Model Driven Software Development With Uml And Java

The 3rd workshop of the Special Interest Group "Model Driven SoftwareEngineering" (SIG MDSE) on Dec. 11-12 , in Berlin, Germany, focused ontransformations, transformation languages and tools. Contributions:Refinement Transformation Support for QVT Relational Transformations,MDA Transformation Languages, Modelling Graphical User Interfaces forembedded Systems, User Interfaces from Task Models, HCI Patterns in theContext of Model Driven Development for Interactive Systems, On-the-flyMDA application modelling using Executable and Translatable UML, AnApplication of the MDSE Principles in IIS*Case, GenGMF - Efficienteditor development for large meta models using the Graphical ModelingFramework, Modelling Behaviour by Activity Diagrams and Complete CodeGeneration, Model-Driven Architecture for an Interactive Ajax MappingPlatform, Customizing the JET2 Template Engine.

Describes ways to incorporate domain modeling into software development.

This book discusses how model-based approaches can improve the daily practice of software professionals. This is known as Model-Driven Software Engineering (MDSE) or, simply, Model-Driven Engineering (MDE). MDSE practices have proved to increase efficiency and effectiveness in software development, as demonstrated by various quantitative and qualitative studies. MDSE adoption in the software industry is foreseen to grow exponentially in the near future, e.g., due to the convergence of software development and business analysis. The aim of this book is to provide you with an agile and flexible tool to introduce you to the MDSE world, thus allowing you to quickly understand its basic principles and techniques and to choose the right set of MDSE instruments for your needs so that you can start to benefit from MDSE right away. The book is organized into two main parts. The first part discusses the foundations of MDSE in terms of basic concepts (i.e., models and transformations), driving principles, application scenarios, and current standards, like the well-known MDA initiative proposed by OMG (Object Management Group) as well as the practices on how to integrate MDSE in existing development processes. The second part deals with the technical aspects of MDSE, spanning from the basics on when and how to build a domain-specific modeling language, to the description of Model-to-Text and Model-to-Model transformations, and the tools that support the management of MDSE projects. The second edition of the book features: a set of completely new topics, including: full example of the creation of a new modeling language (IFML), discussion of modeling issues and approaches in specific domains, like business process modeling, user interaction modeling, and enterprise architecture complete revision of examples, figures, and text, for improving readability, understandability, and coherence better formulation of definitions, dependencies between concepts and ideas addition of a complete index of book content In addition to the contents of the book, more resources are provided on the book's website http://www.mdse-book.com, including the examples presented in the book.

Model Driven development (MDD) is a software and systems development model that involves the application of visual modeling principles and best practices.

This title includes a number of Open Access chapters. Model-driven engineering (MDE) is the automatic production of software from simplified models of structure and functionality. It mainly involves the automation of the routine and technologically complex programming tasks, thus allowing developers to focus on the true value-adding functionality that the system needs to deliver. This book serves an overview of some of the core topics in MDE. The volume is broken into two sections offering a selection of papers that helps the reader not only understand the MDE principles and techniques, but also learn from practical examples. Also covered are the following topics: • MDE for software product lines • Formal methods for model transformation correctness • Metamodeling with Eclipse eCore • Metamodeling with UML profiles • Test cases generation This easily accessible reference volume offers a comprehensive guide to this rapidly expanding field. Edited by experienced writers with experience in both research and the practice of software engineering, Model-Driven Engineering of Information Systems: Principles, Techniques and Practice is an authoritative and easy-to-use reference, ideal for both researchers in the field and students who wish to gain an overview to this important field of study.

An integral element of software engineering is model engineering. They both endeavor to minimize cost, time, and risks with quality software. As such, model engineering is a highly useful field that demands in-depth research on the most current approaches and techniques. Only by understanding the most up-to-date research can these methods reach their fullest potential. Advancements in Model-Driven Architecture in Software Engineering is an essential publication that prepares readers to exercise modeling and model transformation and covers state-of-the-art research and developments on various approaches for methodologies and platforms of model-driven architecture, applications and software development of model-driven architecture, modeling languages, and modeling tools. Highlighting a broad range of topics including cloud computing, service-oriented architectures, and modeling languages, this book is ideally designed for engineers, programmers, software designers, entrepreneurs, researchers, academicians, and students.

