

Thesis for the Degree of Doctor of Philosophy

# A Scholarship Approach to Model-Driven Engineering

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**Time and Place:**

The defence will be held on  
**Friday 17th of October, 2014 at 10.15**  
in room **EC**, EDIT building, Rännvägen 6B  
at Campus Johanneberg,  
Chalmers University of Technology

**Faculty opponent:**

**Prof. Robert France**, Colorado State University

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# Abstract

Model-Driven Engineering is a paradigm for software engineering where software models are the primary artefacts throughout the software life-cycle. The aim is to define suitable representations and processes that enable precise and efficient specification, development and analysis of software.

Our contributions to Model-Driven Engineering are structured according to Boyer's four functions of academic activity – the scholarships of teaching, discovery, application and integration. The scholarships share a systematic approach towards seeking new insights and promoting progressive change. Even if the scholarships have their differences they are compatible so that theory, practice and teaching can strengthen each other.

**Scholarship of Teaching** While teaching Model-Driven Engineering to under-graduate students we introduced two changes to our course. The first change was to introduce a new modelling tool that enabled the execution of software models while the second change was to adapt pair lecturing to encourage the students to actively participate in developing models during lectures.

**Scholarship of Discovery** By using an existing technology for transforming models into source code we translated class diagrams and high-level action languages into natural language texts. The benefit of our approach is that the translations are applicable to a family of models while the texts are reusable across different low-level representations of the same model.

**Scholarship of Application** Raising the level of abstraction through models might seem a technical issue but our collaboration with industry details how the success of adopting Model-Driven Engineering depends on organisational and social factors as well as technical.

**Scholarship of Integration** Building on our insights from the scholarships above and a study at three large companies we show how Model-Driven Engineering empowers new user groups to become software developers but also how engineers can feel isolated due to poor tool support. Our contributions also detail how modelling enables a more agile development process as well as how the validation of models can be facilitated through text generation.

The four scholarships allow for different possibilities for insights and explore Model-Driven Engineering from diverse perspectives. As a consequence, we investigate the social, organisational and technological factors of Model-Driven Engineering but also examine the possibilities and challenges of Model-Driven Engineering across disciplines and scholarships.