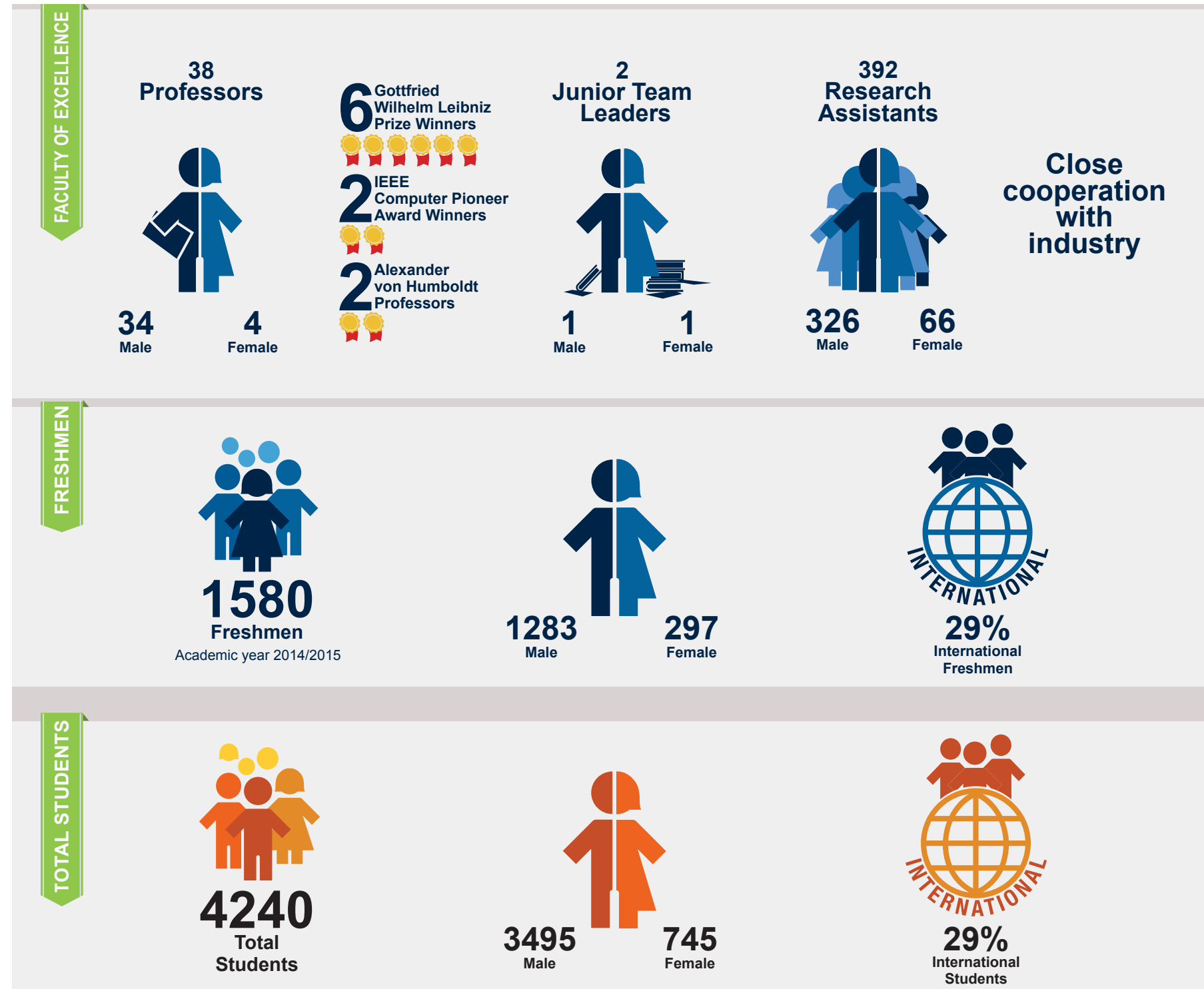


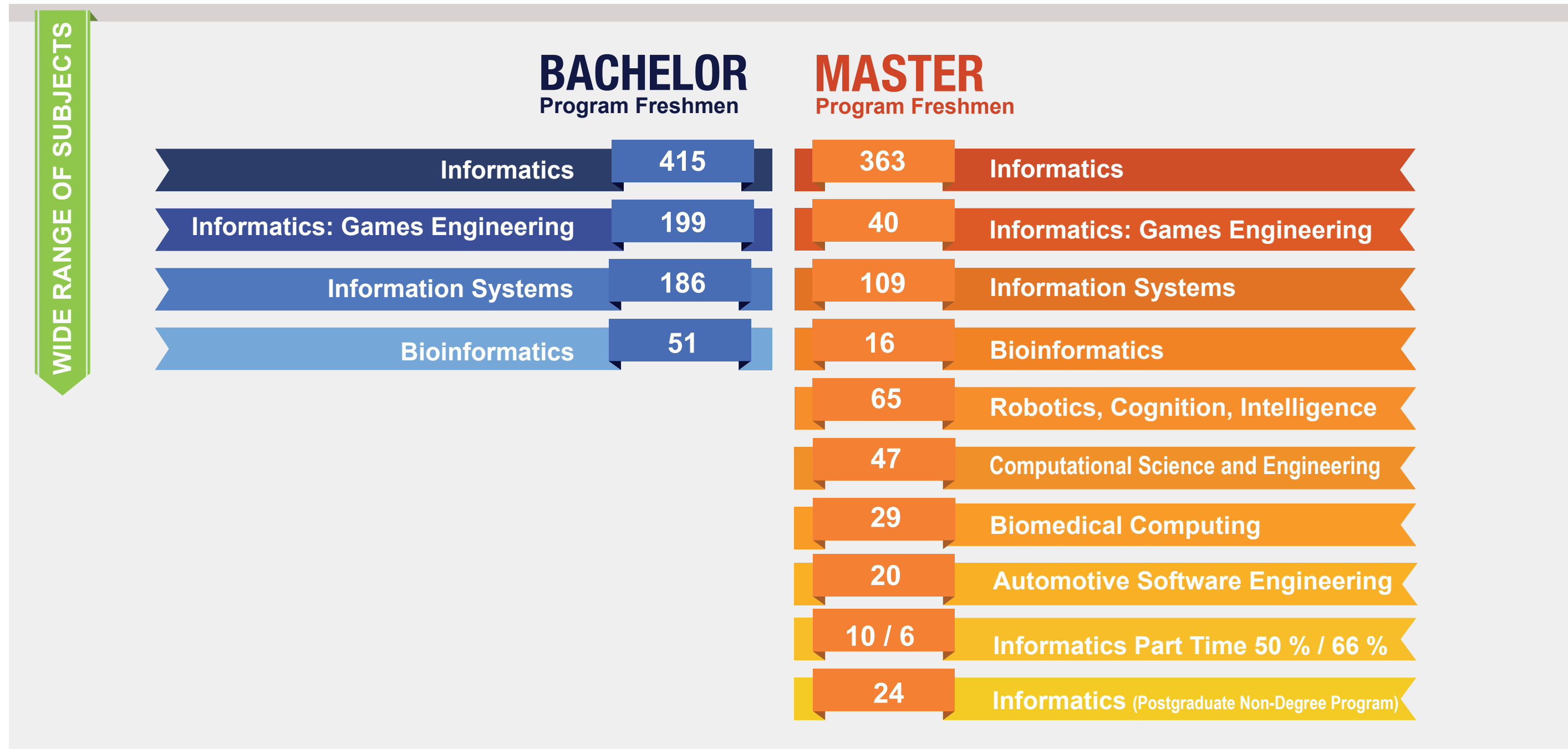
Teaching Practice Oriented Software Engineering at TU Munich

Stefan Nosović, M.Sc.
Chair for Applied Software Engineering
Faculty of Informatics
Technical University of Munich

