NTNU / IDI’s
Software Engineering Group (SU)

Per 17 April 2001

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1. General about NTNU and IDI
2. General about SU group
3. Courses from SU group
5. Presentation of group members
6. Work conditions for PhD students and teachers
About NTNU and IDI (1)

- **NTH:** In Trondheim, Norway, started 1910
- **NTNU:** Merge of engineering (NTH), general univ. studies, medicine & museum in 1996:
  - 2001: 18,500 students (11,500 full-time), 200 mill. $ (1800 mill. NOK) from Government
  - Students take 20 credit points (vt) per year, often as 8 courses à 2.5 vt
  - Nine faculties -- one for Physics, Informatics and Mathematics (FIM), with three dept.s

IDI, employees (2)

- Total number of employees: 118 (34 teachers)
  - Professors: 13 (1 woman)
  - Assistant/associate professors: 18 (4)
  - Professor II (20% position): 3 (0)
  - Associate professor II (20%): 10 (1)
  - PhD fellows: 38 (7)
  - Teaching Assistants, 50-100%: 11
  - IT-services: 15
  - Administrative staff: 10
  - Student Assistants (6-12h/week): > 300
IDI, key figures (3)

- In 2000:
  - 90 courses, 1250 PCs/servers, some special hw/sw
  - 1100 full-time students, all categories (10% of NTNU)
  - 4000 exams graded for both free and engineering studies, totally 8000
  - 60% of IDI’s resources spent on non-specialists
  - 5 interdisciplinary study programs + continuing education for industry
  - 5 courses also as net-based education in a national network

  Ca. 1 M$ in external R&D grants

- IDI in 2000: 3% of NTNU teachers, 5% of budget,
  10% of students => 18% of students in 2004?

IDI, siv.ing. student input (4)

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Comm. Techn., incl. Telematics</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>124</td>
<td>149</td>
</tr>
<tr>
<td>Computer Science</td>
<td>101</td>
<td>171</td>
<td>233</td>
<td>194</td>
<td>272</td>
</tr>
<tr>
<td>(incl. Telematics 96-98)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>6</td>
<td>50</td>
<td>69</td>
<td>50</td>
<td>67</td>
</tr>
<tr>
<td>Men</td>
<td>95</td>
<td>121</td>
<td>164</td>
<td>144</td>
<td>205</td>
</tr>
<tr>
<td>Primary applicants</td>
<td>600</td>
<td>750</td>
<td>800</td>
<td>600</td>
<td>680</td>
</tr>
<tr>
<td>(from high schools)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All applicants</td>
<td>?</td>
<td>?</td>
<td>3000</td>
<td>2000</td>
<td>2300</td>
</tr>
</tbody>
</table>

Sivilingeniør study (engineering): extended from 4.5 to 5 years from 1997, intake in 1st and 4th study year.

Special “Girls and data” program since 1997.
### IDI, candidate output (5)

<table>
<thead>
<tr>
<th>Year</th>
<th>Sivilingeniør</th>
<th>Cand.Scient.</th>
<th>Total</th>
<th>12% Doctors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>77</td>
<td>10</td>
<td>87</td>
<td>2</td>
</tr>
<tr>
<td>2000</td>
<td>110</td>
<td>25</td>
<td>135</td>
<td>5</td>
</tr>
<tr>
<td>2002</td>
<td>160</td>
<td>25</td>
<td>185</td>
<td>(22)</td>
</tr>
<tr>
<td>2003</td>
<td>160</td>
<td>25</td>
<td>185</td>
<td>(22)</td>
</tr>
<tr>
<td>2004</td>
<td>200</td>
<td>25</td>
<td>225</td>
<td>(27)</td>
</tr>
<tr>
<td>2005</td>
<td>260</td>
<td>25</td>
<td>285</td>
<td>(34)</td>
</tr>
</tbody>
</table>

**Sivilingeniør:** M.Eng. (Computer Science), 4.5=>5 years.  
**Cand.Scient:** M.Sc (Informatics), 5 years.  
**Dr/PhD:** 3 years (one for qualifiers) + 1 year as teaching assistant.

