

Research

1 Overview

David Kendall leads the High Integrity Embedded Systems Group, conducting research into formal methods in the engineering of embedded systems, in particular the application of model-checking in the design and analysis of real-time systems.

He is the main architect of [CANDLE](#), a modelling language and development environment for distributed embedded systems built using the Controller Area Network (CAN). He was previously involved in the [AORTA](#) project. He is the author or co-author of more than 20 academic [publications](#).

2 Embedded Systems



Embedded control systems appear in many of the manufactured products upon which our society increasingly depends, from household goods such as washing machines and video recorders to advanced space vehicles or nuclear power plant controllers. In every case, system developers need better development methods in order to be more confident that the systems which they deliver will behave properly. The need is particularly pressing in the case of distributed, hard real-time control systems for industrial sectors where reliability is paramount, such as transport, medical, chemical and manufacturing.

The High Integrity Embedded Systems group at Northumbria University is concerned with the theory and practice of embedded systems development and analysis. In particular, its members conduct research into key concepts and advanced practical techniques and tools required for the production of embedded systems solutions which are

- *high-integrity*,
- *real-time*,
- *distributed*, and
- *open*.

3 Research students

Current

- Ali Almohammad *Rigorous code generation for distributed embedded systems*, 2008
- Neil Eliot *Energy-efficient swarming protocols for UAVs*, 2011
- Stephen Doswell *Anonymity and mobility in IP networks*, 2011

Former

- Michael Brockway, *Compositionality in the formal modelling and analysis of broadcasting embedded control systems*, 2010
- Kashif Saghar, *Formal modelling and analysis of denial of service attacks in wireless sensor networks*, 2010
- Stephen Bradley, *An implementable formal language for real-time systems*, 1995
- David Turner, *Predictable communication protocols for real-time systems*, 1995