ICC 2009, Dresden, Germany

Industry-Academia Collaborations Panel
June 15, 2009

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Why Industry-Academia Collaborations Panel?

- **Companies depend on innovation to stay competitive – that means tapping the best and brightest minds, some of the finest concentrations of which can be found at universities**

- **Universities depend on cutting-edge research projects that meet the need of the society and the industry – that means strong links to the industry, its information and data resources as well as its experienced researchers that have numerous challenging real-world research problems**

- **The two, therefore, make a perfect match for collaborations**

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Questions/Challenges

Industry Challenges:

What are the most pressing challenges facing industry researchers when seeking younger researchers to Innovate new services & products serving the society? How to reduce the gap between the skills of fresh university graduates and the needs of the industry?

Academia Challenges:

What are the most pressing challenges facing university researchers when suggesting dissertation topic to their PhD students? How to fund research projects and PhD students? How to produce graduates that can immediately be absorbed by the industry and serve the society through research and innovations directly applicable to the industrial needs.

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Questions/Challenges

Joint Challenges:

What are the challenges related to the administrative issues of collaboration including the legal process & procedures as well as protection of the Intellectual Property Rights of academia and industry? How the industry – academia collaboration can benefit both sides in a cost efficient manner resulting in a "win-win" scenario?

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Panelists

Dr. Fiona Williams, **Research Director, Ericson**

Dr. Marek Rusinkiewicz, **General Manager of Applied Research Laboratories, Telcordia Technologies**

Prof. Dr. Hans-Joachim Grallert, **Chair for Telecommunications at Technical University Berlin, Managing Director Fraunhofer Heinrich Hertz Institute Berlin**

Dr. Hendrik Berndt, **CTO & Senior Vice-President of DOCOMO Communications Laboratories in Europe**

Dr. Flavio Bonomi, **Cisco Distinguished Engineer & Head of the Advanced Architecture & Research, Cisco**

AT&T Labs Research
University Collaborations Research Program

ICC 2009, Dresden, Germany

Mahmoud Daneshmand, PhD

Executive Director, University Collaborations Program

AT&T Labs Locations

"People, Purpose and Environment
– The requirements for success"

Dr. James B. Fisk
Head of Bell Telephone Laboratories in 1959-1974

San Ramon, CA

Middletown, NJ

Florham Park, NJ

Austin, TX

Atlanta, GA

AT&T's patent portfolio includes over 6,000, issued and pending applications

Over 75% of our researchers hold a PhD degree

Heritage includes 7 Nobel Prizes

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AT&T Labs, Inc.