### IDI: research groups (6)

- Nine groups, going to four in 2001:  
  - Software Engineering, prof. Reidar Conradi  
  - System Work, prof. Eric Monteiro  
  - Information Systems, prof. Arne Sølvberg  
  - Databases, prof. Kjell Bratbergsengen  
  - Information Management, prof. Ingeborg Sølvberg  
  - Algorithms and Visualization, prof. Arne Halaas  
  - Image Processing, prof. Richard Blake  
  - Computer Architecture, prof. Lasse Natvig  
  - Knowledge Based Systems, prof. Jan Komorowski  
  - Artificial Intelligence, prof. Agnar Aamodt
### IDI: 5-year engineering study (7)

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd, fall</td>
<td>Non-tech. subject</td>
<td>Focused proj. (&quot;mini-diploma&quot;)</td>
<td>Focused proj. (&quot;mini-diploma&quot;)</td>
<td>Theory coupled to focused project</td>
</tr>
<tr>
<td>4th, spring</td>
<td>Voluntary subject</td>
<td>Tech. subject</td>
<td>Experts in Team (interdiscipl.)</td>
<td>Specialization course II</td>
</tr>
<tr>
<td>4th, fall</td>
<td>Voluntary subject</td>
<td>Customer-driven project</td>
<td>Customer-driven project</td>
<td>Specialization course I</td>
</tr>
<tr>
<td>2nd, spring</td>
<td>Comm., sys. + shared proj.</td>
<td>MMI &amp; graph. + shared proj..</td>
<td>Databases + shared proj..</td>
<td>System dev. + shared proj.</td>
</tr>
<tr>
<td>1st, spring</td>
<td>Gen. topic 1 (soc. science)</td>
<td>Math 3 (linear algebra)</td>
<td>Discrete math.</td>
<td>Programming w/ projects (Java)</td>
</tr>
<tr>
<td>1st, fall</td>
<td>Gen. topic 2 (philosophy)</td>
<td>Math 1 (calculus)</td>
<td>Circuits and electronics</td>
<td>IT intro</td>
</tr>
</tbody>
</table>

Presentation of NTNU/IDI’s Software Engineering Group, 17 April 2001

### IDI: 8 study tracks in 4-5th year of engineering study (8)

- Algorithms and Graphics (AG)
- Image Processing (BB)
- Computers (DM)
- Databases (DB)
- Operation of Computer Systems (DR)
- Information Systems (IS)
- Knowledge-based Systems (KS)
- System Development (SU)

- Each has 2-4 special topics in 4-5th year

Presentation of NTNU/IDI’s Software Engineering Group, 17 April 2001
IDI: Success Story -- FAST (9)

• FAST -- FAs t Search and Transfer

• FAST search engine for retrieval of information on the Internet

• Based on more than 20 years work of professor Arne Halaas and his doctoral students

• Applied methods from Algorithm and data structures

• No support from Norwegian Research Council, except PhD fellows

• Stock exchange value: Has been 10 to 20 GNOK, now ??

• Number of employees in Norway about 100

• Agreements with Dell, Lycos, Elsevier, ...

Idi: Success Story -- Clustra (10)

• Product: Ultra reliable and available database system with high performance
  - Maximum downtime allowed: 30 minutes during 30 years
  - Performance: 5000 transactions per second, scalable further up
  - Response time: 5 ms maximum
  - Targeted application areas: Telecom and Internet applications

Sold to Telecordia to be used in ultra modern multi media switches
  - 25 switches sold to Sprint to be used in their ION (Integrated on Demand Network, voice, TV and Internet traffic)

Offices in Oakland (20 employees, head quarter, sales support, customer service) and Trondheim (80 employees, research and product development)

Based on research in the database research groups at IDI and SINTEF Informatics and Telematics since 1970

More than 25M US $ has been collected from US investors, Siemens is now a partner
IDI, future (11)

- => 100 PhD fellows (now 40), “PhD school”
- => Over 1000 siv.ing. students, 200/year
- => 70 teachers (2X) and 10 researchers!
- But 15 vacant prof.’s in 2000: 3-4 filled?
- Active interplay with industry (Telenor, …)
- Active interplay with other national partners (U.Oslo, Simula Res. Lab/Fornebu, SINTEF)
- Active int’l contacts: 5 guests autumn 2000.

