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Teaching Formal Methods

CoLogNET/FME Symposium, TFM 2004
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Proceedings

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Preface

> "Professional engineers can often be distinguished from other designers by the engineers' ability to use mathematical models to describe and analyze their products."[1]

This observation by Parnas describes the de facto professional standards in all classical engineering disciplines (civil, mechanical, electrical, etc.). Unfortunately, it is in sharp contrast with current (industrial) practice in software design, where mathematical models are hardly used at all, even by those who, in Holloway's words[2] "aspire to be engineers." The rare exceptions are certain critical applications, where mathematical techniques are used under the general name formal methods.

Yet, the same characteristics that make formal methods a necessity in critical applications make them also advantageous in everyday software design at various levels from design efficiency to software quality.

Why, then, is education failing with respect to formal methods?

- failing to convince students, academics and practitioners alike that formal methods are truly pragmatic;
- failing to overcome a phobia of formality and mathematics;
- failing to provide students with the basic skills and understanding required to adopt a more mathematical and logical approach to software development.

Until education takes these failings seriously, formal methods will be an obscure byway in software engineering, which in turn will remain severely impoverished as a result.

These proceedings record the papers presented at the Symposium on Teaching formal methods (TFM 2004) held at the University of Ghent in Belgium, 18–19 November 2004. This symposium served as a forum to explore the failures and successes of formal methods education, to consider how the failings might be resolved, to learn from the successes, and to promote cooperative projects to further the teaching and learning of formal methods (FMs). The symposium was instrumental in bringing together

- formal methods educators, both actual and potential;
- other computer science and software engineering educators;
- industrial practitioners and project managers;
- technical and scientific publishers.

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[1] David L. Parnas, "Predicate Logic for Software Engineering", *IEEE Trans. SWE 19*, 9, pp. 856–862 (Sept. 1993)

[2] Michael Holloway, "Why Engineers Should Consider Formal Methods", *Proc. 16th. Digital Avionics Systems Conference* (Oct. 1997), `http://techreports.larc.nasa.gov/ltrs/PDF/1997/mtg/NASA-97-16dasc-cmh.pdf`

The response to the Call for Papers was very encouraging, and it was possible to select a number of high-quality contributions.

The conference was also blessed with three excellent invited speakers: David Gries from Cornell University, Leslie Lamport from Microsoft Corporation, and Peter Pepper from the Technische Universität Berlin.

September 2004 Neville Dean
Raymond Boute

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Organization

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