The Innovation Engine Behind AT&T's World-Class Technology

- 1,100 of the world's best scientists and engineers

- 130 years of technology breakthroughs and product/service innovation

- Currently involved with over 50 U.S. & International Universities

Austin, TX

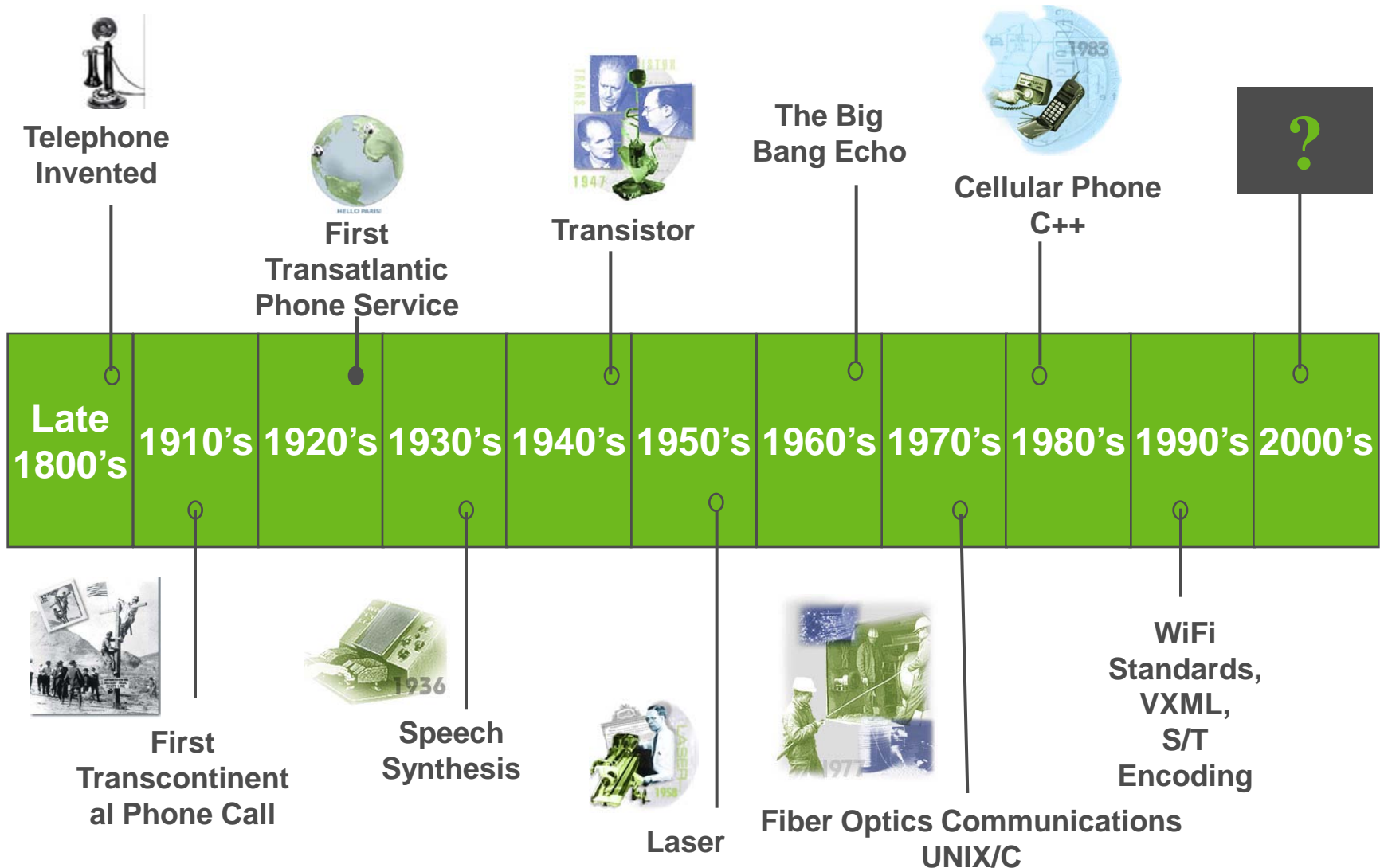Middletown, NJ

Florham Park, NJ

San Ramon, CA

Atlanta, GA

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Making History

Telephone
Invented

First
Transatlantic
Phone Service

Transistor

The Big
Bang Echo

Cellular Phone
C++

?

Late 1800's	1910's	1920's	1930's	1940's	1950's	1960's	1970's	1980's	1990's	2000's

First
Transcontinent
al Phone Call

Speech
Synthesis

Laser

Fiber Optics Communications
UNIX/C

WiFi
Standards,
VXML,
S/T
Encoding

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AT&T Labs UC Research Program
Goal

   To have direct and first hand access to Technology, Knowledge, and Innovations at global academic institutions,

   To maintain and increase vibrant relations with the academic community for the purpose of experience and knowledge sharing,

   To enrich the selection of future full-time research hires,

   To promote joint research collaborations leading to faster industrial innovations and enhanced academic education.

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AT&T Labs UC Research Program

AT&T has a long history of university collaborations – close to 100 years. We have been using many different approaches for our formal university research collaborations. One approach, called VURI (Virtual University Research Initiative) has been more popular.

Let me spend couple of minutes to introduce VURI

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AT&T Labs UC Research Program

VURI (Virtual University Research Initiative)

VURI is a joint research program between Universities and AT&T Labs designed for PhD students to conduct their dissertation research on a problem of interest to AT&T under the joint supervision of their professor and a Labs researcher:

VURI builds teams: (University Professor, PhD Student, Labs Researcher),

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AT&T Labs UC Research Program

VURI (continued)

Each *team* specifies a well defined research problem directly applicable to the AT&T business needs,

The PhD student works as a summer intern at the AT&T Labs,

AT&T supports the educational expenses of the PhD student by providing research funds to the student's
Professor under certain "Gift" and "IP Right" agreements

