

Short presentation of the
Software Engineering area
(softeng.fe.up.pt)

João Pascoal Faria
CSIG, INESC Porto, 26 nov 2014

MISSION

- M1. to develop novel methods, techniques, and tools that advance the way in which software is designed, synthesized and assessed;
- M2. to ensure that our research results have a lasting impact in software development practice;
- M3. to offer students an education that prepares them to take a leading role in complex software development projects;
- M4. to contribute to improve the competitiveness of the industry

Values: Pragmatic, industry-oriented, high-quality, cost-effective

software engineering

PEOPLE

PhD Members



Ademar
Aguiar



Ana
Paiva



João
Faria



Hugo
Ferreira



Nuno
Flores



Raul
Vidal



Rui
Maranhão

PhD Students



Alexandre
Perez



André
Restivo



André
Riboira



Artur
Rocha



Bruno
Lima



Filipe
Correia



Inês
Morgado



Isabel
Margarido



Jorge
Garcia



Luís
Cruz



Mushtaq
Raza



Nuno
Cardoso



Rodrigo
Moreira



Tiago
Boldt

software engineering

SUBAREAS

Software Design and Construction

- Model-Driven Software Engineering
- Software Architecture and Design

Software Testing and Analysis

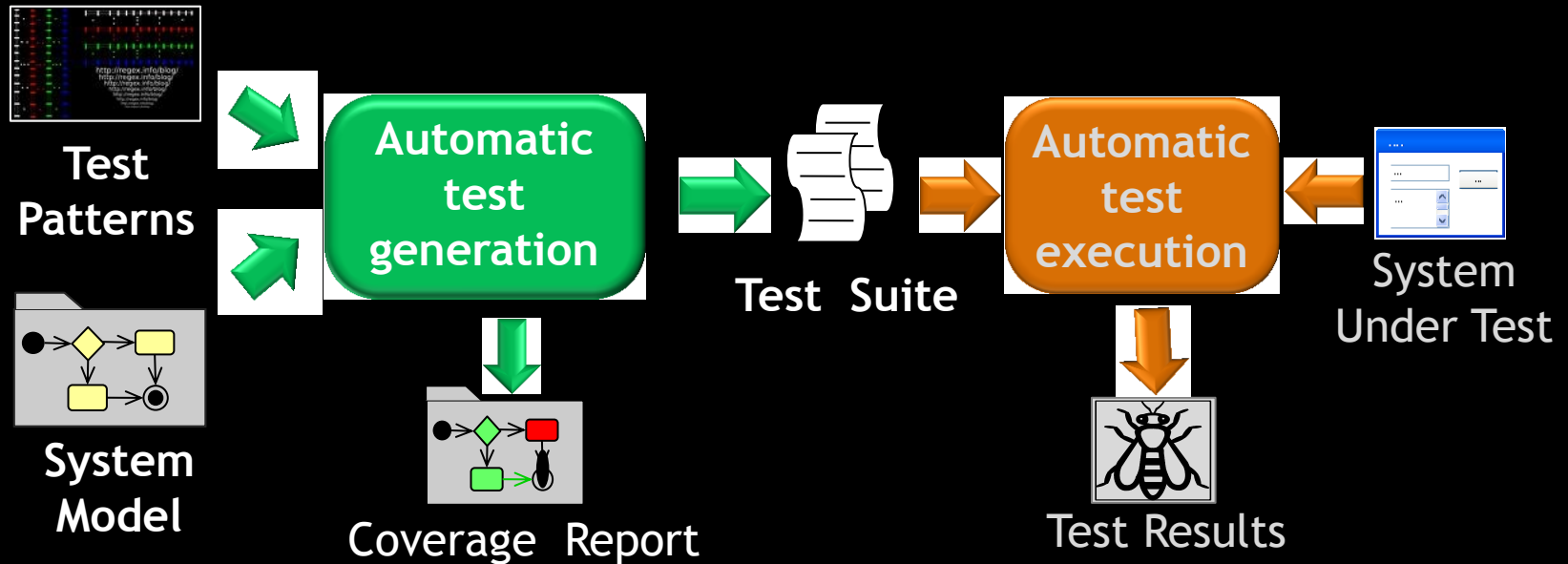
- Software Test Automation
- Automatic Fault Localization and Debugging

