PMA: Master's theses

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IfI UiO

August 2009

Master thesis

- close connection to our research topics
- embedded into projects (international collaboration)
- range from "theoretical" to "practical"
- background/interest in "formal methods" and programming theory welcome:
  - semantics
  - concurrent & distributed languages
  - logics
  - program analysis ...
  - compiler techniques

Goal, focus, and methods

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Goal: software quality assurance

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focus: what?

- open, object-oriented distributed systems
- internet-based services
- wireless sensor networks
- long-lived, evolutionary systems

Goal, focus, and methods

Goal: software quality assurance

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- open, object-oriented distributed systems
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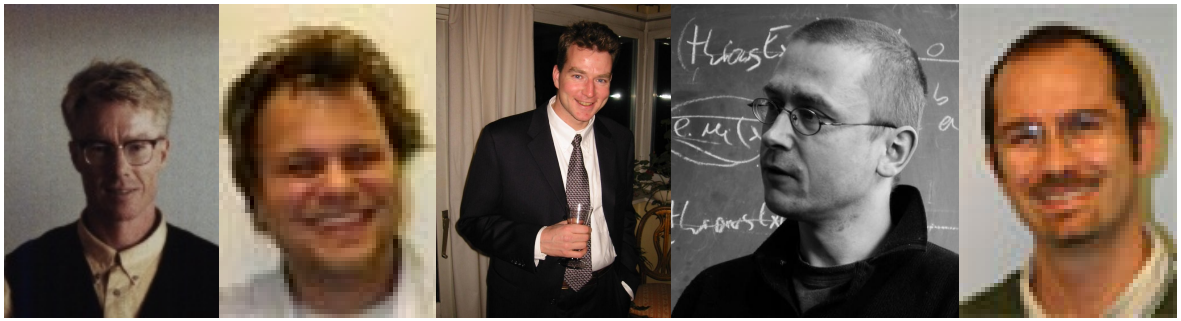
methods: How?

- languages for modeling, design, and programming
- theory $\longleftrightarrow$ practice
- tools for analysis, testing and quality assurance of software
- innovative language designs
- framework: Maude and rewriting logic

