

9th International Conference of Z Users

ZUM'95

Organised by the Z User Group

Sponsored by BT, Forbairt, Praxis and the University of Limerick

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7–8th September 1995

Department of Computing, University of Limerick, Ireland,

The conference was well attended and was ably hosted by the University of Limerick. The standard of presentation was very high with speakers from all over the world. Invited speakers were *Professor David L. Parnas* (McMaster University, Canada), *Dr. John Rushby* (SRI International, USA), *Professor Jeannette M. Wing* (Carnegie Mellon University, USA) and *Professor David Gries* (Cornell University). The main conference opened with a message of welcome which had been sent by Mary Robinson, President of Eire.

David Parnas gave a provocative talk: *Language-Free Mathematical Methods for Software Design* suggesting that new notations played too great a role in specification. He remarked that in traditional engineering disciplines, mathematical methods are *not* introduced by teaching languages. For example Electrical Engineers learn circuit design in three distinct courses: mathematics, physics and engineering. He viewed this “separation of concerns” as extremely important, in distinguishing syntax from method and semantics. He went on to distinguish between *descriptions* and *specifications*, in that “the statement that a product satisfies a given specification constitutes a description”. He advocated a simple tabular notation combined with predicate calculus for specifying programs.

[*The talk generated a response from John Nicholls of Oxford University, which we hope to publish in FME Europe in the near future.*]

John Rushby gave a talk entitled: *Mechanising Formal Methods: Opportunities and Challenges*. He described both the opportunities created by mechanised formal methods, and the technical challenges in effective implementation. The talk was based on the authors experience in the development and use of the PVS theorem prover. The importance of establishing correct requirements was emphasised: 50% of the critical faults discovered during integration testing of JPL spacecraft were due to flawed requirements. The use of mechanisation was advocated in e.g. calculating properties of formally specified designs, and in adapting to changed requirements.

Jeannette Wing presented: *Specifications and Their Use in Defining Subtypes* (joint paper with Barbara Liskov). The paper was concerned with the interaction between specifications and types hierarchies and described a new way of showing how one type is a subtype of another. The method provided a specification technique for object types that allowed creators to be specified separately from types. The specifications were based on Larch, and contained explicit constraints identifying a minimal set of history properties that methods of the type and all its subtypes must preserve.

David Gries (Cornell University) gave a presentation at the Educational Session, *Equational Logic: A Great Pedagogical Tool for Teaching a Skill in Logic*. The tutorial was for people who teach logic or discrete mathematics and described a 6–7 week course on equational logic. (Substitution of equals for equals is the dominant inference rule.) Students soon gain a skill and hence lose some of their fear of the subject; students also see that formal logic is *useful*. The text “A Logical Approach to Discrete Math” by D Gries and F B Schneider (Springer-Verlag, 1993) accompanied the talk. (See: <http://www.cs.cornell.edu/Info/People/gries/gries.html>.)

The main conference concluded with a vote for best paper(s) and two papers tied for this honour. These were “An Algebraic Proof in VDM[♣]” by *Arthur Hughes and Alexis Donnelly* (Trinity College, Dublin), and “Testing as Abstraction” by *Susan Stepney* (Logica, UK). The first paper presented an algebraic, constructive style of specification and proof used in the Irish School of VDM; the example used to illustrate was a novel one however, viz. the Irish parliament or Dáil, and its T.D.s (*teachta dála* is member of parliament). Susan Stepney’s paper described work on the PROST-Object project, a method of formally specifying tests based on systematic abstraction from a “state-plus-operation” style specification.

Social aspects of the conference included a magnificent dinner at Dromoland Castle, where we were accompanied by traditional Irish music. Another enjoyable feature of the conference was a Boat Trip on Lough Derg on the last evening. Evenings at the conference were also enlivened for some delegates by visits to Irish Music Sessions in the pubs of Limerick. Since the location was Limerick, “limericks” were an important part of the conference, which included a novel feature: a limerick competition. David Gries gave a memorable after dinner speech at Dromoland Castle, composed entirely of limericks! A sample follows:

This conference is all about Z.
Well that's far too narrowly said.
It's formality
and its uses you see,
From which we all earn our good bread.

David Parnas concluded his talk with:

A method that's simply called math,
Will seldom incur people's wrath.
So, abstract from the state,
Show how traces relate,
For specs people read in the bath.

