POSITIONING COMPUTER SCIENCE IN A UNIVERSITY - RESEARCH PERSPECTIVE VERSUS MANAGEMENT PERSPECTIVE

Gabriele Anderst-Kotsis
Johannes Kepler University Linz, Austria
Computer Science in the Scientific Landscape
- Classification of disciplines
- Research staff
- Research output

Computer Science at (Austrian) Universities
- Contributions to objectives and key performance indicators
- Organisational structures
- Expectations

University Management and Computer Science
- Involvement of computer scientists in management positions
- (How) should we manage (computer) scientists?
- Expectations

Impact of/on Interdisciplinary Work
- Mutual understanding
- Joint Projects
- Academic careers in interdisciplinary fields
COMPUTER SCIENCE IN THE SCIENTIFIC LANDSCAPE

- Classification of Disciplines
- Science Theory
- European Union
- Worldwide Academic Organisations
- Statistik Austria
## Classification of Disciplines (ÖFOS 2002 versus 2012)

<table>
<thead>
<tr>
<th>Code</th>
<th>Element</th>
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<tbody>
<tr>
<td>1</td>
<td>NATURWISSENSCHAFTEN</td>
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<tr>
<td>101</td>
<td>Mathematik</td>
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<tr>
<td>102</td>
<td>Informatik</td>
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<tr>
<td>103</td>
<td>Physik, Astronomie</td>
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<td>Chemie</td>
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<td>Geowissenschaften</td>
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<td>Biologie</td>
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<td>107</td>
<td>Andere Naturwissenschaften</td>
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<td>2</td>
<td>TECHNISCHE WISSENSCHAFTEN</td>
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<td>6</td>
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COMPUTER SCIENCE IN THE SCIENTIFIC LANDSCAPE

- Research Staff: 4.5% in Computer Science Austrian wide
COMPUTER SCIENCE IN THE SCIENTIFIC LANDSCAPE

- Research Output: 4.5% in Computer Science Austrian wide
COMPUTER SCIENCE IN THE SCIENTIFIC LANDSCAPE

- A variety of views on „Informatics“
  - Applied Mathematics
  - Engineering Science
  - Interdisciplinary Research versus new Scientific disciplines
  - Information Technology
  - Office Programs
  - Its the future, but not mine (young girl at career fair)
COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

- Contributions to objectives & KPIs
- Organisational structures
- Expectations
COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

Objectives of an University

COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

- Performance Indicators

- Try to measure and quantify the achievements (against the objectives?) of an institution
  - Rankings (U-Multirank)
  - University Reporting Systems (JKU Fodok, Wissensbilanz)

- Can be used to allocate budget to organisational units
  - Within the University
  - In Austria „formelgebundenes Budget“

- Is it possible to quantify the contribution of individual disciplines?
- Is interdisciplinary work reflected or considered?
COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

- Performance Indicators – U-Multirank

- Categories
  - Teaching and Learning
  - Research
  - Knowledge Transfer
  - International Orientation
  - Regional Engagement

- One indicator are Interdisciplinary publications
### COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

- Performance Indicators – U-Multirank
- Allows to drill down for individual subjects

#### Computer Science, Master

<table>
<thead>
<tr>
<th>Teaching &amp; Learning</th>
<th>Score</th>
<th>Other universities</th>
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<td>Graduating in time</td>
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#### International Orientation

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COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

Performance Indicators – JKU Fodok

Aufsatz / Paper in Tagungsband (releviert)
Performance Comparison of Information Encoding in Droplet-based Microfluidic Systems


Details
Buchtitel: Proceedings of the 3rd ACM International Conference on Nanoscale Computing and Communication
Erscheinungsjahr: 2016
Seitenreferenz: 37.1 -- 37.2
Anzahl Seiten: 2
Web: http://doi.acm.org/10.1145/2967446.2967483
DOI: http://dx.doi.org/10.1145/2967446.2967483
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ISBN: 978-1-4503-4061-8
Reichweite: International

Beteiligte
AutorInnen / HerausgeberInnen: Assist.-Prof. Dr. Werner Haselmayer, Dr Christian Wirth, Andreas Buchberger, Univ.-Prof. Dr. Andreas Springer

Forschungseinheiten:
100.0% Institut für Nachrichtentechnik und Hochfrequenzsysteme

Wissenschaftszweige: 202030 Nachrichtentechnik | 202037 Signalverarbeitung | 202038 Telekommunikation

www.jku.at/fodok
# Performance Indicators - Wissensbilanz

<table>
<thead>
<tr>
<th>Wissenschafszweige (lt. Statistik Austria)</th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
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<tr>
<td>1 NATURWISSENSCHAFTEN</td>
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JKU Wissensbilanz 2015
COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

- Performance Indicators

![External Funding Pie Chart](chart.png)

Wissensbilanz der Österreichischen Universitäten 2015

Dean´s Workshop | Oct 24 2016
Performance Indicators:
- 80 Active Students per Prof (FTE)
- 4.6% of student subscriptions in CS
- 3.6% of active students in CS
- 3.75% of Completed studies
COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

Performance Indicators

![Diagram showing scientific staff distribution by gender and teaching FTE distribution by gender.]