Software Engineering Group, SU (1)

- Three teachers:
  - prof. Reidar Conradi
  - prof. Tor Stålhanne
  - Assoc. prof. M. Letizia Jaccheri
- Five PhD students:
  - Roxana E. Diaconescu (CSE project w/ Math.)
  - Torgeir Dingsøyr (SPIQ/PROFIT)
  - Tore Dybå (SPIQ/PROFIT), at SINTEF
  - Parastoo Mohagheghi (INCO), Ericsson, 15.3.2001
  - Carl Erik Sørensen (MOWAHS), from 15.8.2001
- Have educated 13 PhDs over past 11 years
Software Engineering Group (2)

- **Three new postdocs:**
  - (dr.) Alf Inge Wang (MOWAHS), 5.3.2001, prev. at CAGIS project
  - dr. Marco Torchiano (INCO), from Torino, 5.5.2001
  - dr. NN (Simula Research Lab)

- **2-3 guest researchers from Germany, Italy, China, ...**

SU motivation (3)

- Software essential in many important societal activities. 50-60,000 system developers in Norway – many without formal SW education. Still many challenges wrt. software quality and delivery on time and budget; cf. [US Standish report, 1995], cited in [PITAC, 1999], on projects for tailored software:
  - 31% stopped before finish, 81 bill. $ loss/year (1% of GNP!)
  - 53% have serious overruns (189% average), 59 bill. $/year

- **Some challenges:**
  - Web-systems: Manage time-to-market (TTM) vs. reliability?
  - How do software systems evolve over time, cf. Y2K?
  - What is empirically known about SW products and processes?
  - How can small companies carry out systematic improvement?
  - How to perform valid sw.eng. research in a university
    -- by student projects and having industry serving as a lab?
SU: Scientific Profile (4)

- Software quality (reliability, safety, usability), software process improvement
- Component-based development, reuse, OO
- Software architecture, evolution
- Web-based development: agents, XML, …
- Process modelling and support
- Versioning and configuration management
- Empirical studies, experience bases
- Software engineering education

SU: Research methods: theory (5)

- Theory formation <=> student/industrial trials
- Using data mining, field and case studies, formal student experiments, ...
- Both qualitative and quantitative techniques
- But software research is “soft”
- Results in experience bases, joint work with Oslo and U. Maryland, and in PROFIT
- Build a new PhD/MSc method course?
- Joint research seminars
SU: Research methods: applic. (6)

- Ex. Reuse studies at Genera, Mogul, ...
- Ex. Estimation models, at Telenor 4tel
- Ex. Design inspections at Ericsson
- Ex. OORT inspections, for students
- Ex. Success factors for SPI, in SPIQ/PROFIT
- Ex. Success factors for experience bases, general and field studies (Computas, Mogul)
- Ex. Sw maintenance studies, for students?
- Ex. Post-mortem analysis for InfoStream, ...

SU: Work mode with industry (7)

- Perform “live” empirical studies, as part of joint research projects (PROFIT, INCO, …): OO/RUP, sw arch., sw maintenance, SPI/QA, knowledge management, ...
- Use industrial cases/examples in regular education, e.g. Ericsson SPI/QA work.
- Project/diploma/PhD theses: many possibilities.
- Build long-term alliances:
  => Seek relevance and benefit for both parties!
Courses of SU group (8)

• System development (Stålhane), 2th year
• Customer-driven project (Conradi et al.), 4th
• Experts in Team, project (Conradi), 4th
• Software Architecture (Jaccheri), 4th
• SW quality and process impr. (Stålhane), 4-5th
• Predipl./depth proj. (Jaccheri, Stålhane), 5th
• Diploma topics, 15-20 per year (all), 5th
• 3 PhD courses (Conradi, Jaccheri): OO syst., distr. info systems, process modelling.

Motivation for SU courses (9)

• Very relevant for later jobs
• Awareness of “system/quality” issues matures through practice, e.g. project work
• Study by Timothy C. Lethbridge in 1998 -- practitioners said they should know more on:
  – Testing and Quality Assurance
  – Configuration Management
  – Process Standards
• I.e. big gap in what they learned in university.
**SU topics for 4.-5. year stud. at NTNU (10)**

- General platform in 1.-3. year courses, incl. SIF8018 Systems Development.
- **4th year, SU combination:**
  - SIF8080 Customer-driven project, 5 vt
  - SIF8010 Experts in Team, 2.5 vt
  - SIS1070 Technology Management, 2.5 vt
  - SIF8054 Software Quality or SIF8056 Software Architecture, 2.5 or 5 vt
  - Other courses: 5-7.5 vt
- **5th year: SIF80xx Depth project in SU, 7.5 vt**