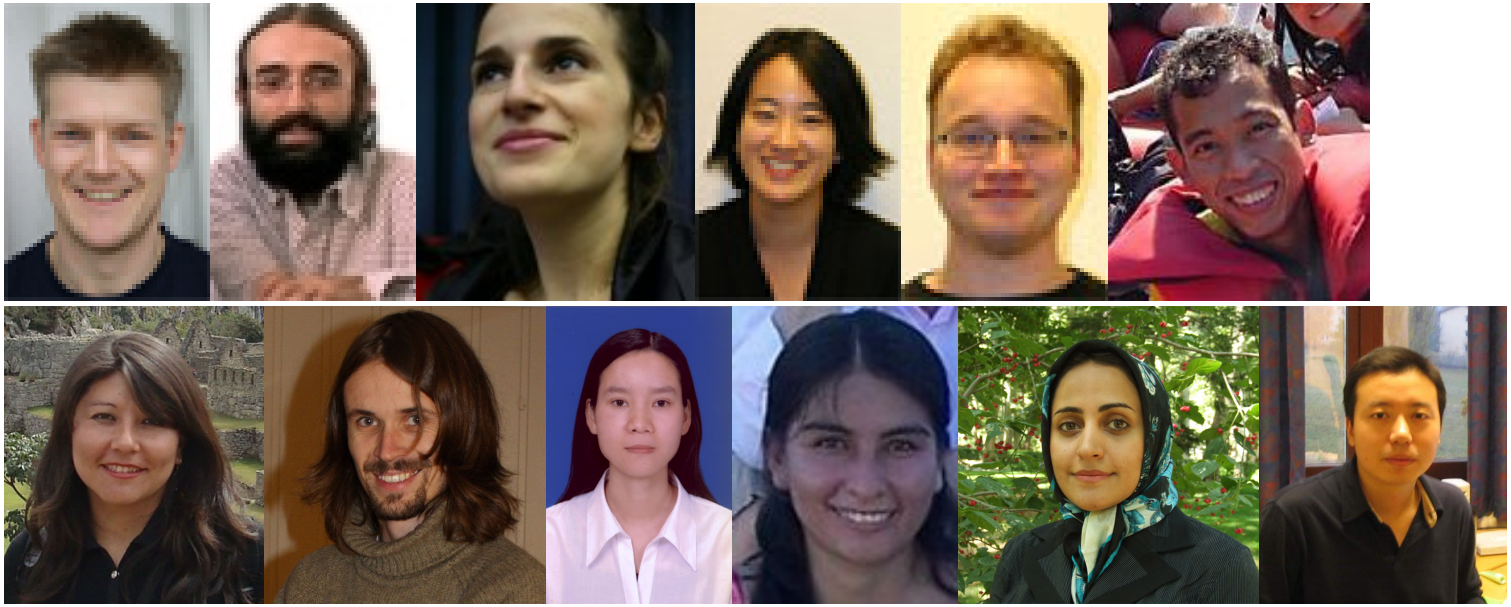
People

People



- Olaf Owe (professor)
- Einar Broch Johnsen (1. amanuensis)
- Peter Ölveczky (1. amanuensis)
- Martin Steffen (1. amanuensis)
- Gerardo Schneider (part time)

