

# University - Steel Industry Interaction

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Cooperation between the steel industry and Universities presents the potential for great mutual benefit. Benefits to the steel industry include: 1) access to inexpensive research to gain a deeper fundamental understanding of manufacturing processes in order to improve both efficiency and product quality; 2) access to inexpensive research to understand structure - processing - property relationships necessary to develop new products that can extend the market for steel; 3) access to new people with the technical and management skills needed to lead the steel industry into the next century. Benefits to the University include: 1) research funding; 2) direction to ensure relevant research; 3) a job market for graduating students. To be successful, it is important that each institution understand the capabilities and needs of the other.

Research advances in steel manufacturing processes need industry and Universities working together. Economic pressures are making it more difficult for the research departments at individual steel companies to justify the generation of fundamental research results on their own that will be of ultimate benefit to the entire industry. Universities, on the other hand, are ideally suited to work on problems of common interest to many different companies. This work can be funded, for example, by consortiums of several companies, where a small amount of funding from each company can go a long way. Where fundamental issues of common practical importance can be identified, such projects also can (and should) attract matching funds from government agencies, such as the National Science Foundation in the U.S.A.

Universities have access to laboratory equipment, advanced computers and software, libraries, and a wide range of fundamental understanding. These tools need to be supplemented, however, as Universities do not have the actual commercial-scale plants needed to generate the experience and data that is essential for producing relevant projects, validating the results, and implementing

them into practice. University research needs direction from industry. It is important to carefully choose the fundamental problems to work on, in order to ensure that they are the most relevant. In addition, the important interactions and constraints between processes, which may be well known to the experienced industry researcher with extensive background on the entire system, are often not appreciated by the University researcher who specializes in one process or phenomenon. As research funding and job markets become more competitive, Universities are seeking increased interaction with industry.

The role of industrial researchers is also changing. Instead of developing the mathematical models and performing the bench-top experiments in-house, more companies are employing Universities, suppliers, and other outside contractors for these important tasks. Industry researchers increasingly play a management role in overseeing their outside projects, in addition to keeping current with other projects and literature relevant to the interests of their company. Their in-house research projects also need to target specific problems of interest to their company. Industry researchers also have the important responsibility of ensuring that new knowledge is actually implemented in their plant. Thus, industry researchers should be involved in plant trials to identify the nature of their problems, and to test and implement solutions. Continuous quality improvement demands that there should always be a plant trial underway. These tasks are not easy for outsiders (such as those at the University) to take on.

Universities can also be centers for technology transfer. This means more than just placing trained students into industry positions where they can immediately apply their knowledge. The knowledge gained from University research is generally well archived, both in the literature and in the faculty. University faculty often stay in their specialized field of expertise longer than their industrial counterparts. Thus, they can offer short courses to train industry personnel who often move between jobs, even while at the same company. The collection and archiving of knowledge and the effective teaching and distribution of that knowledge is one of the hallmarks of the University institution, and should be exploited to its fullest.

In conclusion, the interaction between Universities and the steel industry should increase in the coming years, for the benefit of both.