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**SIF8018 System Development (Stålhane)**

- General intro course in software engineering
- Life cycle models, requirements, (OO) design, implementation, testing, maintenance
- Project management, verification/validation
- Using UML and Java for implementation
- Project work in teams, shared with database and telematics course, to design and implement a system from fixed requirements
- Textbook by Ian Sommerville
SIF8054 Software Quality and Process Improvement (Stålhane)

• Important topics in real-life projects!
• Ex. How to tackle time-to-market vs. traditional quality (reliability, safety)?
• Ex. Inspections, testing, ...
• Ex. ISO 9000 and similar standards
• Ex. Goal Question Metrics method for lean and relevant measurements
• Mini-projects, report industrial experiences
• Own SPIQ textbook from Norwegian project

SIF8080 Customer-driven project (Rønneberg, Conradi, A. Sølvberg)

• Software engineering: a constructive discipline (create new reality), not an observing science: learning by doing, “situated” learning.
• 6-7 stud./group, 350 h/stud., int. & ext. advisor.
• Combine topics from 1.-3. year with practical problem, team work, time and resource pressure.
• From (vague) rqmts to demo in 12 weeks.
• The most important course in the study!!
• Highly valued by industry.
SIF8080 Customer-driven project (2)

- **Ex. topics from 2000** (8 of 15 projects):
  - Sverresborgen i virtuell virkelighet, Folkemuseet og IDI
  - Metis Editor for Rules in Framesolutions, Computas i Oslo
  - Dedisert søketjeneste for CV’er på Internett, FAST
  - Database monitoring system, Ectopus, i Oslo/Los Angeles
  - OO Rammeverk for benchmarking, IKT-Norge og SINTEF
  - Grafisk editor for minibankapplikasjoner, EDB Fundator
  - Elektronisk faktura, EM Technology i Halden
  - Sterk autentisering for WAP, Mogul.com
- Often 400 p. report, in English.

SIF8010 Experts in Team (Conradi etc.)

- Interdisciplinary project for all 4th year engineering students at NTNU, 2.5 vt.
- Three IDI’s contributions, spring 2000:
  - Image processing, f.aman. J. Hokland
  - Network-based education, prof. A. Sølvberg
  - Electronic pasient journal, prof. R. Conradi
- “Villages” of 20-30 stud., 5-7 teams of 4 stud.
- Process emphasis, plus courses in technical writing and literature search.
- Exam on final demo day: technical report: 50%, process report: 25%, presentation: 25%.
SIF8056 Software Architecture (Jaccheri)

- Principles for software design (high-level architecture)
- Software patterns and reuse, architectural styles, components and connectors
- Software evolution and maintenance
- Requirements vs. design, traceability
- Ex. study UML and RUP
- Case study/project work on web-system
- Textbook by Jan Bosch

SIF80xx Depth project in System Development (Jaccheri, Stålhane)

- 1. Project work: 5 vt (in SU area):
  - “Pre-diploma” in chosen research area
  - Linked to theory item below and ongoing projects
- 2. Two selected theory items, each 1.25 vt:
  - *Software quality and empirical work* (Stålhane)
  - *New software technologies* (Jaccheri)
  - Oral exam in selected topics of these
- Joint exam mark for all this, 7.5 vt
- Opportunity to work close together!
**Work community: students - teachers**

- Now: two separate worlds
- In “new” building: put last year students close to teachers/PhD-students
- Mutual seminars, discussions, coffee breaks -- social and work community
- Try “**dr. school**”: spread 5th year over two years, with 50% job as und.ass. Use diploma thesis as PhD start-up.

**Some possible summer jobs/proj.topics**

- Connect to ongoing projects: INCO, MOWAHS, PROFIT, Simula Research Lab., ...
- Ex:
  - Experiments in OO reading (Simula center)
  - Implement web-base for sw experiments (ESERNET)
  - Assist in reuse at Ericsson and NERA: document components/architectures (PROFIT, INCO)
  - Agent-based process support (MOWAHS)
  - Investigate evolution in web-based systems (INCO)
  - Prepare sw projects for 2nd/4th year course, with maintenance experiments
  - Web-based tool for GQM
CAGIS: Cooperating Agents in the Global Information Space