Wissensbilanz der Österreichischen Universitäten 2015

Dean’s Workshop | Oct 24 2016
COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

- Organisational Structures
  - „CS only“ units
    - School of Computer Science, Fakultät für Informatik, Fachbereich Informatik
  - Embedded into larger structures
    - Department(s) of Computer Science (or even more specific identifiers for professor positions) as sub-units of schools or other organisational units
  - Matrix-oriented Structures trying to combine the advantages of both (and bearing the risk of adding the disadvantages of both)
COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

- Example JKU

- JKU | Informatik: The largest field of teaching @ TNF
  - ~ 1800 Students (Bakk, Master, PhD)
  - ~ 370 different courses / year
  - ~ 7000 exams / year
  - largest number of outgoing students of the TNF
COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

- Example JKU

- JKU | Informatik: Research Funding
  - 5.8 Million EUR external research funding p.a.
  - EU Projects
  - 2 CD Labs
  - 1 NFN
  - FWF projects
  - FFG projects
  - Wittgenstein award
  - ERC Grant
COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

Example: JKU
COMPUTER SCIENCE AT AUSTRIAN UNIVERSITIES

- Expectations

- Comparatively large number of students per professor for technical subject, but lower number of “active” students
- Need for better integration of working students
- Specific scientific culture should be better reflected in KPIs
- Interdisciplinary work should be more visible, e.g. included in KPIs
UNIVERSITY MANAGEMENT AND
COMPUTER SCIENCE

- Involvement of computer scientists in academic management positions
- (How) should we manage (computer) scientists?
- Expectations
UNIVERSITY MANAGEMENT AND COMPUTER SCIENCE

- Involvement of computer scientists in management positions

![Bar chart showing involvement of computer scientists in management positions across different faculties at 8 Austrian universities.](chart.png)

- Web sites of 8 Austrian Universities (JKU Linz, TU Graz, TU Vienna, Uni Innsbruck, Uni Klagenfurt, Uni Salzburg, Uni Vienna, WU Vienna)
UNIVERSITY MANAGEMENT AND COMPUTER SCIENCE

- Involvement of computer scientists in management positions

Web sites of 8 Austrian Universities (JKU Linz, TU Graz, TU Vienna, Uni Innsbruck, Uni Klagenfurt, Uni Salzburg, Uni Vienna, WU Vienna)
UNIVERSITY MANAGEMENT AND COMPUTER SCIENCE

- Expectations

- CS rather seen for its merits in research than in teaching
- CS Departments strong in acquisition of third party funding without requiring large investments in infrastructure
- Other disciplines reluctant to vote for a computer scientist?
UNIVERSITY MANAGEMENT AND COMPUTER SCIENCE

■ (How) should we manage (computer) scientists?

■ Computer scientists know what’s technically feasible / useful, we do not accept a “that’s impossible”

■ We are addicted to obtaining and processing information

■ Keep intrinsic motivation at a high level
IMPACT OF/ON INTERDISCIPLINARY WORK

- Mutual understanding
- Joint Projects
- Academic careers in interdisciplinary fields
IMPACT OF/ON INTERDISCIPLINARY WORK

- Mutual understanding
- Engage in University-wide management functions to learn about the specific characteristics and need of other disciplines
- Dedicate time to listening to talks beyond the own subject
- Create an atmosphere for social interaction across disciplines
IMPACT OF/ON INTERDISCIPLINARY WORK

- Joint Projects

- Difficulties in evaluating interdisciplinary work
  - Finding appropriate reviewers
  - Lack of accepted criteria in comparing the merits with other projects / disciplines
IMPACT OF/ON INTERDISCIPLINARY WORK

- Academic careers in interdisciplinary fields

- Each discipline has specific criteria and requirements, interdisciplinary work must meet them all
  - Possible for joint projects, but difficult in evaluations of individuals

- Many steps in the scientific career depend highly on the embedding into one specific discipline (PhD, Habilitation, …)
CONCLUSIONS

There seems to be an agreement on the value and importance of interdisciplinary work, but there is a lack of mechanisms, indicators, incentives or rewards to promote it!