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University Collaborations

VURI:

25 Universities, 35 Teams, 35 Joint Research Projects, 35 Interns

Annual UC Symposium:

http://www.research.att.com/ucollaborations

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ICC'09
Industry-Academia Joint Research Collaborations

Dr. Fiona Williams

Ericsson Research

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Types of collaboration

- **Bi-lateral cooperation examples**
  - Student thesis cooperation
  - Contracts for specific research
  - Sponsorship of programmes

  - Small scale collaboration
  - Often standard contracts for students
  - Individual contracts for sponsorship

- **Collaborative project examples**
  - Framework Programme projects
  - EIT KIC Clusters
  - National research programmes

  - Standard EU Grant Agreement
  - Standard agreement for national projects
  - Standard agreements on IPR conditions

- **Organisation based collaboration examples**
  - *e*Mobility
  - Wireless World Research Forum

  - No formal legal framework for collaboration (all contributions are in the public space)

Ericsson Research Branches

Sweden
- Kista
- Luleå
- Linköping
- Mölndal
- Lindholmen
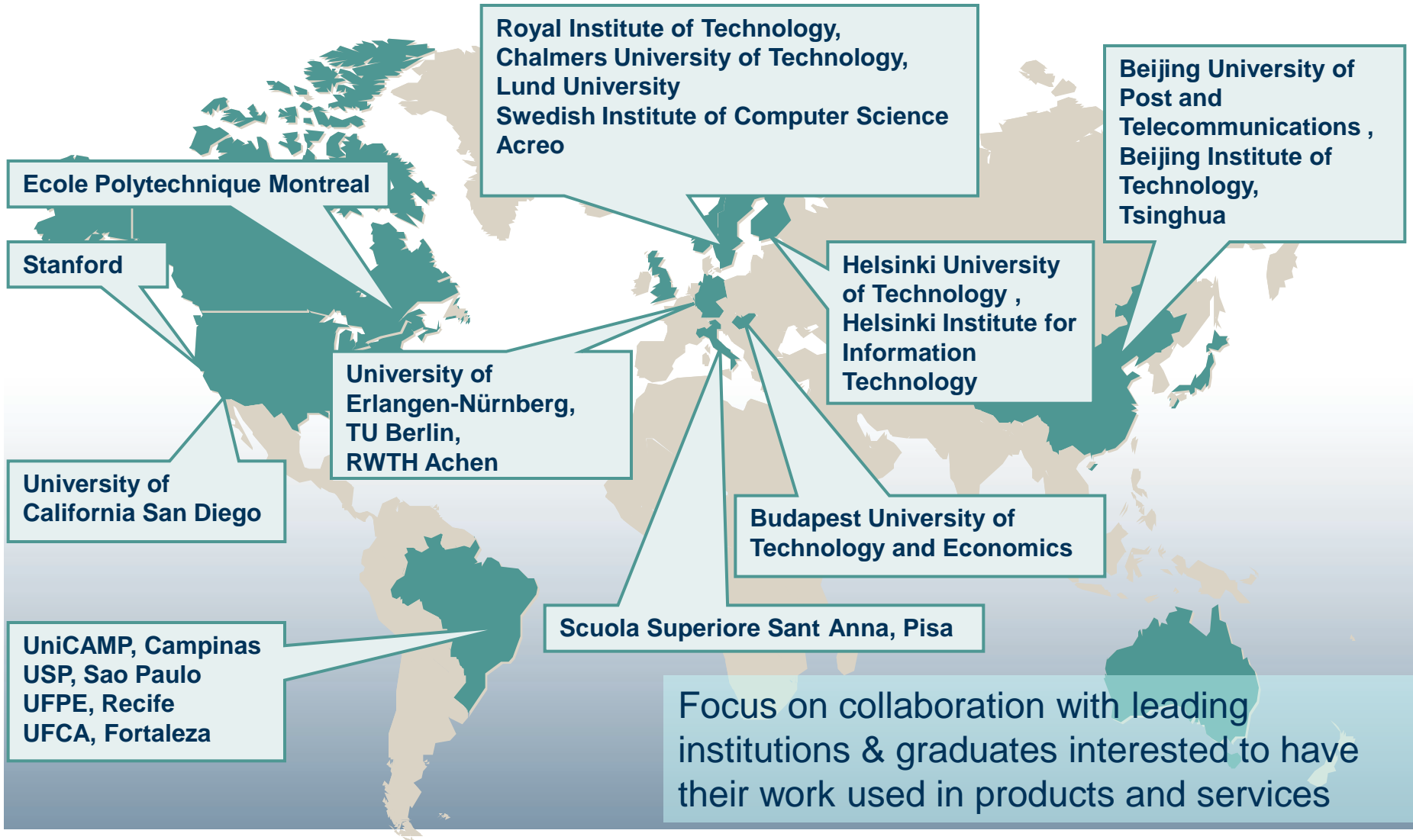- Lund