- NFR basic R&D, 1997-2003. 4+1 PhD students, one researcher. 5 IDI groups
- Distributed agents and processes, A.I Wang
- Cooperating transactions, H. Ramampiaro
- Document classification, T. Brasethvik
- Computer-assisted learning, E. Prasolova
- Intelligent agents (IDI), Sobah A. Petersen

CSE project

- NTNU “Strategic University Program in Computation Science and Engineering”.
- CSE stands for those activities in science and engineering where numerical analysis on a computer is important.
- Objective: to improve the level of competence in using numerical mathematics and computer science in engineering.
CSE project (2)

- 9 Ph.D. positions:
  - Dept. of Mathematical Sciences: 3 positions
  - Dept. of Computer Science, IDI: 2 positions
    - Roxana Elena Diaconescu, OO modelling (Conradi)
    - Zoran Constantinescu, visualization (Blake)
  - Dept. of Marine Hydrodynamics: 2 positions
  - Dept. of structural engineering: 2 positions
- NTNU - responsible for one out of three supercomputing projects in Norway -- a CRAY T3E, CRAY J90 etc. -- used in CSE.

SPIQ/PROFIT: better software quality for Norwegian IT industry

- NFR industrial R&D project. Jointly with Univ. Oslo and SINTEF in 1997-99, 2000-02. 3 PhD students, 4-6 researchers. 10 active companies.
- Lead by Bravida Geomatikk (Telenor), attn/Tor Ulsund.
- How to help smaller companies to improve? Need insight from organizational sciences!
- Pilot projects in companies, over 20 such.
- Empirical studies, experience bases
- Method book (in Norwegian)
SPIQ/PROFIT (2): PhD students etc.

- Torgeir Dingsøyr, NTNU: experience bases, doing field studies in pilot project at Computas, at Univ. Kaiserslautern in Spring 2001
- Tore Dybå, NTNU: success factor for successful software process improvement, large gable toward Norwegian IT industry, consulting in many pilot projects towards industry
- Erik Arisholm, UiO: incremental sw development
- Coworkers: Nils Brede Mo, Tor Stålthane and Tore Dybå, SINTEF; Dag Sjøberg, UiO; and others

NAWUS: teaching network in software engineering education

- Web portal with shared educational material: lecture notes, exercises, project descriptions, repeatable experiments.
- Bias towards Ian Sommerville’s book?
- A dozen cooperating colleagues in universities and colleges
Simula Research Lab: Center of Excellence, with subcenter in Software Engineering (SFF-Fornebu: Senter for Fremsragende Forskning)

- Proposed by Ifi/UiO (Dag Sjøberg) and IDI/NTNU (Reidar Conradi), July 1999
- Accepted part of SFF-Fornebu, Nov. 2000
- Decentralized: Fornebu/Oslo, Trondheim
- Budget of 10 mill. NOK per year.
- 25 teachers, researchers & PhD students; 30-40 MSc students: welcome!

SFF and cooperating partners (2)

SINTEF
DnV, Telenor, ...

…> 20 Norw. Compan., partly in PROFIT

NTNU T.heim

SFF
SE (UiO/NTNU)

Int’l contacts
ISERN network
Other projects
SFF- Scientific Profile (3)

Six themes:

<table>
<thead>
<tr>
<th>Theme</th>
<th>Responsible(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object-oriented development and maintenance</td>
<td>D. Sjøberg</td>
</tr>
<tr>
<td>Incremental and component-based development</td>
<td>R. Conradi, D. Sjøberg</td>
</tr>
<tr>
<td>Methods to achieve quality of Web-based, distributed systems</td>
<td>L. Jaccheri</td>
</tr>
<tr>
<td>Estimation, planning and risk evaluation of software projects</td>
<td>M. Jørgensen</td>
</tr>
<tr>
<td>General software process improvement and quality work</td>
<td>R. Conradi, T. Skramstad</td>
</tr>
<tr>
<td>Empirical software engineering</td>
<td>M. Jørgensen, T. Stålhane</td>
</tr>
</tbody>
</table>

Research method: Model construction and subsequent validation in industry, among students and through international cooperation.

