



# Academia-Industry Partnerships: an overview and some 'real-life' examples

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**Why academia-industry partnerships?** Industrial collaboration is a way to transfer university-generated research findings into innovative products that will benefit society and stimulate economic growth. The issue of partnering between industry and academia is gaining increasing momentum simply because of the fact that companies need innovative ideas to ensure profits and competitive advantage in market, while academic researchers need additional funds to sustain research and faculty productivity<sup>1</sup>. A survey performed nearly 25 years back in the USA revealed

that per dollar invested, industry-supported university research in biotechnology is generating four times as many patent applications as is otherwise<sup>2</sup>. To date, about half of the biotechnology firms in USA have collaborative agreements with universities and account for nearly one-fourth of all funding for biotechnology research<sup>3</sup>. The bottlenecks still are recognition of potential of research at universities by the companies and special emphasis paid by universities to approach the companies.

**What are different ways and forms of partnering?** Partnering with industry can be in form of a collaboration for co-development of product/technology, which is a case of joint IP ownership or it could be in form a sole sponsorship by industry or contract research, where the industrial partner often holds the IP rights. Other common forms of partnering are consortia, cooperative research programs, joint commercial ventures, out-licensing of intellectual property to companies, shared use of facilities/equipment's, company equity held by university/research institute, consulting arrangements, and jointly run research facilities.

## **Common advantages and disadvantages of partnering between academia and industry<sup>3,4</sup>:**

Benefits to academic sector:

- industry sponsored/collaborative work is better planned and goal-oriented;
- potential financial rewards (sponsorship, service fees, revenues from patents, licenses etc.);
- a mean to decrease dependence on/ bridge the gaps in government funding;
- access to cutting-edge scientific equipment and facilities which are not always available at research institutes/organizations, thereby improving quality of research and training;
- enhanced institutional prestige that helps to attract top students, competent faculty as well as to acquire available public funds;
- transfer of technology to industry for greater benefit to society, which is a prime goal of nearly all public funding schemes.

Benefits for industry:

- higher prospects of the collaborative work resulting in product/process licenses, patents etc.;
- ease in keeping track of important, current research, thereby stimulating companies' internal research and development programs;
- reduction in costs of intensifying R&D programs in a new field;

- enhancement of the company's public image (joint publications are often used as a public relations tool by companies to add to their prestige);
- training and development platform for company scientists;
- maintaining a better position in market competition, by having a strong product portfolio and multiple products in pipeline;
- companies, as research sponsor have the first right to decide about exploitation of joint patents (e.g. selling or out licensing to others). This is how the companies can achieve leading position in given sector.

*Common concerns and risks for academic sector:*

- biased research agenda: there is a risk of industry-set research agenda being biased, whereby the resources are targeted solely or prominently towards those activities that increase income for the industry;
- ownership and secrecy issues imparting hurdles for the free flow of information and materials among scientific coworkers;
- delays in publications and restrictions on data getting published that may constitute 'trade secret' for the company involved;
- reduced quality of research and conflicts: this happens especially when the university research reflects unfavorably on the product that the industrial partner is dealing with in the market <sup>3</sup>.

*Problems for Industry:*

- The research institute's inability to grant exclusive rights for intellectual property to industry could be a point of dispute. The institutes/universities often tend to retain rights to use the knowledge for further research and training purpose.
- When multiple parties are involved in the collaboration (e.g. consortia), the designation of intellectual property rights and the subsequent decision making may become complex.
- Investing in collaborative research at low technology-readiness level involves risks.
- Maintaining secrecy about company's proprietary information may become difficult in academic environment.

Despite of above mentioned concerns and risks, a survey of over 1200 faculty members at 40 major universities in the USA reveals that biotechnology researchers with industrial support publish at higher rates, patent more frequently, participate in more administrative and professional activities, and earn more than colleagues without such support. Majority also agreed that such arrangements involved less 'red tape' than does Federal funding and increased the rate of practical applications from basic research<sup>2</sup>. As the collaborative arrangements between academic and industrial sectors have evolved over the time and the experience has grown, some of the most worrisome difficulties have been resolved, or never realized<sup>4</sup>. The challenge is to find ways to manage these relationships to enhance the benefits, while minimizing the shortcomings.

***Measures that a university/research institute can take to minimize the risks associated with industrial collaborations <sup>2,4</sup>:***

The collaboration agreements/contracts should take care of:

- specific scope of the agreement (e.g., particular research area(s), time frame, geographical limitations, etc.);
- the right to publish research results timely (with modest delays for companies to file patents);
- rights to disclose and disseminate the research results while also protecting company's proprietary interest in that information;
- right to use the research results/know-how to support further research at university/research institute;
- clearly defined policies for intellectual property ownership and exploitation, dissemination, communication, etc.
- clearly defined responsibilities for the collaborating parties

The gap between laboratory research and the real-life application has to be bridged. This could be best achieved through partnering between academia and industry, which builds capacity to do things neither partner could do alone.