Montreal

Helsinki

Tokyo

RTP

Aachen

Madrid

Beijing

Silicon Valley

Pisa

Budapest

International Cooperation
Research Institutes and Universities

Royal Institute of Technology,
Chalmers University of Technology,
Lund University
Swedish Institute of Computer Science
Acreo

Beijing University of Post and Telecommunications ,
Beijing Institute of Technology,
Tsinghua

Ecole Polytechnique Montreal

Stanford

Helsinki University of Technology ,
Helsinki Institute for Information Technology

University of Erlangen-Nürnberg,
TU Berlin,
RWTH Achen

University of California San Diego

Budapest University of Technology and Economics

Scuola Superiore Sant Anna, Pisa

UniCAMP, Campinas
USP, Sao Paulo
UFPE, Recife
UFCA, Fortaleza

Focus on collaboration with leading institutions & graduates interested to have their work used in products and services

Technology Leadership
Ways of working
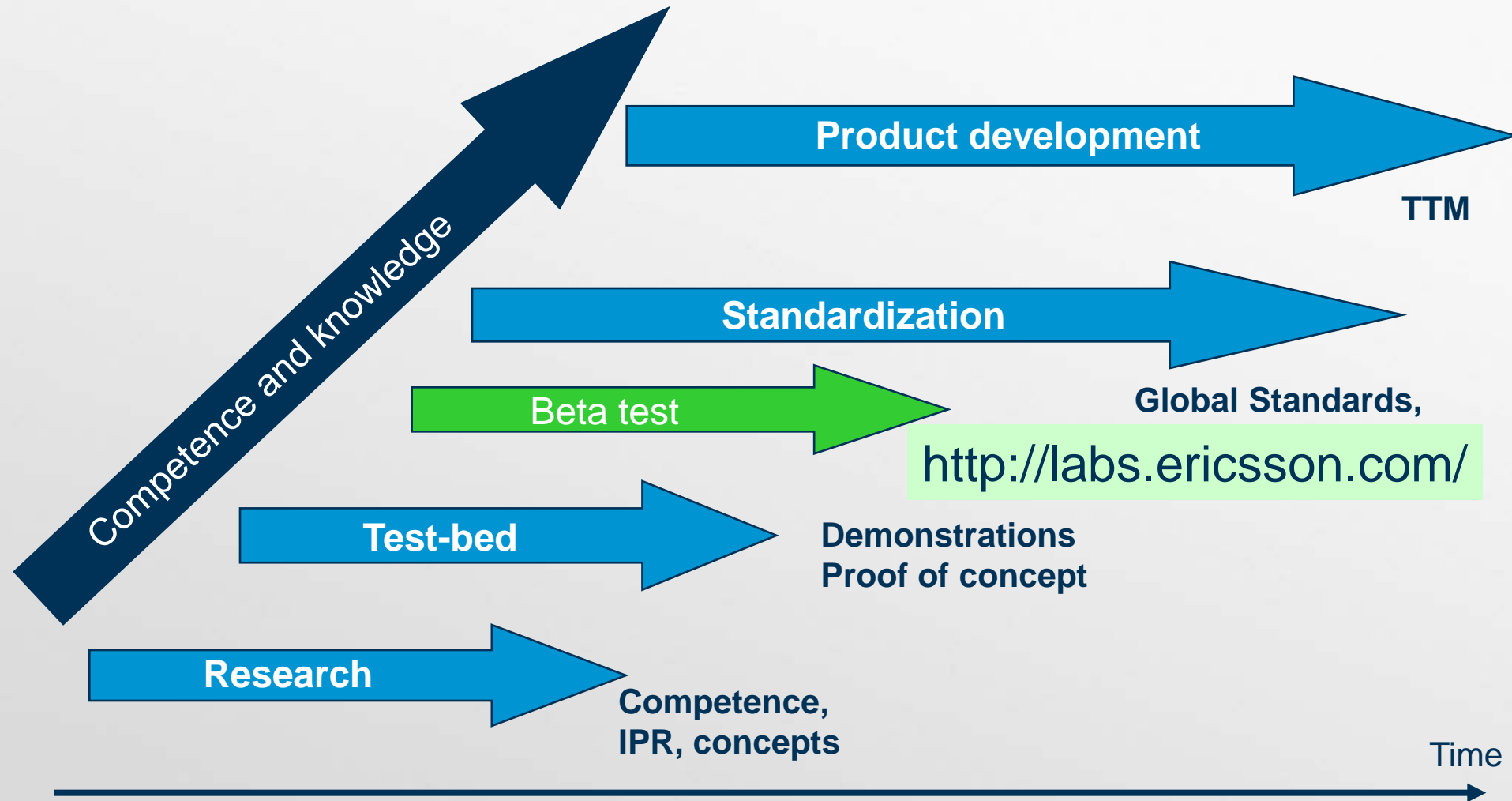
eMobility Vision of *Daily Life* in 2020