SFF: Industry is our lab! (4)

- Both IDI, NTNU and Ifi, UiO has had an industrial focus over some time. We expect that SFF-Fornebu will offer even better possibilities for industrial cooperation.
- Since 1993 we have published the following published papers, 1/3 based on industrial cooperation:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Total number of papers</th>
<th>Papers with int'l colleagues</th>
<th>Papers with nat'l/industrial colleagues</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTNU</td>
<td>275</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>UiO</td>
<td>60</td>
<td>17</td>
<td>13</td>
</tr>
</tbody>
</table>

Presentation of NTNU/IDI’s Software Engineering Group, 17 April 2001
SFF: Published papers per June 2000, based on industrial cooperation (5)

<table>
<thead>
<tr>
<th>Title</th>
<th>Publication</th>
</tr>
</thead>
</table>

SFF: International cooperating partners, with some candidates for guest researchers/adjunct teachers (6)

1. Professor Chunnian Liu, dr.ing. (NTH 1983). Beijing Polytechnic University, PR China, Area: software engineering, process support, distributed systems.
2. Professor Alfonso Fuggetta, Politecnico di Milano, Italy, Area: software engineering, software architecture, feature engineering, middleware.
5. Prof.s d.r. Victor R. Basili and Marvin Zeilолов, Univ. of Maryland, with a sister institute of IESE in software engineering (FC-MD), Area: SPI and software quality, inspection techniques, COTS, experience bases, metrics, empirical studies.
6. Associate Professor Lionel C. Briand, Ph.D. (Paris, France), Carleton Univ. (Ottawa), Area: Inspections and testing in OO software. Software quality assurance and control. Project planning and risk analysis. Technology evaluation, Experimental SW engineering.
7. Professor Ray Welland, Head of Computing Science Department, University of Glasgow, Area: software engineering, Web application development, software tools, design methods.
8. Professor Malcolm Atkinson, University of Glasgow, Area: Persistent programming, language design, (distributed) information systems, software engineering.

Presentation of NTNU/IDI’s Software Engineering Group, 17 April 2001
INCO: Incremental and Component-Based Development

• Newly accepted NFR basic R&D project, 2001-2004. UiO and NTNU. 3 PhDs and one postdoc.
• Need a revolution in development paradigms -- waterfall is dead, “internet” time, extend RUP and similar models. Rqmts <=> design: a negotiation!
• Component-based development, using OO / RUP / Components-Off-The-Shelf (COTS) -- but how to manage the risks?
• Empirical studies towards Norwegian IT industry

MOWAHS: Mobile Work Across Heterogeneous Systems

• Newly accepted NFR basic R&D project, 2001-2004. SU and DB group. 2 PhDs (one vacant) and one postdoc.
• Software infrastructure for mobile agents that can move across fixed and portable PCs, PDAs etc.
• Novel transaction models to regulate access and updates to partly shared data.
• Nomadic computing.
• Try out for software engineering and teaching.
• Internationalization, Telenor etc. cooperation
ESERNET: network of excellence in EU’s 5th framework program

- Coordinated by Fraunhofer IESE in Kaiserslautern, with 30 other partners.
- Work topics: experimental methods, experiments in OO and reuse, knowledge bases, exploit and disseminate results. Web portal.
- Coach six experiments from each partner.
- Couple to Norwegian PROFIT and Simula Center, and our UiO colleagues.

WebSys: Web-based systems – Time-to-market vs. Reliability (not yet approved)

- Sought NFR competence R&D project, 2001-2004. IDI, SINTEF and UiO. 3PhDs, one postdoc, and one part-time researcher. Three cooperating companies, incl. Mogul and Consult IT.
- Trade-offs for “sooner” vs. “correct” Web-based systems. Market is God!
- Empirical studies in cooperating companies.
- Improve industrial technologies and processes.
- Strong international component.
Internal PhD fellowships in SU group: two in applied software engineering, two in free topics

- Two PhD project fellowships in **applied software engineering**: Empirical methods and studies against Norwegian IT industry, e.g. on Web-based systems.
  - Deadline spring 2001. Contact Reidar Conradi
- One PhD univ. fellowship, perhaps on **safety**.
  - Deadline spring 2001. Contact Tor Stålhane
- One PhD univ. fellowship, **general sw.eng**.
  - Deadline spring 2001. Contact Letizia Jacheri

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Teachers: prof. Reidar Conradi

- Born in Oslo, 1946
- MSc (1970) and PhD (1976) from NTNU
- At SINTEF 1972-75, at NTNU later
- Interests: software quality and process improvement, OO/reuse, distributed systems, versioning.
  Also: politics, jazz, skiing, swimming, ...
- Projects: most in SU group
Teachers (2): prof. Tor Stålhane

- Born in Skien, 1944
- MSc (1970) and PhD (1988) from NTNU
- Interests: software quality (especially safety and reliability), process improvement, industrial development, data analysis (statistics) and empirical methods
- Projects: PROFIT, WebSys?, ...