Software
Quality

Software Processes Engineering and Knowledge Management

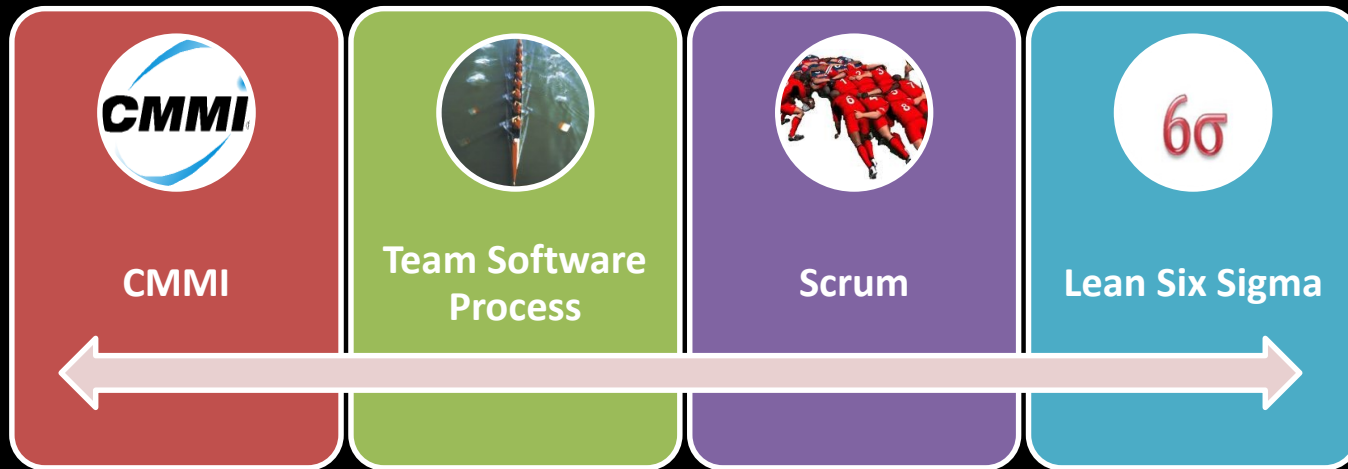
- Software Process Improvement
- Software Knowledge Management

SOFTWARE TEST AUTOMATION: Focuses on the development of novel techniques and tools to improve testing effectiveness and efficiency, particularly through automatic test generation based on models and patterns.



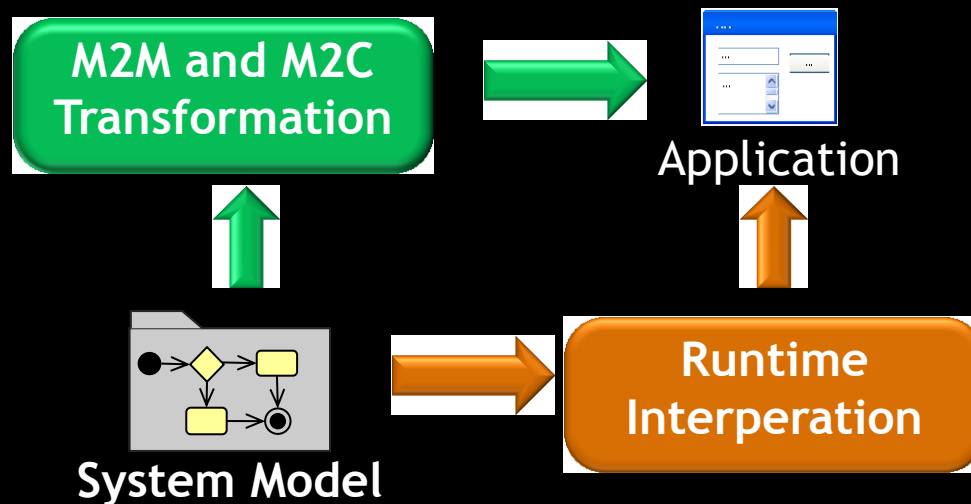
- [AAL4ALL - Ambient Assisted Living for All - Testing & Certification](#) [QREN, 1MSc, 2011-15]
- [GENT - Automatic test generation from algebraic specs of generic types](#) [2MSc, 2010-14]
- [PBGU - Pattern-based GUI testing](#) [2PhDs, 3MScs, 2011-2015]
- [UML Checker - A Toolset for Conformance Testing against UML Sequence Diagrams](#) [1PhD, 1MSc, 2010-]