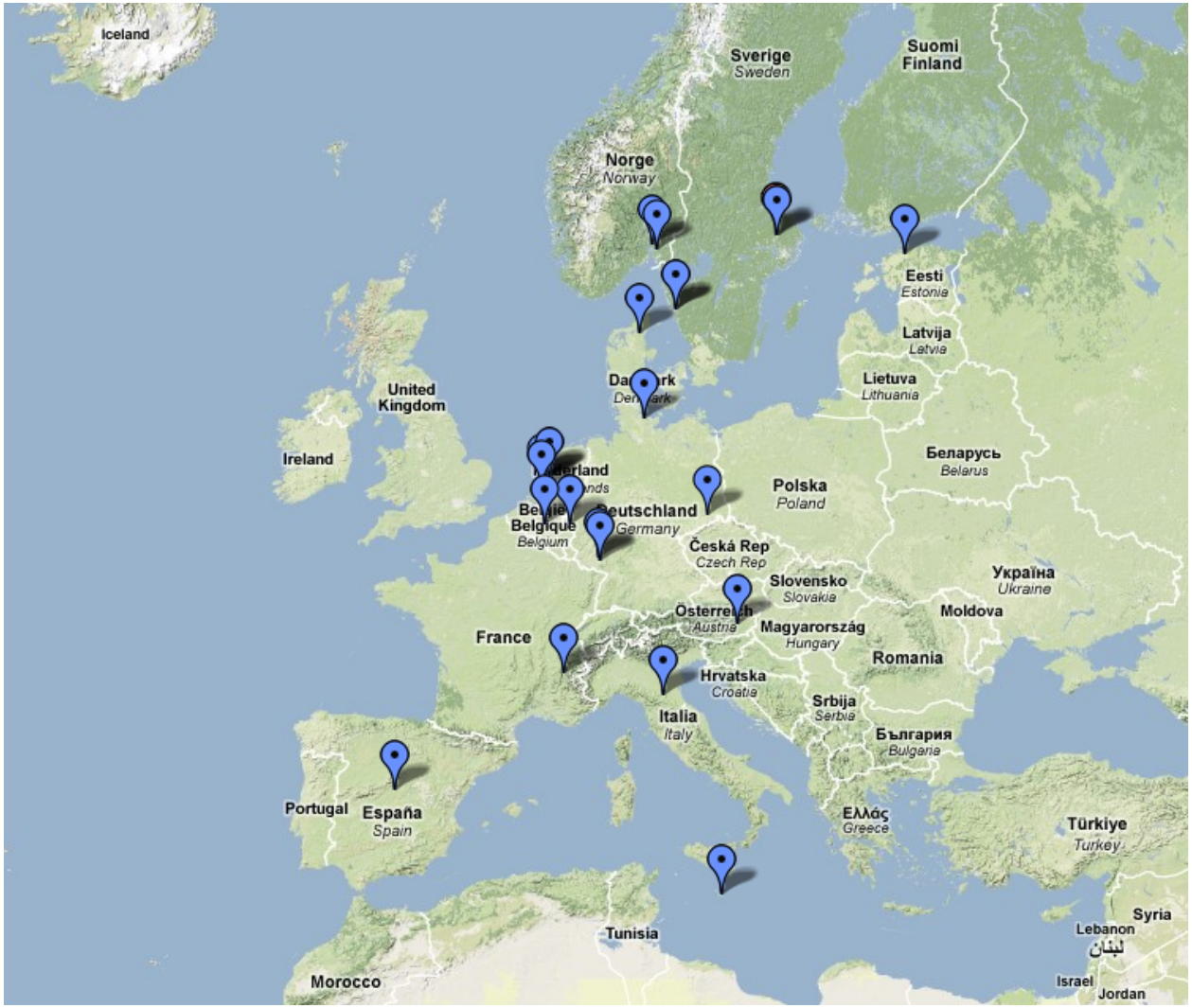
PhD studentent + scientific assistants



- approx. 15 from 10 different countries
- most working in/connected to various projects
- we are expanding: 5 new positions start this semester

Collaboration

Collaboration



Research & Projects

European/international projects:

- HATS (EU FP7): Software families
- Credo (EU FP7): Adaptive, distributed programs
- EU COST-action: Exchange network : Verification of OO
- Norway-Germany exchange for young researchers: Automatic validation of behavioral interferfaces

Norwegian projects (NFR funded)

- Creol: active objects
- Connect: heterogeneous, adaptive networks in hospital environment
- Contracts for internet services
- Rhytm: Real-time systems

Courses

- Videregående emner (10 poeng)

INF3110/4110	Programmeringsspråk (med OMS)	Høsten
(INF3140)/4140	Modeller for parallellitet	Høsten
INF3170/4170	Logikk og analysemetoder (OMS)	Våren
INF3230/4230	Formell modellering og analyse av kommuniserende systemer	Våren

- Avanserte emner (10 poeng)

INF5130	Utvalgte emner i omskrivningslogikk	Høst 09, 11
INF5140	Kravspesifikasjon og verifikasjon av parallelle systemer	Våren 09, 11, ..
INF5150	Uangripelige IT-systemer (OMS)	hver høst
INF5906	Utvalgte emner i statisk analyse	Våren 08,10...

- Poenggivende seminar (5 poeng)

INF5160	Databehandling seminar (for PMA students)	Hvert semester
INF5170	Masterseminar i logikk (OMS)	Hvert semester

In a nutshell

- concurrency
- compositionality
- correctness

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Credo

Goal

Compositional modelling and analysis of dynamically reconfigurable software systems as systems of object-oriented components interacting via a network. Compositionality by behavioral interfaces for

- objects and classes
- components
- network

HATS

"Highly adaptable & trustworthy software using formal methods"