Teachers (3): assoc.prof. M. Letizia Jaccheri

- Born in Pisa, 1965
- Politecnico di Torino 1991-97, NTNU since 1997
- Interests: software quality, process improvement, software architecture, distributed systems, software engineering education
- Projects: various, INCO, SIMULA Research Lab?
PhD students (1): Roxana E. Diaconescu

- Born in Romania, 1974
- Topic of thesis: Find appropriate numerical approaches and SW in less human time and effort.
  - Embody knowledge in a “reusable” framework (design and tailoring principles, reusing OO libraries)
  - Use parallel computing to achieve better cost / efficiency -- by segmentation on Linux PC-clusters?

PhD students (2): Torgeir Dingsøyr

- Born in Søgne, 1974?
- MSc (1998) NTNU, PhD student from Feb. 1998
- Interests: software process improvement, knowledge management, experience databases, organizational learning.
  Also journalism, student organizations
- Projects: SPIQ/PROFIT
- Thesis: Experience Bases for SPI
PhD students (3): Tore Dybå

- Born in Oslo, 1961
- MSc (1986) NTNU, PhD student from July 1997
- Interests: software quality, process improvement, organizational change, organizational learning, qualitative and quantitative methods
- Projects: SPIQ/PROFIT, many at SINTEF
- Thesis: Success factors for SPI

PhD students (4): Parastoo Mohagheghi

- Born in Iran, 1962, Norwegian citizen
- MSc (1994) NTNU in Electronics, now researcher at Ericsson, PhD student from Feb. 2001
- Interests: software architecture, component-based development, OO, RUP, industrial studies.
- Establish contact Ericsson / HiA and NTNU.
- Project: INCO.
- Thesis: reuse methods, applied at Ericsson
**PhD students (5): Carl Erik Sørensen**

- Born in Narvik, 1966
- Interests: software architecture, OO, RUP, mobile and distributed systems, XML.
- Project: MOWAHS.
- Thesis: not yet defined.

**Ex. Previous PhD student: Bjørn P. Munch**

- Born in Oslo, 1964
- Interests: robust databases, software quality, distributed software architectures, configuration management
- Projects: EPOS and other projects
Postdocs (1): dr. Alf Inge Wang

- Born in Levanger, 1970
- Interests: distributed software architectures, agents/XML, configuration management, process modelling.
- Also music, and family life
- Project: EU projects, CAGIS, MOWAHS
- Thesis: Agent-based process support

Postdocs (2): dr. Marco Torchiano

- Born in Asti, Italy, 1971
- Interests: OOA/OOD, UML/RUP, software architecture, information and process modelling, fault tolerance, empirical studies.
- Project: Italian projects, INCO.
Life as an IDI PhD student (1)

- Ltr. 45: ca. 300,000 kr per year, up to 20% more from external or other projects
- Combine with leave from industrial job?
- Four years: three for dr. studies, one for teaching
- Assists in courses and supervises MSc students
- Contributes to value chain:
  - jr. student - sr. student - PhD student - teacher
- Four year: three for dr. studies, one for teaching
- Assists in courses and supervises MSc students
- Contributes to value chain:
  - Jr. student - sr. student - PhD student - teacher

Life as an IDI PhD student (2)

- Exciting and relevant research topics
- Very motivated and international environment. Cooperative work in dynamic project groups. Soon a larger research group: Gløs and Lade
- Strong couplings to Norwegian industry. Cooperation with SINTEF and UiO
- Your PhD is valued after the study, in any computer science field (high-tech).
  Ex. FAST and Clustra: 50% of IDI’s PhDs since 1995 -- cannot “afford” more such companies (!)
- Have fun and WELCOME to join 40 others!!
- Ca. 15 vacant positions in 2001
Life as an IDI teacher

- Decent pay (> 400.000 NOK), consult for 20% more
- Work with young people (you!), dynamic environment: IT prioritized area at NTNU / nat’l
- Large freedom in teaching and research
- Industrial connections and mutual projects
- International network, conferences etc.
- Sabbatical year every 5-6 year, with full pay
- **JOIN THE TEAM of 40 others!**
- Ca. 15 vacant positions in 2001