### **References:**

1. Why university-industry collaborations in biotechnology matter. Guest post written by Anthony M. Boccanfuso (2016) Forbes report.  
(<https://www.forbes.com/sites/gmoanswers/2016/01/19/university-industry-collaboration/#659576127d35>)
2. University-industry research relationships in biotechnology: Implications for the university. Blumenthal, D., Gluck, M., Louis, K. S., *et al.*, (1986) *Science*, Vol. 232, 1361- 1366
3. University-industrial research collaboration: Advantages and disadvantages of the collaborative relationships. Article by Lisa M. Jones. *Education Encyclopedia*: StateUniversity.com
4. University-industry research arrangements in biotechnology. Minsky L. (1982) *New developments in Biotechnology: US investment in Biotechnology*. Chapter 7.



### ***Some examples of academia-industry partnering in agriculture:***

1. September 08, 2016 - Bayer and Forschungszentrum Jülich, Germany have entered into a five-year strategic research collaboration named 'Phenotyping for Products' (P4P) to use novel, state-

of-the-art root and shoot phenotyping to study the impact of traits, improved germplasm and biologicals on plant morphology and performance.

<https://www.fz-juelich.de/SharedDocs/Pressemitteilungen/UK/EN/2016/16-09-08-research-collaboration-bayer.html?nn=1939030>

2. September 28, 2016 – DuPont Pioneer and the International Maize and Wheat Improvement Center (CIMMYT) have entered into a Master Alliance Agreement to jointly develop improved crops using CRISPR-Cas based advanced plant breeding technology. Main focus of this collaboration is on breeding for resistance to devastating maize lethal necrosis disease for Africa.

<https://www.pioneer.com/home/site/about/newsmedia/newsreleases/template.CONTENT/guid.6B772F3A-3C4F-4756-7ABA-A10FC7804D51>

3. September 13, 2017 - Through a collaborative project, Purdue University and Dow AgroSciences (a DuPont division) researchers have discovered a novel soybean gene that provides resistance to a devastating and costly fungal disease. Dow AgroSciences intends to make the technology broadly available to soybean farmers.

<https://www.purdue.edu/newsroom/releases/2017/Q3/breakthrough-soybean-research-by-purdue-and-dow-agrosciences-could-save-farmers-millions.html>

4. May 03, 2017 - Plant Impact (Croda International Plc) announce a new R&D collaboration with Ghent University, Belgium. This new collaboration grants Plant Impact exclusive development access and a licensing option to a novel group of phosphonamide pyrabactin analogues. The patent-pending molecules were designed and synthesized in the laboratory of Prof Dr. Christian Stevens, who is Head of the Synthesis, Bioresources and Bioorganic Chemistry Research Group (SynBioC) in Ghent University. Pyrabactin analogues have been found to control the aperture of leaf stomata to reduce water loss from leaves. Plant Impact's R&D team, along with academic partners at Ghent University, is working to advance understanding of plant responses to increasing environmental stresses and develop and commercialize unique chemistries which can assist growers in mitigating yield losses due to drought.

[https://www.plantimpact.com/media/press-releases/2017/ghent\\_collaboration\\_03052017](https://www.plantimpact.com/media/press-releases/2017/ghent_collaboration_03052017)

5. July 11, 2018 - PlantArcBio Ltd., a leading biotechnology startup for the improvement of crop yield signed an agreement with the University of Wisconsin-Madison, under which genes that improve drought tolerance will be tested by the university's scientists in soybean. The genes were discovered by the company using its patented platform.

<http://plantarcbio.com/news/biotech-startup/>

6. May 8, 2019 - Yield10 Bioscience signed Exclusive Worldwide License with University of Missouri (MU) for advanced technology used to boost oil content in Crops. The focus will be on gene targets in the ACCase complex to re-engineer oil biosynthesis pathways in crops. In 2018, Yield10 licensed technology from MU related to a trait named C3007, a gene for a negative controller that inhibits the enzyme activity of ACCase. The new technology licensed by Yield10, C3012, targets an additional gene in the ACCase complex that may complement the activity of C3007 to boost oil

content in crops. Yield10 also licensed from MU in 2018 a yield target called C3010, which, if over-expressed, results in increased activity of ACCase and may lead to increased oil content.

<https://yield10bioscienceinc.gcs-web.com/news-releases/news-release-details/yield10-bioscience-signs-exclusive-worldwide-license-university>

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