This book constitutes thoroughly revised and selected papers from the 4th International Conference on Model-Driven Engineering and Software Development, MODELSWARD 2016, held in Rome, Italy, in February 2016. The 17 thoroughly revised and extended papers presented in this volume were carefully reviewed and selected from 118 submissions. They are organized in topical sections named: modeling languages, tools and architectures; methodologies, processes and platforms; applications and software development.

This book introduces all the relevant information required to understand and put Model Driven Architecture (MDA) into industrial practice. It clearly explains which conceptual primitives should be present in a system specification, how to use UML to properly represent this subset of basic conceptual constructs, how to identify just those diagrams and modeling constructs that are actually required to create a meaningful conceptual schema, and how to accomplish the transformation process between the problem space and the solution space. The approach is fully supported by commercially available tools.

This book constitutes the refereed proceedings of the 9th International Conference on Model Driven Engineering Languages and Systems (formerly UML conferences), MoDELS 2006. The book presents 51 revised full papers and 2 invited papers. Discussion is organized in topical sections on evaluating UML, MDA in software development, concrete syntax, applying UML to interaction and coordination, aspects, model integration, formal semantics of UML, security, model transformation tools and implementation, and more.

This book shows how to apply pattern ideas in business applications. It presents more than 20 structural and behavioral business patterns that use the REA (resources, events, agents) pattern as a common backbone. The developer working on business frameworks can use the patterns to derive the right abstractions and to design and ensure that the meta-rules are followed by the developers of the actual applications. The application developer can use these patterns to design a business application, to ensure that it does not violate the domain rules, and to adapt the application to changing requirements without the need to change the overall architecture.

The next enterprise computing era will rely on the synergy between both technologies: semantic web and model-driven software development (MDSD). The semantic web organizes system knowledge in conceptual domains according to its meaning. It addresses various enterprise computing needs by identifying, abstracting and rationalizing

commonalities, and checking for inconsistencies across system specifications. On the other side, model-driven software development is closing the gap among business requirements, designs and executables by using domain-specific languages with custom-built syntax and semantics. It focuses on using modeling languages as programming languages. Among many areas of application, we highlight the area of configuration management. Consider the example of a telecommunication company, where managing the multiple configurations of network devices (routers, hubs, modems, etc.) is crucial. Enterprise systems identify and document the functional and physical characteristics of network devices, and control changes to those characteristics. Applying the integration of semantic web and model-driven software development allows for (1) explicitly specifying configurations of network devices with tailor-made languages, (2) for checking the consistency of these specifications (3) for defining a vocabulary to share device specifications across enterprise systems. By managing configurations with consistent and explicit concepts, we reduce cost and risk, and enhance agility in response to new requirements in the telecommunication area. This book examines the synergy between semantic web and model-driven software development. It brings together advances from disciplines like ontologies, description logics, domain-specific modeling, model transformation and ontology engineering to take enterprise computing to the next level.

Covers important concepts, issues, trends, methodologies, and technologies in quality assurance for model-driven software development.

This book constitutes the refereed proceedings of the 17th International Conference on Model Driven Engineering Languages and Systems, MODELS 2014, held in Valencia, Spain, in September/October 2014. The 41 full papers presented in this volume were carefully reviewed and selected from a total of 126 submissions. The scope of the conference series is broad, encompassing modeling languages, methods, tools, and applications considered from theoretical and practical angles and in academic and industrial settings. The papers report on the use of modeling in a wide range of cloud, mobile, and web computing, model transformation behavioral modeling, MDE: past, present, future, formal semantics, specification, and verification, models at runtime, feature and variability modeling, composition and adaptation, practices and experience, modeling for analysis, pragmatics, model extraction, manipulation and persistence, querying, and reasoning.

Users increasingly demand more from their software than ever before—more features, fewer errors, faster runtimes. To deliver the best quality products possible, software engineers are constantly in the process of employing novel tools in developing the latest software applications. Progressions and Innovations in Model-Driven Software Engineering investigates the most recent and relevant research on model-driven engineering. Within its pages, researchers and professionals in the field of software development, as well as academics and students of computer science, will find an up-to-date discussion of scientific literature on the topic, identifying opportunities and advantages, and complexities and challenges, inherent in the future of software engineering.

