit additional helpers. Presently we have vacancies for officers to help with fund raising, to liaise with other specialist groups such as the Requirements Engineering group and the European Association for Theoretical Computer Science (EATCS), and to maintain the FACS website. If you are able to help, please contact the FACS Chair, Professor Jawed Siddiqi at the contact points below:

**BCS FACS**  
**c/o Professor Jawed Siddiqi (Chair)**  
**Sheffield Hallam University**  
E [info@bcs-facs.org.uk](mailto:info@bcs-facs.org.uk)  
W [www.bcs-facs.org](http://www.bcs-facs.org)

You can also contact the other Committee members via this email address.

Please feel free to discuss any ideas you have for FACS or voice any opinions openly on the FACS mailing list [[FACS@jiscmail.ac.uk](mailto:FACS@jiscmail.ac.uk)]. You can also use this list to pose questions and to make contact with other members working in your area. Note: only FACS members can post to the list; archives are accessible to everyone at <http://www.jiscmail.ac.uk/lists/facs.html>.

## *Coming Soon in FACS FACTS...*

Conference reports

Details of upcoming FACS Evening Seminars

*And more...*