SOFTWARE PROCESS IMPROVEMENT: Concerned with the improvement of the methods and processes of software development to achieve higher levels of productivity, predictability and quality,.



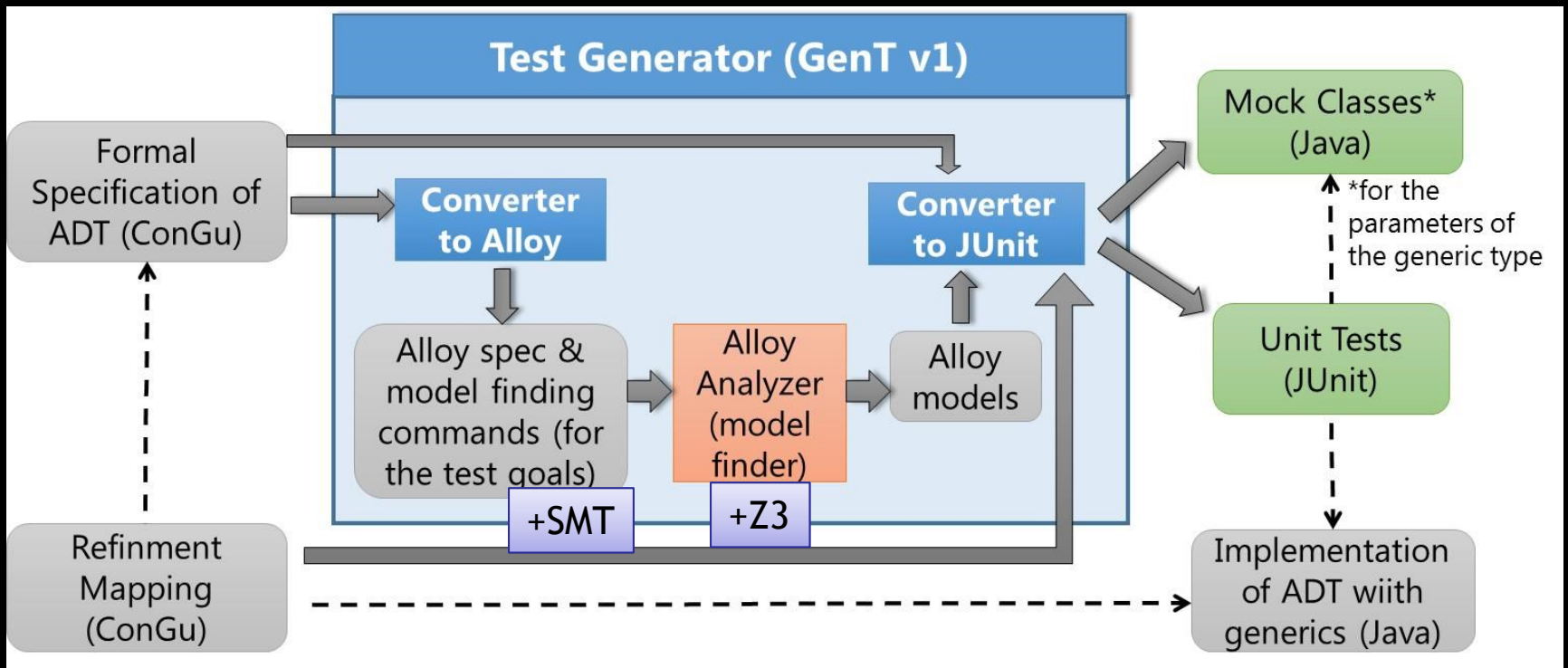
- [Process PAIR - Automated Software Process Performance Analysis & Improvement Recommendation](#)
[+SEI,1MSc, 1PhD, 2011-15]
- AIMS - SaaS Platform To Support the Accelerated Improvement Method
[QREN,+Strongstep+Multicert, 2MSc, 11-14]
- Framework to Evaluate & Improve the Quality of Implementation of CMMI Practices
[1PhD,+UC+SEI,2010-15]