This book constitutes thoroughly revised and selected papers from the Third International Conference on Model-Driven Engineering and Software Development, MODELSWARD 2015, held in Angers, France, in February 2015. The 25 thoroughly revised and extended papers presented in this volume were carefully reviewed and selected from 94 submissions. They are organized in topical sections named: invited papers; modeling languages, tools and architectures; methodologies, processes and platforms; applications and software development.

Model-Driven Software Development (MDSD) is currently a highlyregarded development paradigm among developers and researchers.With the advent of OMG's MDA and Microsoft's Software Factories,the MDSD approach has moved to the centre of the programmer'sattention, becoming the focus of conferences such as OOPSLA, JAOOand OOP. MDSD is about using domain-specific languages to create models thatexpress application structure or behaviour in an efficient anddomain-specific way. These models are subsequently transformed intoexecutable code by a sequence of model transformations. This practical guide for software architects and developers ispeppered with practical examples and extensive case studies.International experts deliver: * A comprehensive overview of MDSD and how it relates to industrystandards such as MDA and Software Factories. * Technical details on meta modeling, DSL construction,model-to-model and model-to-code transformations, and softwarearchitecture. * Invaluable insight into the software development process, plusengineering issues such as versioning, testing and product lineengineering. * Essential management knowledge covering economic andorganizational topics, from a global perspective. Get started and benefit from some practical support along the way!

This unique text/reference provides a comprehensive review of distributed simulation (DS) from the perspective of Model Driven Engineering (MDE), illustrating how MDE affects the overall lifecycle of the simulation development process. Numerous practical case studies are included to demonstrate the utility and applicability of the methodology, many of which are developed from tools available to download from the public domain. Topics and features: Provides a thorough introduction to the fundamental concepts, principles and processes of modeling and simulation, MDE and high-level architecture Describes a road map for building a DS system in accordance with the MDE perspective, and a technical framework for the development of conceptual models Presents a focus on federate (simulation environment) architectures, detailing a practical approach to the design of federations (i.e., simulation member design) Discusses the main activities related to scenario management in DS, and explores the process of MDE-based implementation, integration and testing Reviews approaches to simulation evolution and modernization, including architecture-driven modernization for simulation modernization Examines the potential synergies between the agent, DS, and MDE methodologies, suggesting avenues for future research at the intersection of these three fields Distributed Simulation – A Model Driven Engineering Approach is an important resource for all researchers and practitioners involved in modeling and simulation, and software engineering, who may be interested in adopting MDE principles when developing complex DS systems.

This book constitutes the refereed proceedings of the 32nd International Conference on Advanced Information Systems Engineering, CAiSE 2020, held in Grenoble, France, in June 2020.* The 33 full papers presented in this volume were carefully reviewed and selected from 185 submissions. The book also contains one invited talk in full paper length. The papers were

organized in topical sections named: distributed applications; AI and big data in IS; process mining and analysis; requirements and modeling; and information systems engineering. Abstracts on the CAiSE 2020 tutorials can be found in the back matter of the volume. *The conference was held virtually due to the COVID-19 pandemic.

Defining a formal domain ontology is considered a useful, not to say necessary step in almost every software project. This is because software deals with ideas rather than with self-evident physical artefacts. However, this development step is hardly ever done, as ontologies rely on well-defined and semantically powerful AI concepts such as description logics or rule-based systems, and most software engineers are unfamiliar with these. This book fills this gap by covering the subject of MDA application for ontology development on the Semantic Web. The writing is technical yet clear, and is illustrated with examples. The book is supported by a website.

Aimed at 2nd and 3rd year/MSc courses, Model Driven Software Development using UML and Java introduces MDD, MDA and UML, and shows how UML can be used to specify, design, verify and implement software systems using an MDA approach. Structured to follow two lecture courses, one intermediate (UML, MDA, specification, design, model transformations) and one advanced (software engineering of web applications and enterprise information systems), difficult concepts are illustrated with numerous examples, and exercises with worked solutions are provided throughout.

This book offers a unique insight into a revolution in software development that allows model specifications to be fully and efficiently translated into code. Using the most widely adopted, industry standard, software modelling language, UML, the reader will learn how to build robust specifications based on OMG's Model Driven Architecture (MDA). From there, the authors describe the steps needed to translate the Executable UML (xUML) models to any platform-specific implementation. The benefits of this approach go well beyond simply reducing or eliminating the coding stage - it also ensures platform independence, avoids obsolescence (programming languages may change, the model doesn't) and allows full verification of the models by executing them in a test and debug xUML environment. This is an excellent reference for anyone embarking on what is surely the future of software development for medium and large scale projects.

