Industry and Academia: Why Practioners and Researchers are Disconnected.

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Abstract

The industrial world and the academic world have grown far apart. The distance between the worlds primarily originates from different goals and different means of support. This is a problem in the areas of systems engineering and multidisciplinary design. These areas are relatively young, providing lots of opportunity for research. Education in this area is scarce. Publications are tangible examples of the gap between the two worlds.

In this paper we discuss the needs of both communities with respect to publications, education, and research. The mutual understanding of each other’s needs may help to bridge the gap between academics and industry.
Practitioners and Researchers are Disconnected

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Reflection  Time pressure  Products
Evidence  Pragmatics  Sales
Exposure  Cost constraints  Lots of people
Education

 GAP

Academics  Industry

Results  Problems

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From Mono-Disciplinary to System

- multi-objective design methods
- performance and resource prediction
- single aspect design method
- hybrid methods
- HW/SW codesign
- robustness
- cost
- performance
- reliability
- evolvability
- process organization, people

Legend:
- well defined
- rather soft
- well defined but soft

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version: 0.6

GiAmethodLayers

Mechanical Engineering
Electrical Engineering
Software Engineering
The Gap-Size is Multiple Orders of Magnitude

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GIApyramid
Industry and Academia: Why Practitioners and Researchers are Disconnected.
Industrial Criteria for Articles

- Valuable
- Useful
- Subject
- Industrial relevance of subject
- Goal, solution oriented
- How to
- Practical
- Broad
- Integral
- Other contributors are reviewers
- Single author
- Clear responsibility
- Pointers to related relevant information
- Clear description
- Juicy description
- Understandable
- Lots of signal, very low noise level

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subject
scientific relevance of subject
knowledge oriented
why, what
all contributors are authors
pointers to related scientific work
clear argumentation
every statement is supported by
reference, verifiable facts
correct language
clear positioning, well linked in
with existing scientific work
new
original
deep
including reviewers
more context information
competitors
used existing science
self citations are not-done
blocks broadly interested scientists in development
strong cultural filter in scientific magazines and conferences
Economic Viewpoint on Publications

Industry:
+ writing and reading publications is a cost
+ publications are useful for PR

tension with Intellectual Property Rights (IPR), confidentiality

Academics:
+ number of publications and citations determines standing and funding

limits change of research area, because you have to rebuild a reputation and to bootstrap background know how
Comparing the Industrial and Academical Viewpoints

<table>
<thead>
<tr>
<th></th>
<th>industrial</th>
<th>academical</th>
</tr>
</thead>
<tbody>
<tr>
<td>relevance</td>
<td>useful, valuable</td>
<td>new, original</td>
</tr>
<tr>
<td>orientation</td>
<td>goal, solution</td>
<td>knowledge</td>
</tr>
<tr>
<td>content</td>
<td>practical, how to</td>
<td>theoretical, why, what</td>
</tr>
<tr>
<td>style</td>
<td>clear, understandable, juicy, low noise</td>
<td>clear argumentation, no loose statements</td>
</tr>
<tr>
<td>references</td>
<td>service to the reader</td>
<td>positioning in existing science</td>
</tr>
<tr>
<td>author</td>
<td>single author</td>
<td>all contributors as author</td>
</tr>
<tr>
<td>economic driver</td>
<td>writing and reading = cost public relation vs IPR and confidentiality</td>
<td>funding based on number of publications and citations</td>
</tr>
</tbody>
</table>
writing facilitates overview and understanding

writing milestones help to focus on results

stops endless wandering
Different publications needed for industry and academics

some re-use via copy/paste

But how to share information between the worlds?

And how to cross fertilize, how to get inspiration from the other world?

Industry: how to outsource education to academic community?

Academics: how to enter the unknown area?
The Embedded Systems Institute (ESI) solution:
collaborative research;
seeding for long term (10-15 years) renewed respect