About TUM Informatics



About TUM Informatics



Chair for Applied Software Engineering

Research fields

- Continuous Software Engineering
- Agile Development
- Cyber-Physical Systems
- Smart Environments
- E-Textiles
- Education in Software Engineering
- Human Computer Interaction



Prof. Bernd Brügge, Ph.D.
<mailto:bruegge@in.tum.de>

Chair for Applied Software Engineering

Staff:

- 1 Professor
- 2 Post-Docs
- 14 Doctoral Students
- 4 Administration

Courses:

- Essentials of Applied Software Engineering
- Software Engineering 2: Project Organization and Management
- Patterns in Software Engineering

Lab Courses:

- iPraktikum
- Agile Project Management

Seminars:

- Teaching iOS
- Agile Project Management
- Software Analytics – Application of Machine Learning in Software Engineering

Average number of students per semester: ~1000

Our Philosophy

“Tell me and I will forget.
Show me and I will remember.
Involve me and I will understand.
Step back and I will act.”
(Chinese Proverb)



iPraktikum Philosophy

- **R**ead clients
- **R**ead problems
- **R**ead data
- **R**ead teamwork
- **R**ead projects
- **R**ead deadlines
- **R**ead delivery



Real Clients

SIEMENS



B/S/H/

NTT DATA

...T...Systems...



Lufthansa

BR¹

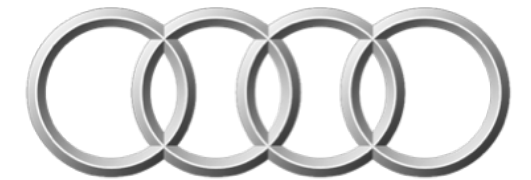
Innoactive.



BOSCH



incapptic



Audi

wirecard

Allianz

adesso



3 O K O W S K Y + L A Y M A N N
Marketing in Computer-Mediated Environments

Carnegie Mellon University

Overview

- Multi-project course with 10-12 projects and ~100 participants
- Development of mobile apps on the Apple Platform combined with sensors, beacons, custom hardware
- State-of-the art agile software development workflows
- Since 2008, 75+ projects and 100+ apps



What do we do?

- We develop prototypes! They are great to
 - Present a product vision
 - Show off the information- and system architecture
 - Solve the main technical challenges (e.g. find appropriate algorithms)
- Prototypes can consist of components for
 - Smartphones, tablets, watches etc.
 - Application servers, sensors, wearables etc.

What do we teach the students?

- During the course of the praktikum, the students are presented with following topics:
 - Swift programming language
 - Project management
 - Scrum (Rugby) development process framework
 - Basic stages in the software engineering process
 - UML Modelling