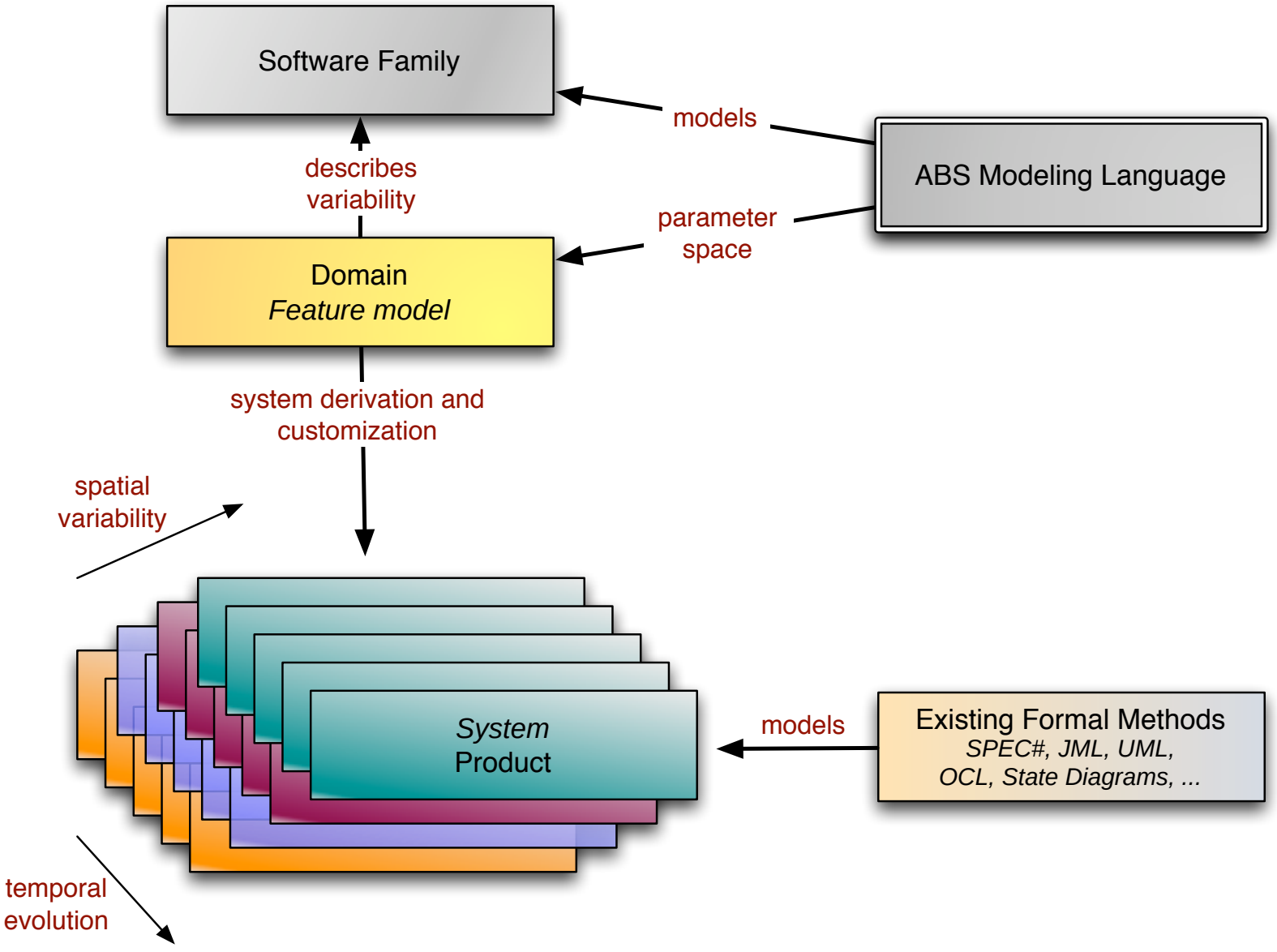
- new European project, start 2009, 4 years
- 11 (8 +3) partners

Goal

Formal basis for eternal systems

- adaptability
- trustworthiness

Adaptation and evolution



Challenges & topics

- further language development
  - innovative features to capture dynamicity
  - software families
  - concurrency features
  - tool integration (Eclipse)
- new (automatic, semantic-based) analyses
  - testing and run-time verification
  - type checking
  - static behavioral checking
- compositional methodologies
- behavioral model and interface descriptions

Possible Master topics

- test generation from contracts
- Eclipse/compiler support for dynamic class upgrades
- Eclipse support for interface testing
- technique for garbage collection for active objects (+ implementation)
- visualization/animation of Creol-executions in Eclipse
- language design for software families
- testbed implementation for *transactions*
- Case studies
  - for adaptive systems
  - distributed components
  - ...
- ...

Further info

See `http://www.ifi.uio.no/pma/` or *contact us*