eMobility
(Connect to the network community)

Freetime **Entertainment** **Work**

Utility

Doing
(alone)

Talking &
Messaging
(person-to-person)

Sharing
(one-to-some)

Automating
(machine-to-
machine[s])

Publishing
(one-to-many)
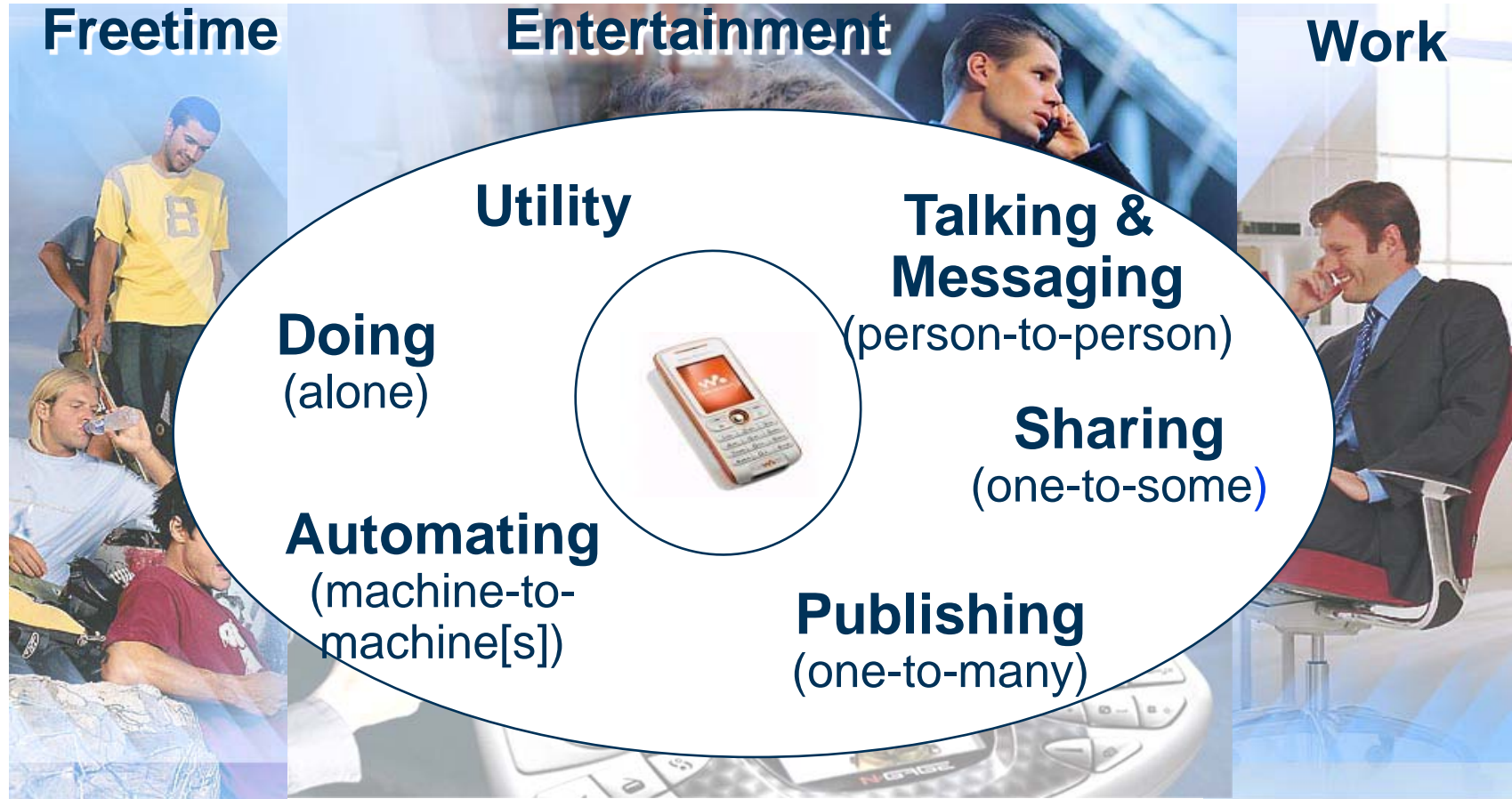
SET – Simplicity, Efficiency and Trust