Model Driven Architecture (MDA) is a new approach to software development that helps companies manage large, complex software projects and save development costs while allowing new technologies that come along to be readily incorporated. Although it is based on many long-standing industry precepts and best practices, such as UML, it is enough of a departure from traditional IT approaches to require some "proof of the pudding." Real-Life MDA is composed of six case studies of real companies using MDA that will furnish that proof. The authors' approach MDA projects by describing all aspects of the project from the viewpoint of the end-users—from the reason for choosing an MDA approach to the results and benefits. The case studies are preceded by an introductory chapter and are followed by a wrap-up chapter summarizing lessons learned. Written for executives, analysts, architects, and engineers positioned to influence business-oriented software development at the highest levels Filled with concrete examples and analyses of how MDA is relevant for organizations of various sizes Considers a range of uses for MDA—from business process analysis to full-scale software modeling and development Presents results for each case study in terms of tangible, measured benefits, including automatically generated code, defect reduction, improved visibility, and ROI

"Highlights of this book include: the MDA framework, including the Platform Independent Model (PIM) and Platform Special Model (PSM); OMG standards and the use of UML; MDA and Agile, Extreme Programming, and Rational Unified Process (RUP) development; how to apply MDA, including PIM-to-PSM and PSM-to-code transformations for Relational, Enterprise JavaBean (EJB), and Web models; transformations, including controlling and tuning, traceability, incremental consistency, and their implications; metamodeling; and relationships between different standards, including Meta Object Facility (MOF), UML, and Object Constraint Language (OCL)."--Jacket.

Meta-Programming and Model-Driven Meta-Program Development: Principles, Processes and Techniques presents an overall analysis of meta-programming, focusing on insights of meta-programming techniques, heterogeneous meta-program development processes in the context of model-driven, feature-based and transformative approaches. The fundamental concepts of meta-programming are still not thoroughly understood, in this well organized book divided into three parts the authors help to address this. Chapters include: Taxonomy of fundamental concepts of meta-programming; Concept of structural heterogeneous meta-programming based on the original meta-language; Model-driven concept and feature-based modeling to the development process of meta-programs; Equivalent meta-program transformations and metrics to evaluate complexity of feature-based models and meta-programs; Variety of academic research case studies within different application domains to experimentally verify the soundness of the investigated approaches. Both authors are professors at Kaunas University of Technology with 15 years research and teaching experience in the field. Meta-Programming and Model-Driven Meta-Program Development: Principles, Processes and Techniques is aimed at post-graduates in computer science and software engineering and researchers and program system developers wishing to extend their knowledge in this rapidly evolving sector of science and technology.

This book constitutes thoroughly revised and selected papers from the 5th International Conference on Model-Driven Engineering and Software Development, MODELSWARD 2017, held in Porto, Portugal, in February 2017. The 20 thoroughly revised and extended papers presented in this volume were carefully reviewed and selected from 91 submissions. They contribute to the development of highly relevant research trends in model-driven engineering and software development such as methodologies for MDD development and exploitation, model-based testing, model simulation, domain-specific modeling, code generation from models, new MDD tools, multi-model management, model evolution, and industrial applications of model-based methods and technologies.

Abstraction is the most basic principle of software engineering. Abstractions are provided by models. Modeling and model transformation constitute the core of model-driven development. Models can be refined and finally be transformed into a technical implementation, i.e., a software system. The aim of this book is to give an overview of the state of the art in model-driven software development. Achievements are considered from a conceptual point of view in the first part, while the second part describes technical advances and infrastructures. Finally, the third part summarizes experiences gained in actual projects employing model-driven development. Beydeda, Book and Gruhn put together the results from leading researchers in this area, both from industry and academia. The result is a collection of papers which gives both researchers and graduate students a comprehensive overview of current research issues and industrial forefront practice, as promoted by OMG’s MDA initiative.

Written by the original members of an industry standardization group, this book shows you how to use UML to test complex software systems. It is the definitive reference for the only UML-based test

specification language, written by the creators of that language. It is supported by an Internet site that provides information on the latest tools and uses of the profile. The authors introduce UTP step-by-step, using a case study that illustrates how UTP can be used for test modeling and test specification.