Course Structure

Program Management

 Lukas Alperowitz
Program Manager

 Dora Dzvonyar
Program Manager

 Bernd Bruegge
Program Manager
Methodologist













Infrastructure

 Helma Schneider
Head of Technology
Administration

 Franz Beilmaier
Technical
Administration

 Monika Markl
Chair Secretary

 Ruth Demmel
Head of Movie Team

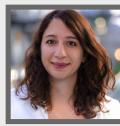
Partners										Cross-functional Teams		
adesso	BMW	BOSCH	B/S/H/	IGNITE Adaptive Sports	Quartett mobile	Roche	SIEMENS	SIEMENS	T-Systems	Coach Instructors		
<p> Olaf Schumacher Adesso</p> <p> Sacha Catein Adesso</p> <p>Project Management</p> <p> Barbara Reichart Project Leader</p> <p> Stefan Kofler Team Coach</p> <p>Development Team</p> <p> Annika Saken</p> <p> Matthias Holdorf</p> <p> Ghulam Nasir</p> <p> Jonas Tomasini</p> <p> Malte Bucksch</p> <p> Sarah Jungwirth</p>	<p> Christoph Kracke BMW</p> <p>Project Management</p> <p> Stephan Krusche Project Leader</p> <p> Florian Kistner Team Coach</p> <p>Development Team</p> <p> Fabian Warthenpfuhl</p> <p> Stefan Reu</p> <p> Christian Eichhorn</p> <p> Daniel Nilsen</p> <p> Markus Jantunen</p> <p> Maria Narazani</p> <p> Patricia Vitoria Carrera</p>	<p> Matthias Schaffer Bosch</p> <p> Renata Soares Bosch</p> <p>Project Management</p> <p> Dr. Yang Li Project Leader</p> <p> Stephan Rabanser Team Coach</p> <p>Development Team</p> <p> Ange Laure Temzeung Kouemo</p> <p> Ingo Glaser</p> <p> Samit Vaidya</p> <p> Agastya Fauzan Alfath</p> <p> Christian Dallago</p> <p> Michaela Pfister</p> <p> Shivguru Rao Bhimasena Visweswera</p>	<p> Pavel Osipov B/S/H/</p> <p>Project Management</p> <p> Dora Dzvonyar Project Leader</p> <p> Alexander Harlass Team Coach</p> <p>Development Team</p> <p> Ekaterina Sebina</p> <p> Dennis Nehrenheim</p> <p> Julian Zurmühl</p> <p> Alexander Maslew</p> <p> Belinda Zahra</p> <p> Fabian Manhardt</p> <p> Sami Amr Afifi</p> <p> Tomas Ruiz</p>	<p> John Humbrecht Ignite Adaptive Sports</p> <p> Alan Apt Ignite Adaptive Sports</p> <p> Bernd Bruegge Global Project Liaison</p> <p>Project Management</p> <p> René Milzarek Project Leader</p> <p> Sajjad Taheri Project Leader</p> <p> Sebastian Stein Team Coach</p> <p> Agnes Köhler Team Coach</p> <p>Development Team</p> <p> Robert Krämer</p> <p> Maximilian Reif</p> <p> Laurence Castagnoli</p> <p> Lukas Heinzmann</p> <p> Samy El Deib</p> <p> Philipp Heuer</p> <p> Aldijana Sakinovic</p> <p> Ding Liu</p> <p> Carmen Breyer</p> <p> Shpend Mahmuti</p>	<p> Leon von Tippelskirch Quartett Mobile</p> <p>Project Management</p> <p> Sebastian Klepper Project Leader</p> <p> Jan Philip Bernius Team Coach</p> <p>Development Team</p> <p> Kilian Käslin</p> <p> Arald Haveriku</p> <p> Jimmy Abu Al Denien</p> <p> Florian Heinz</p> <p> Florian Seppi</p> <p> Manuel Nonnenmacher</p> <p> Teodora Lata</p> <p> Thu Lao</p>	<p> Jens Pflüger Roche</p> <p>Project Management</p> <p> Lukas Alperowitz Project Leader</p> <p> Marius Schulz Team Coach</p> <p>Development Team</p> <p> Thomas Breier</p> <p> Michael Fröhlich</p> <p> Florian Dreier</p> <p> Gaurav Srivastava</p> <p> Irina Camilleri</p> <p> Kirsten Rauffer</p> <p> Tobias Piffrader</p>	<p> Tobias Aigner Siemens CT</p> <p>Project Management</p> <p> Andreas Seitz Project Leader</p> <p> Alexander Meissner Team Coach</p> <p>Development Team</p> <p> Simon Rehwald</p> <p> Ramakant Agrawal</p> <p> Madhukar Sollepura Prabhu Shankar</p> <p> Lara Marie Reimer</p> <p> Monika Varshney</p> <p> Ning Wang</p> <p> Pedro Silva</p>	<p> Dr. Asa MacWilliams Siemens CT</p> <p> Steffen Klepke Siemens CT</p> <p>Project Management</p> <p> Zardosht Hodaie Project Leader</p> <p> Cecil Wöbker Team Coach</p> <p>Development Team</p> <p> Xiaoyu Guo</p> <p> Daniel Gallenberger</p> <p> Francisco Rubin</p> <p> Christian Kiwitt</p> <p> Lukas Steigerwald</p> <p> Marcus Hott</p> <p> Selina Elsner</p>	<p> Dr. Stephan Verclas T-Systems</p> <p> Dr. Raman Tandon WIWeB</p> <p>Project Management</p> <p> Constantin Scheuermann Project Leader</p> <p> Konstantin Kromer Team Coach</p> <p>Development Team</p> <p> Josef Seidl</p> <p> Dimitar Magurev</p> <p> Valeria Chernenko</p> <p> Aly Saleh</p> <p> João Trindade</p> <p> Richard Otto</p> <p> Simon Zimmermann</p>	<p> Lukas Alperowitz</p> <p> Dora Dzvonyar</p> <p> Dora Dzvonyar</p> <p> Florian Kistner</p> <p> Stephan Rabanser</p> <p> Lukas Alperowitz</p> <p> Jan Philip Bernius</p> <p> Konstantin Kromer</p> <p> Andreas Seitz</p> <p> Alexander Harlass</p> <p> Stefan Kofler</p>	<p>Modeling</p> <p>Release Management</p> <p>Merge Management</p>	