Membership – 623 members

eMobility
(Connect to the network community)

Map legend:
- 0-5 members
- 6-10 members
- 11-20 members
- 21-40 members
- 41-60 members
- 61-100 members

Total number of members 623

Industry **126**
Research **222**
SME **243**
Liaison 32

Steering Board of
22 members
(all elected)
+
Expert Group
Mirror Group
Executive Group

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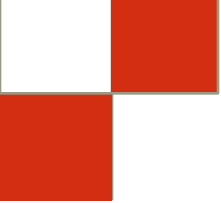
Marek Rusinkiewicz
Telcordia Applied Research Laboratories
marek@research.telcordia.com

June 2009

Telcordia Applied Research Labs
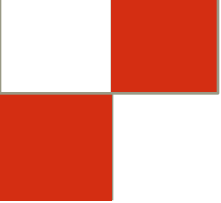
- Over 250 researchers in telecommunications engineering, computer science, math and information technologies, with labs in New Jersey, Maryland, Texas, (Taiwan, Poland)
- Renowned for research and development in areas of ADSL, ATM, ISDN, SONET, Video on Demand, Voice-over-IP, software testing technologies, malicious code detection, etc.
- Core competence in:
  - Network and Services Management, Security and Integrity, Optical Networking and Broadband Access, Mobile IP, Wireless and ad-hoc Networking
  - Software technologies, Network Security, Information analysis and assurance, Mathematical Sciences/Statistics
- A source of industry leadership and innovation
  - Among leaders in patent citations, with more than 1800 patents issued worldwide
  - Major contributor to standards and industry forums
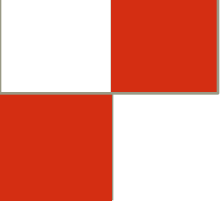
Industry-Academia Collaboration Issues

- Industrial labs have good insights into real research problems, but the information sharing is often complicated by competition-sensitiveness
  - Abstraction into challenge problems
  - Dialog about important hard problems and models
- Industrial labs have access to real data, but our ability to share them is restricted by confidentiality requirements
  - Data obfuscation and anonymization
  - One approach: publish data a sets of (measurements) points in metric spaces
  - Computation on encrypted data
- Reproducible research over standardized sets of test data

Industry-Academia Collaboration Mechanisms

- Sabbaticals, internships, summer jobs for academics at industrial Labs
- Adjunct positions for industrial scientists at Universities
- Term Projects, Master Projects, Dissertation Topics
- Industrial Advisory Boards
- Curricula
  - Conflict between the emphasis on solid foundations (math, reasoning) and the desire to cover "marketable skills"
  - One promising approach uses threads,
    - CS + x
    - Communications + X
  - Network Science – social, information, communications
  - Liberal arts based network engineering program?