MODEL-DRIVEN SOFTWARE ENGINEERING: Focuses on the development of novel generative and interpretative model-driven engineering approaches, for rapid application development and adaptation, ensuring quality by construction.



- Adaptive Object-Modelling: Patterns, Tools and Applications [1PhD, 2008-11]
- Automatic UI Gen. from Rigorous Domain and Use Case Models [1PhD, 2008-11]

SOFTWARE TEST AUTOMATION: GenT



SOFTWARE TEST AUTOMATION: UML Checker

ATM_checker - EA Academic

File Edit View Project Diagram Element Tools Add-Ins Settings Window Help

Test Generator

- Execute Tests
- Execute Tests Checking Coverage
- Generate JUnit from Sequence Diagrams
- Check Model Consistency and Completeness
- Preferences

Interaction

- Actor
- Lifeline
- Boundary
- Control
- Entity
- Fragment
- Endpoint
- Diagram Gate
- State/Continuati

Common

Sequence

Client

Account(balance, log) a :Account

alt

[amount <= balance]

withdraw(amount)

setBalance(balance-amount)

opt

[log]

Movement(a, new java.util.Date(), amount, "withdraw") m :Movement

:"OK"

[else]

withdraw(amount)

:"INSUF_BALANCE"

«Parameters»

balance: double	amount: double	log: boolean
100	150	true
100	50	false

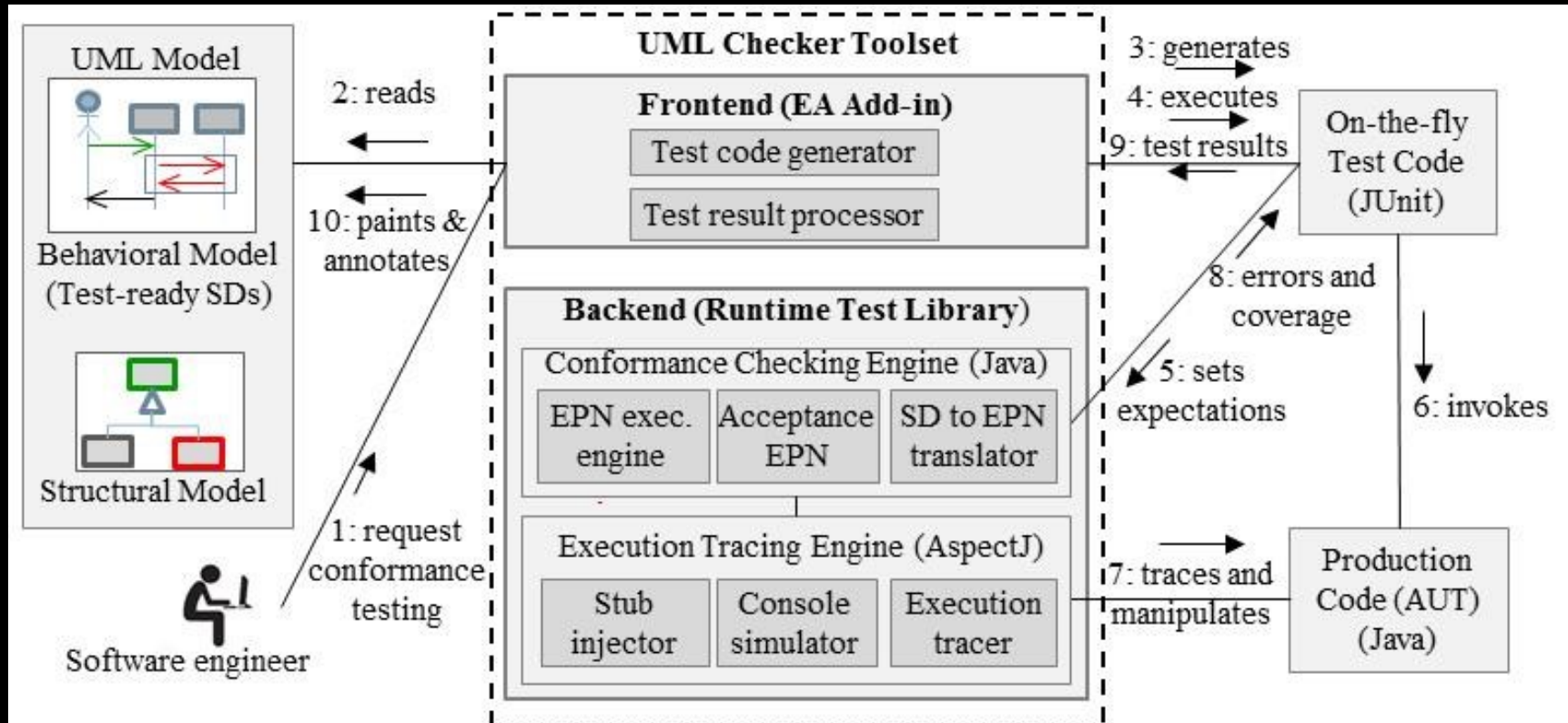
Project Browser

- Model
- Dynamic View
- «Failed» ATM
- «Failed» ATM
- ATM
- Client
- a: Account
- m: Movement
- «Failed» Bugs
- Logical View
- ATM
- Logical View
- Account
- «NotCovered» Customer
- Movement