This book constitutes the refereed proceedings of the 10th International Conference on Model Driven Engineering Languages and Systems (formerly the UML series of conferences), MODELS 2007, held in Nashville, USA, September 30 - October 5, 2007. The 45 revised full papers were carefully reviewed and selected from 158 initial submissions. The papers are organized in topical sections.

Many approaches to creating Software Product Lines have emerged that are based on Model-Driven Engineering. This book introduces both Software Product Lines and Model-Driven Engineering, which have separate success stories in industry, and focuses on the practical combination of them. It describes the challenges and benefits of merging these two software development trends and provides the reader with a novel approach and practical mechanisms to improve software development productivity. The book is aimed at engineers and students who wish to understand and apply software product lines and model-driven engineering in their activities today. The concepts and methods are illustrated with two product line examples: the classic smart-home systems and a collection manager information system.

This book discusses how model-based approaches can improve the daily practice of software professionals. This is known as Model-Driven Software Engineering (MDSE) or, simply, Model-Driven Engineering (MDE). MDSE practices have proved to increase efficiency and effectiveness in software development, as demonstrated by various quantitative and qualitative studies. MDSE adoption in the software industry is foreseen to grow exponentially in the near future, e.g., due to the convergence of software development and business analysis. The aim of this book is to provide you with an agile and flexible tool to introduce you to the MDSE world, thus allowing you to quickly understand its basic principles and techniques and to choose the right set of MDSE instruments for your needs so that you can start to benefit from MDSE right away. The book is organized into two main parts. The first part discusses the foundations of MDSE in terms of basic concepts (i.e., models and transformations), driving principles, application scenarios, and current standards, like the well-known MDA initiative proposed by OMG (Object Management Group) as well as the practices on how to integrate MDSE in existing development processes. The second part deals with the technical aspects of MDSE, spanning from the basics on when and how to build a domain-specific modeling language, to the description of Model-to-Text and Model-to-Model transformations, and the tools that support the management of MDSE projects. The second edition of the book features: a set of completely new topics, including: full example of the creation of a new modeling language (IFML), discussion of modeling issues and approaches in specific domains, like business process modeling, user interaction modeling, and enterprise architecture complete revision of examples, figures, and text, for improving readability, understandability, and coherence better formulation of definitions, dependencies between concepts and ideas addition of a complete index of book content In addition to the contents of the book, more resources are provided on the book's website http: //www.mdse-book.com, including the examples presented in the book.

Topological UML Modeling: An Improved Approach for Domain Modeling and Software Development presents a specification for Topological UML® that combines the formalism of the Topological Functioning Model (TFM) mathematical topology with a specified software analysis and design method. The analysis of problem domain and design of desired solutions within software development processes has a major impact on the achieved result – developed software. While there are many tools and different techniques to create detailed specifications of the solution, the proper analysis of problem domain functioning is ignored or covered insufficiently. The design of object-oriented software has been led for many years by the Unified Modeling Language (UML®), an approved industry standard modeling notation for visualizing, specifying, constructing, and documenting the artifacts of a software-intensive system, and this comprehensive book shines new light on the many advances in the field. Presents an approach to formally define, analyze, and verify functionality of existing processes and desired processes to track incomplete or incorrect functional requirements Describes the path from functional and nonfunctional requirements specification to software design with step-by-step creation and transformation of diagrams and models with very early capturing of security requirements for software systems. Defines all modeling constructs as extensions to UML®, thus creating a new UML® profile which can be implemented in existing UML® modeling tools and toolsets

System Quality and Software Architecture collects state-of-the-art knowledge on how to intertwine software quality requirements with software architecture and how quality attributes are exhibited by the architecture of the system. Contributions from leading researchers and industry evangelists detail the techniques required to achieve quality management in software architecting, and the best way to apply these techniques effectively in various application domains (especially in cloud, mobile and ultra-large-scale/internet-scale architecture) Taken together, these approaches show how to assess the value of total quality management in a software development process, with an emphasis on architecture. The book explains how to improve system quality with focus on attributes such as usability, maintainability, flexibility, reliability, reusability, agility, interoperability, performance, and more. It discusses the importance of clear requirements, describes patterns and tradeoffs that can influence quality, and metrics for quality assessment and overall system analysis. The last section of the book leverages practical experience and evidence to look ahead at the challenges faced by organizations in capturing and realizing quality requirements, and explores the basis of future work in this area. Explains how design decisions and method selection influence overall system quality, and lessons learned from theories and frameworks on architectural quality Shows how to align enterprise, system, and software architecture for total quality Includes case studies, experiments, empirical validation, and systematic comparisons with other approaches already in practice.