Major Problem that Needs to be Solved: Intellectual Property

- University want on their share of IP revenues, but often they are not well prepared monetize IP
- Funding models for engineering research
  - Industry funded research – no IP rights for Universities
  - DARPA – government use rights, with the commercial rights retained by the research institution
  - EU Frameworks -- IP agreements up-front
  - NSF -- no funding for industry (resulting sometimes in "academic" projects and unsupportable claims)
  - Cost-sharing is not a panacea and presents problems for all parties

The biggest challenge university graduates face

when finishing university and starting in the industry

is the change of working cultures

Needed Skill Sets

- Industry needs skilled people able to identify real-world problems, strip them to their core and look up for solutions

- Innovative solutions come up only with open-minded people that possess a very wide view on the problem scope and the range of possible approaches able to solve it

- Essential is to move researchers from academia closer to real problems, the ones that industry looks at everyday. Industries should inform through seminars, invited lectures etc. about the people they are searching for

Pure Research vs. Industrial Problems

➜ The challenge of exciting a PhD student for research relates to the contrasting needs of the pure research world - looking always for ground-breaking ideas - even worse research for the purpose of research, & the industrial world - often focused on short-term solutions for the most pressuring market needs

Pure Research vs. Industrial Problems

➜ But graduate students can be attracted from the perspective of getting a PhD by engaging in research tasks that at the end bring them directly in touch with the industrial world - without losing 4-5 years in limbo, whose exit is only the academic research

➜ Collaborations help Universities to better understand the industry problems

● Sometimes real world problems serve as door openers for further scientific work

The role of academia is to

give the instruments,

the role of industry is to tell

which tune to play
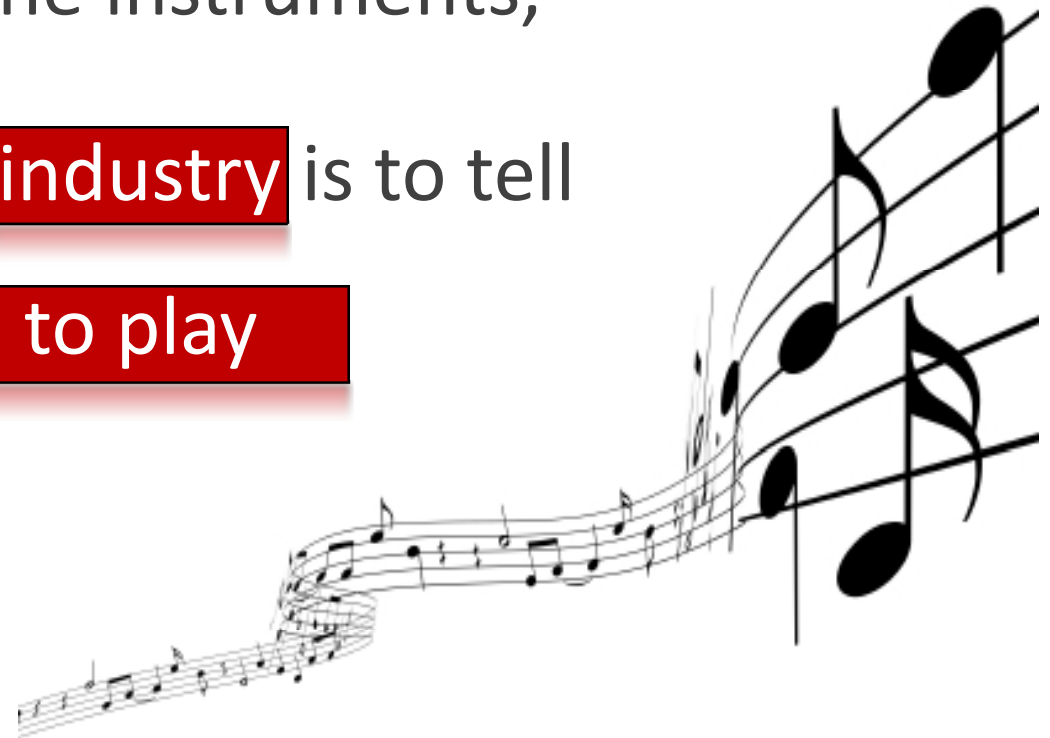
"Win-Win" Scenario

- **Academia** should not pressure to much on making money out of IPRs that result from industry collaboration.
  It can benefit from industrial collaborations in many other ways e.g. creating a cutting-edge research pool, where companies invest their money, giving importance and credibility to the university attracts students and researchers to study and work there.