Margaret West, University of Huddersfield;
David Till, City University

The conference proceedings have been published as:

ZUM'95: The Z Formal Specification Notation – 9th International Conference of Z User's, Limerick, Ireland, September 1995, Proceedings, Lecture Notes in Computer Science 967, Springer-Verlag, Heidelberg.

This contains papers presented in the Main meeting and the Educational issues session; contents of the Main meeting are given below.

ZUM'95 Programme: 7–8th September 1995

Opening Remarks and welcome message sent by Mary Robinson, President of Eire. Jonathan Bowen, Oxford Univ., UK (Conference Chair)
Mike Hinchey, NJIT, USA & Univ. of Limerick, Ireland (Programme Chair)

Methods

Language-Free Mathematical Methods for Software Design.
A Formal Approach to Software Design: The Clepsydra Methodology.
Refining Database Systems.

Chairs: Jonathan Bowen & Mike Hinchey
David Lorge Parnas, McMaster University, Canada (*invited speaker*)
P. Ciaccia, P. Ciancarini & W. Penzo, Italy
David Edmond, Australia

Applications I

Structuring a Z Spec. to Provide a Formal Framework for Autonomous Agent Systems.
On the use of Formal Specs. in the Design and Simulation of Artificial Neural Nets.
Structuring Specification in Z to Build a Unifying Framework for Hypertext Systems.

Chair: Chris Sennett
Michael Luck & Mark d'Inverno, UK
P. Duarte de Lima Machado & S. L. Meira, Brazil
Mark d'Inverno & Mark Priestley, UK

Proof

*Mechanizing Formal Methods:
Challenges and Opportunities.
An Algebraic Proof in VDM[♣].*

Testing

*Testing as Abstraction.
Improving Software Tests using Z Specifications.
Compilation of Z Specifications into C
for Automatic Test Result Evaluation.*

Language

*Equal Rights for Schemas in Z.
Structuring Z Specifications:
Some Choices.
Experiments with the Z Interchange Format
and SGML.*

Panel Session

The Future of Industrial Formal Methods.

Object Orientation

*Specifications and Their Use
in Defining Subtypes.*

*How Firing Conditions Help Inheritance.
Extending W for Object-Z.*

Applications II

*A Formal Semantics for a Language
with Type Extension.
From Z to Code:
A GUI for a Radiation Therapy Machine.
The French Population Census for 1990.*

Animation

*Implementing Z in Isabelle.
The Z-into-Haskell Tool-kit:
An Illustrative Case Study.
Types and Sets in Gödel and Z.
Exploring Specifications with Mathematica.*

Method Integration

*Using Z to Rigorously Review a Specification
of a Network Management System.
A 2-dimensional View of Integrated Formal
and Informal Specification Techniques.
Viewpoints and Objects.*

Chair: David Till

John Rushby, SRI International,
USA (*invited speaker*)
Arthur Hughes & Alexis Donnelly, Ireland

Chair: Elspeth Cusack

Susan Stepney, UK
Hans-Martin Hörcher, Germany
Erich Mikk, Germany

Chair: Neville Dean

Sam Valentine, UK
Anthony MacDonald &
David Carrington, Australia
Daniel M. Germán & D. D. Cowan, Canada

Participants: Anthony Hall, Nico Plat,
David Parnas, John Rushby, Chris Sennett

Chair: Elspeth Cusack

Jeannette M. Wing, Carnegie Mellon University,
USA (*invited speaker*)
(joint paper with Barbara Liskov, MIT, USA)
Ben Strulo, UK
Graeme Smith, Australia

Chair: Jim Woodcock

Peter Bancroft & Ian Hayes, Australia

Jonathan Jacky & Jonathan Unger, USA

Pascal Bernard & Guy Laffitte, France

Chair: Sam Valentine

Ina Kraan & Peter Baumann, Switzerland
Howard S. Goodman, UK

Margaret West, UK
Colman Reilly, Ireland

Chair: Mike Hinchey

Tony Bryant, A. Evans, L. Semmens, R. Milovanovic,
S. Stockman, M. Norris & C. Selley, UK
Robert B. France
& Maria M. Larrondo-Petrie, USA
Howard Bowman, John Derrick
& Maarten Steen, UK