

ZB 2000: Formal Specification and Development in Z and B

First International Conference of B and Z Users York, UK, August 29 - September 2, 2000 Proceedings

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*These proceedings are dedicated to the memory of
Philippe Facon*

Preface

These proceedings record the papers presented at the first International Conference of B and Z Users (ZB 2000), held in the historic city of York in the north of England.

B and Z are two important formal methods that share a common conceptual origin; each is widely used in both academia and industry for the specification and verification of both hardware and software systems. Jean-Raymond Abrial is the founder of both approaches, which share a common mathematical basis of set theory. Z was designed mainly for formal *specification* of computer-based systems. Subsequently, B was designed to aid in the formal *development* from a specification to a program. B has tool support for this process. Both approaches aim to *avoid* errors that are otherwise typically discovered and removed, often more expensively, at the testing stage or, worse, remain until after delivery to the customer.

In ZB 2000 the B and Z communities came together to hold a joint conference that simultaneously incorporated the 12th International Conference of Z Users (formerly the Z User Meeting) and the 3rd International Conference on the B Method. Although organized as an integral event, editorial control of the joint conference remained vested in two separate but cooperating programme committees that respectively determined its B and Z aspects, but in a coordinated manner.¹ In particular, a joint meeting was held in March 2000, hosted by South Bank University in London. At this meeting, the programme committees met separately and together to select the papers for the conference. The committees are especially grateful to Janet Aldway and Stella Jimoh of the School of Computing, Information Systems and Mathematics (SCISM) for aiding in the organization and smooth running of this two-day meeting.

The conference benefited from the contributions of a range of distinguished invited speakers drawn from both industry and academia, who addressed significant recent industrial applications of the two methods, as well as important academic advances serving to enhance their potency and widen their applicability. Our invited speakers for ZB 2000 were drawn from France and the United Kingdom, reflecting the roots of B and Z: David Everett (Platform 7, UK), Jean-Louis Lanet (GemPlus Research Laboratory, France), Dominique Méry (Université Henri Poincaré, Nancy, France), and Mike Spivey (Oxford University Computer Laboratory, UK).

Besides its formal sessions the conference featured tool demonstrations, publishers' displays, special tutorials, and other meetings. The conference was also held in conjunction with the IEEE ICFEM 2000 International Conference on Formal Engineering Methods, held at York during the week after ZB 2000. The

¹ An indication of which Programme Committee accepted a paper is given in the Table of Contents.

co-location of the two conferences was designed to enable some delegates, especially those from abroad, to attend both events at reduced expense.

The location of ZB 2000 at the University of York reflected important work in the area of formal methods at the university, including Z and B. In particular, members of the Department of Computer Science at the University of York had been very active in the establishment of an international ISO Z standard which was nearing completion.

The ZB 2000 conference was jointly organized by the Z User Group (ZUG) and the International B Conference Steering Committee (APCB). The conference was sponsored by Praxis Critical Systems, Daimler-Chrysler AG, IBM, Rolls-Royce plc, and BAE SYSTEMS plc. It was also supported by BCS-FACS. We are grateful to all those who have contributed to the success of the conference.

On-line information concerning the conference is available under the following Uniform Resource Locator (URL):

<http://www.cs.york.ac.uk/zb2000/>

This also provides links to further on-line resources concerning the Z notation and B Method.

We hope that all participants and other interested readers enjoy these proceedings.

August 2000

Jonathan Bowen
Steve Dunne
Andy Galloway
Steve King

Programme and Organizing Committees

The following people were members of the ZB 2000 Z programme committee:

Chair: Jonathan Bowen, South Bank University, London, UK
Co-chair: Sam Valentine, University of York, UK
Ali Abdallah, South Bank University, London, UK
Paolo Ciancarini, University of Bologna, Italy
Neville Dean, Anglia Polytechnic University, UK
John Derrick, The University of Kent at Canterbury, UK
Andy Evans, University of York, UK
Andreas Fett, Daimler-Chrysler Research Berlin, Germany
David Garlan, Carnegie-Mellon University, USA
Wolfgang Grieskamp, Technical University of Berlin, Germany
Henri Habrias, University of Nantes, France
Jonathan Hammond, Praxis Critical Systems, UK
Ian Hayes, University of Queensland, Australia
Mike Hinchey, { University of Nebraska at Omaha, USA
 University of Skövde, Sweden
Mark d'Inverno, University of Westminster, UK
Jonathan Jacky, University of Washington, USA
Randolph Johnson, National Security Agency, USA
Steve King, University of York, UK
Kevin Lano, King's College, London, UK
Shaoying Liu, Hiroshima City University, Japan
Jean-Francois Monin, France Télécom R&D, France
Fiona Polack, University of York, UK
Norah Power, University of Limerick, Ireland
Mark Saaltink, ORA, Ottawa, Canada
Thomas Santen, { Technical University of Berlin, Germany
 GMD FIRST, Berlin, Germany
Alf Smith, DERA Malvern, UK
Susan Stepney, Logica, UK
David Till, City University, London, UK
Jim Woodcock, Oxford University, UK
John Wordsworth, IBM Hursley UK Laboratories, UK

The following served on the ZB 2000 B programme committee:

Chair: Steve Dunne, University of Teesside, UK
 Co-chair: Andy Galloway, University of York, UK
 Christian Attiogbé, University of Nantes, France
 Richard Banach, University of Manchester, UK
 Marc Benveniste, STMicroelectronics, France
 Didier Bert, IMAG, France
 Juan Bicarregui, CLRC Rutherford Appleton Laboratory, UK
 Pierre Bieber, CERT, France
 Michael Butler, University of Southampton, UK
 Jeremy Dick, Quality Systems and Software, UK
 Mark Frappier, University of Sherbrooke, Canada
 Jeremy Jacob, University of York, UK
 Brian Matthews, CLRC Rutherford Appleton Laboratory, UK
 Luis-Fernando Mejia, Alstom, France
 Jean-Marc Meynadier, Matra Transport, France
 Louis Mussat, $\left\{ \begin{array}{l} \text{Service Central de la Sécurité des Systèmes} \\ \text{d'Information, France} \end{array} \right.$
 Marie-Laure Potet, IMAG, France
 Ken Robinson, The University of New South Wales, Australia
 Steve Schneider, Royal Holloway, UK
 Emil Sekerinski, McMaster University, Canada
 Bill Stoddart, University of Teesside, UK
 Marina Waldén, Åbo Akademi, Finland

At the University of York, the following helped with the local organization in various capacities:

General Chair:	John McDermid
Administration:	Ginny Wilson
Co-chair/Publicity:	Sam Valentine
Co-chair/Publicity:	Andy Galloway
Treasurer:	Jonathan Moffett
Submissions:	Steve King
Local Arrangements:	Darren Buttle
Exhibitions/Sponsorship:	Fiona Polack
Tool Demonstrations:	Ian Toyn
Proceedings:	David Hull
Website:	James Blow

We are especially grateful to the above for their efforts in ensuring the success of the conference.

External Referees

We are grateful to the following people who aided the programme committees in the reviewing of papers, providing additional specialist expertise:

Pascal André, Institut National Polytechnique, Côte d'Ivoire
Peter Breuer, Universidad Carlos III de Madrid, Spain
Michael Cebulla, Technische Universität Berlin, Germany
Francis Klay, France Télécom R&D, France
Jean-Yves Lafaye, Université de La Rochelle, France
Michael Luck, Warwick University, UK
Ulrich Ultes-Nitsche, University of Southampton, UK

Sponsors

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BAE SYSTEMS plc
Daimler-Chrysler AG
IBM
Praxis Critical Systems
Rolls-Royce plc

Tutorial Programme

The following tutorials were scheduled on the day before the main conference (August 29, 2000):

An Introduction to Object-Z
Graeme Smith, University of Queensland, Australia

A machine-independent approach to real-time refinement
Ian Hayes, University of Queensland, Australia

The B-Method
Ib Sørensen and Ken Robinson, B-Core Ltd, UK and University of New South Wales, Australia