Course Structure

Program Management



Lukas Alperowitz
Program Manager



Dora Dzvonyar
Program Manager



Bernd Bruegge
Program Manager
Methodologist

Program Management

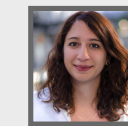
- Project Acquisition
- Education & Methodology
- Event organization

Cross-Functional Teams

Responsibilities

- Modeling
- Release Management
- Merge Management

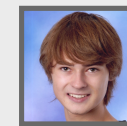
Cross-functional Teams



Dora Dzvonyar



Florian Kistner

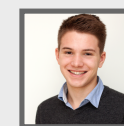


Stephan Rabanser

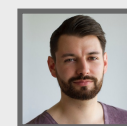
Modeling



Lukas Alperowitz



Jan Philip Bernius



Konstantin Kromer

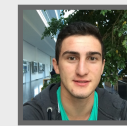
Release Management



Andreas Seitz



Alexander Harlass



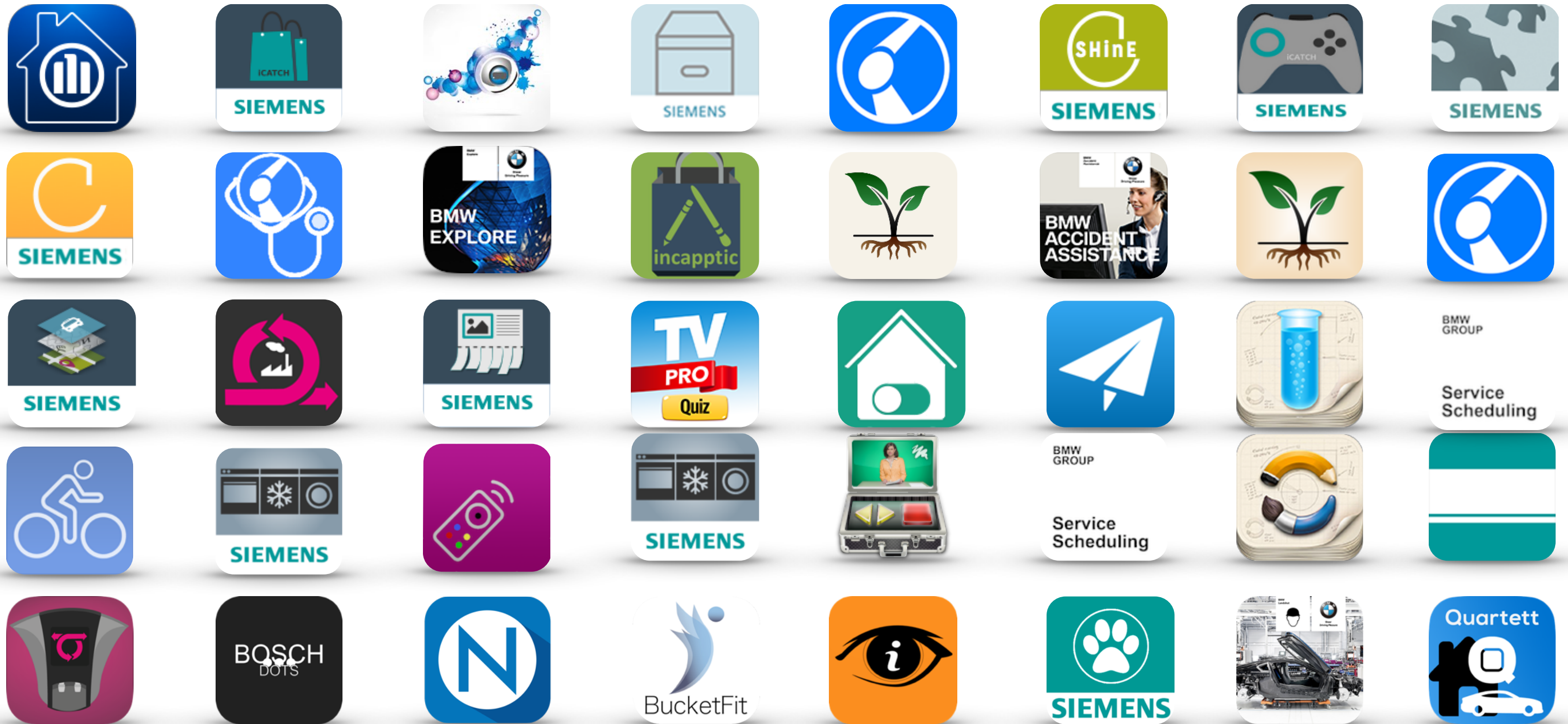
Stefan Kofler

Merge Management

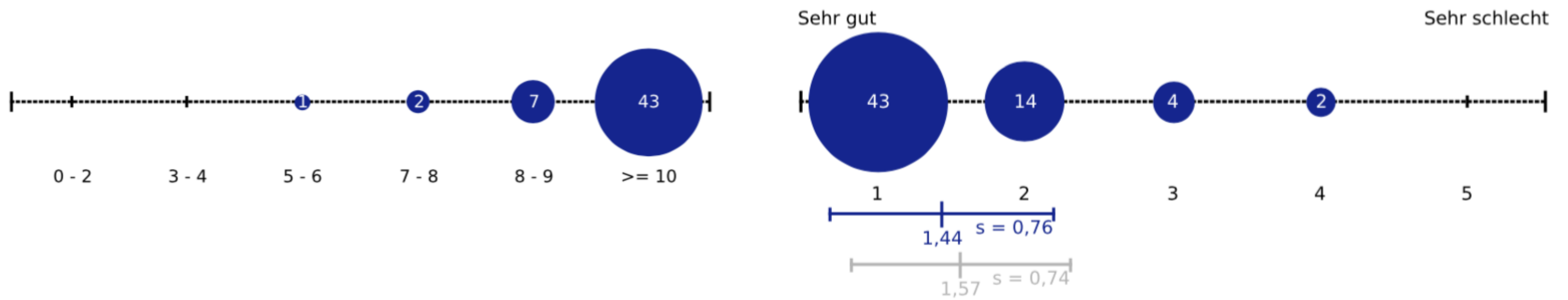
What do we deliver?

- We deliver the following artefacts
 - Source code of the application
 - Documentation (user and developer) for the application
 - Trailer that presents the addressed problem and the proposed solution
 - Rationale documentation
 - Know-how about the technologies used for solving the problem

Over 75 Apps in the last 5 Years



Student Evaluation



Time spent on topics related to the course per week,
during lecture period (14 Weeks)

Overall grade of the course

Conclusion

- We achieve a Win-Win-Win situation:
 - Students get:
 - practical knowledge about “real” software development
 - potential job offer
 - Companies get:
 - prototypes
 - potential employees
 - We get:
 - funding for two PhD positions
 - a chance to learn project management (with international teams)

Thank You for Your Attention