Zain-ul-Abdin received his B.Sc. in Electrical Engineering from University of Engineering & Technology, Taxila, Pakistan in 1999 and his M.Sc. in Computer Systems Engineering from Halmstad University, Sweden in 2005. Zain has been a graduate student at the Centre for Research on Embedded Systems, Halmstad University, Halmstad, Sweden.

This thesis focuses on the programming aspects of coarse-grained reconfigurable computing devices, including the relevant computation models that are capable of exposing different kinds of parallelism inherent in the application and the ability of these models to capture the adaptability requirements of the application. The thesis suggests the occam-pi language for programming of a broad class of coarse-grained reconfigurable architectures as an intermediate language. The salient properties of the occam-pi language are explicit concurrency with built-in mechanisms for inter-processor communication, provision for expressing dynamic parallelism, support for the expression of dynamic reconfigurations, and placement attributes.

To evaluate the programming approach, a compiler framework was extended to support the language extensions in the occam-pi language, and the backends were developed to target two different coarse-grained reconfigurable architectures, Ambric and XPP. The results of the implemented case-studies suggest that the occam-pi language based approach simplifies the development of applications employing run-time reconfigurable devices without compromising the performance benefits.