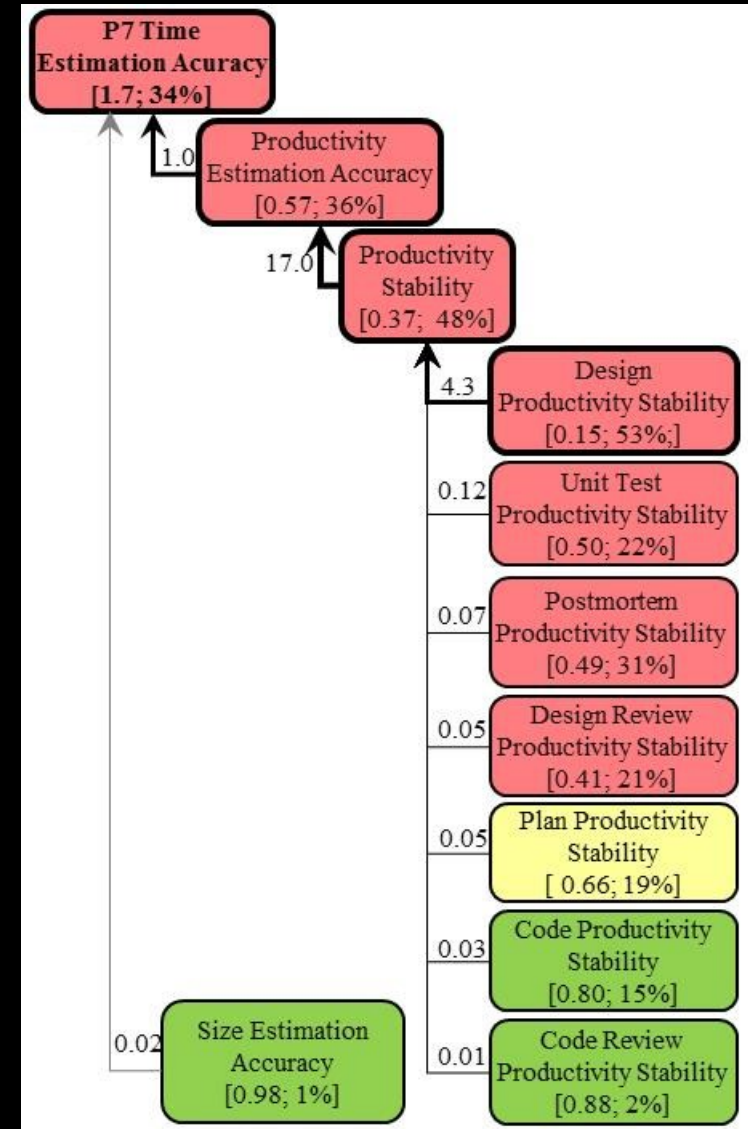
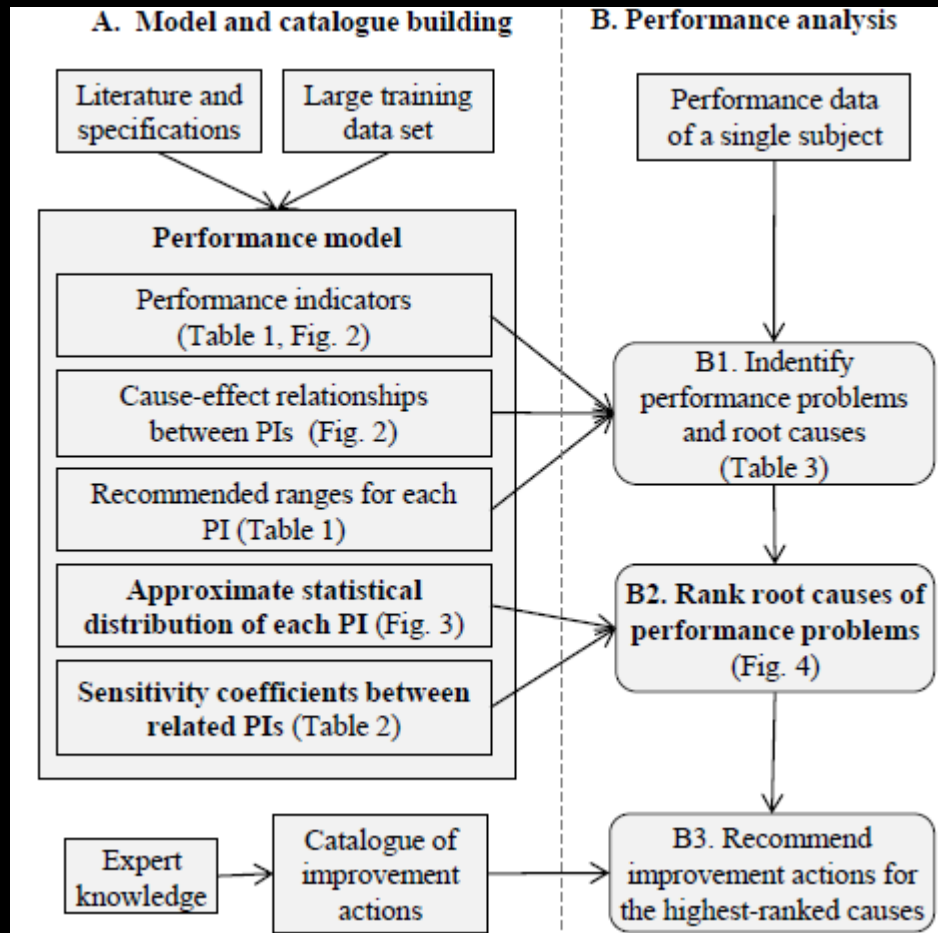
Notes

Execution result: covered Execution result: expected: <[INSUF_BALANCE]> but was: <[FAIL]>

SOFTWARE TEST AUTOMATION: UML Checker



SOFTWARE PROCESS IMPROVEMENT: Process PAIR



software engineering



Research Opportunities

Model-based Testing

Security Testing

Mobile Testing

Data Analytics & Data Mining for SPI

Usage Monitoring for Requirements Maintenance

NLP and MDE in Requirements Engineering

Games for Software Engineering Education

Reverse Engineering (Model Extraction)

software engineering

CONTACTS

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