Today, reliable software systems are the basis of any business or company. The continuous further development of those systems is the central component in software evolution. It requires a huge amount of time- man power- as well as financial resources. The challenges are size, seniority and heterogeneity of those software systems. Christian Wagner addresses software evolution: the inherent problems and uncertainties in the process. He presents a model-driven method which leads to a synchronization between source code and design. As a result the model layer will be the central part in further evolution and source code becomes a by-product. For the first time a model-driven procedure for maintenance and migration of software systems is described. The procedure is composed of a model-driven reengineering and a model-driven migration phase. The application and effectiveness of the procedure are confirmed with a reference implementation applied to four exemplary systems.

Software product lines provide a systematic means of managing variability in a suite of products. They have many benefits but there are three major barriers that can prevent them from reaching their full potential. First, there is the challenge of scale: a large number of variants may exist in a product line context and the number of interrelationships and dependencies can rise exponentially. Second, variations tend to be systemic by nature in that they affect the whole architecture of the software product line. Third, software product lines often serve different business contexts, each with its own intricacies and complexities. The AMPLE (http://www.ample-project.net/) approach tackles these three challenges by combining advances in aspect-oriented software development and model-driven engineering. The full suite of methods and tools that constitute this approach are discussed in detail in this edited volume and illustrated using three real-world industrial case studies.

Overviews the process of building and compiling executable UML models for software development. The book focuses on the BridgePoint tool suite and object action language developed by Project Technology. The authors discuss identifying system requirements, diagramming classes and attributes, constraints on the class diagram, ways of building sets of communicating statechart diagrams, and model verification. Annotation copyrighted by Book News, Inc., Portland, OR.

As organizations and research institutions continue to emphasize model-driven engineering (MDE) as a first-class approach in the software development process of complex systems, the utilization of

software in multiple domains and professional networks is becoming increasingly vital. Advances and Applications in Model-Driven Engineering explores this relatively new approach in software development that can increase the level of abstraction of development of tasks. This publication covers the issues of bridging the gaps between various disciplines within software engineering and computer science. Professionals, researchers, and students will discover the most current tools and techniques available in the field to maximize efficiency of model-driven software development.

"[The authors] are pioneers. . . . Few in our industry have their breadth of knowledge and experience." —From the Foreword by Dave Thomas, Bedarra Labs Domain-Specific Modeling (DSM) is the latest approach to software development, promising to greatly increase the speed and ease of software creation. Early adopters of DSM have been enjoying productivity increases of 500–1000% in production for over a decade. This book introduces DSM and offers examples from various fields to illustrate to experienced developers how DSM can improve software development in their teams. Two authorities in the field explain what DSM is, why it works, and how to successfully create and use a DSM solution to improve productivity and quality. Divided into four parts, the book covers: background and motivation; fundamentals; in-depth examples; and creating DSM solutions. There is an emphasis throughout the book on practical guidelines for implementing DSM, including how to identify the necessary language constructs, how to generate full code from models, and how to provide tool support for a new DSM language. The example cases described in the book are available the book's Website, www.dsmbook.com, along with, an evaluation copy of the MetaEdit+ tool (for Windows, Mac OS X, and Linux), which allows readers to examine and try out the modeling languages and code generators. Domain-Specific Modeling is an essential reference for lead developers, software engineers, architects, methodologists, and technical managers who want to learn how to create a DSM solution and successfully put it into practice.

This book constitutes thoroughly revised and selected papers from the 7th International Conference on Model-Driven Engineering and Software Development, MODELSWARD 2019, held in Prague, Czech Republic, in February 2019. The 16 thoroughly revised and extended papers presented in this volume were carefully reviewed and selected from 76 submissions. They address some of the most relevant challenges being faced by researchers and practitioners in the field of model-driven engineering and software development and cover topics like language design and tooling; programming support tools; code and text generation from models, behavior modeling and analysis; model transformations and multi-view modeling; as well as applications of MDD and its related techniques to cyber-physical systems, cyber security, IoT, autonomous vehicles and healthcare.