- **Industry** provides its presence, creates new facilities, research labs, jobs. The outcome of research can also be conveniently serve the community e.g. industry's funded research is deploying its inventions to improve services available across the campus.

Academia is more concerned with publications, while...

Industry research concerns the transfer of results!

Mobile Adventure

Thank you

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Short Introduction

Hans Grallert

- **7 ys   Technical Universities**
- **23 ys   Industry (Research, Development, Management, CEO)**
- **5 ys   Managing Director of Fraunhofer Heinrich Hertz Institute, (240 employees, Budget 25 mio €), Chair for Telecommunications at Technical University Berlin**

Fraunhofer Association:

- **Largest Organisation for Applied Research in Europe**
- **Model of Performance based Financing,**
- **Support of Industry with Research and Development**

Talk is mainly restricted to situation in Germany and Europe

**Institute for Telecommunication Systems
Chair for Telecommunications**

Deutschland
Land der Ideen
Ausgewählter Ort 2009

Fraunhofer
Heinrich Hertz Institute

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Research Funding in Germany and Europe

Germany

Hightech Strategy, Focus on 17 strategic fields
Information and Communication technologies

……
Increase of collaboration between economy and sciences
Fast conversion of research results into products, services…..
Special funding programmes and support for SMEs

Europe

FP7: Framework Programme for Research and Technological Development
strengthen the scientific and technological base of European Industry

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Heinrich-Hertz-Institut

Prof. Dr.-Ing. Grallert

Industry Challenges (1):

What are the most pressing challenges facing industry researchers when seeking younger researchers to innovate new services and products serving the society ?

Work is accomplished in teams

    Lack of economical, social and legal competencies

    Faster access for researchers with experience in cooperation projects

Industry Challenges (2):

How to reduce the gap between the skills of fresh university graduates and the needs of the industry?

To much focus on high qualified researchers (PhD, post-docs) ?

Establish a looking forward plan about the needs of the industry

Professors have a lack of industry experience

Young graduates have to be prepared for lifelong learning

Sabbaticals for industry engineers ?

No complains about too less engineers, too less women ???

Academia Challenges (1):

What are the most pressing challenges faced by university researchers when suggesting dissertation topics to their PhD students?

Find research topics, where industry is interested in
topics out of common research projects
makes transition to industry easier for the PhD

Conflict publishing vs. not publishing
Universities are interested in and dependant on publishing (ranking, citation indices…)
Industry to avoid publishing because competition

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Prof. Dr.-Ing. Grallert

Academia Challenges (2):

How to fund research projects and PhD students?

Refer to Research Funding in Germany and Europe

> **Most of projects are not funded by 100%**
> **Expectation of financing by industry or**
> **research institutes have to have admission to sell / licence results**

Need for more 100% funded projects,
> **e.g. basic research, less interest from industry**

Academia Challenges (3):

How to produce graduates that can immediately be absorbed by the industry and serve the society through research and innovations directly applicable to the industrial needs

Refer to Industry Challenges (2)

Too much focus on high qualified researchers (PhD, post-docs) ?
 > need for well qualified engineers

Establish a looking forward plan about the needs of the industry

Professors have a lack of industry experience

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What are the challenges related to the administrative issues of collaboration including the legal process & procedures as well as protection of the Intellectual Property Rights of academia and industry?

Industry wants to own all results exclusively

    Legal sitatuation in Germany:
Inventions belong to inventors > work contract > employers (universities, research institutes, etc)
> employers own all rights

As long as there is no 100% funding of universities and research institutes they have to make money of patents

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Joint Challenges (2):

How the industry – academia collaboration can benefit both sides in a cost efficient manner resulting in a "win-win" scenario

Industry finances more Ph. D. students.
For the industry this is a cost efficient manner to stay on top with cutting-edge research and for the University this is a good opportunity to have close contacts with industry and an enabler for high-level research projects.

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Berlin

Thank you very much !

Prof. Dr.-Ing. Hans-Joachim Grallert

http://www.hhi.fraunhofer.de

Institut für Telekommunikationssysteme
Lehrstuhl für Nachrichtentechnik

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