

**CFP: CRIS 2018****Title: “Fostering Open Science at Fraunhofer”**

Founded in the same year as the Federal Republic of Germany in 1949, Fraunhofer started out as a small office with just three employees. Today, 72 individual institutes and research units carry out Fraunhofer research projects at locations throughout Germany and abroad, in addition to the work of 25,000 scientists and engineers who are granted an annual research budget totalling 2.3 billion euros. Fraunhofer undertakes applied research that drives economic development and serves the wider benefit of society. Its services are solicited by customers and contractual partners in industry, the service sector, and public administration. As Europe’s largest Research and Technology Organisation (RTO), how does Fraunhofer meet the challenges of Open Science?

In the first part of the talk/paper, we will outline the academic side of Fraunhofer’s work: The research activity produces a yearly output of over 10,000 scientific papers, books and conference papers. We will show how Fraunhofer is comparable to other research organizations and universities and has similar research governance structures. Hence, there is a convergent “Open Science evolution” which we will outline by looking at its various manifestations and activities at Fraunhofer:

- The various Open Access developments and achievements of recent years, from an organic start in 2003 via a growing OA-repository and the necessity of policy making and advocacy, setting up internal funding mechanisms for OA-publications as well as an “OA-transformation task force” and the need for a central author support.
- The recent Open Data project “FORDATIS” to establish a research data repository and to enable a research data management system not only under the FAIR principles but also well connected to both the publication repository and the internal data management systems.
- In addition to these core infrastructure developments, various Fraunhofer Institutes themselves already engage in Open Science projects such as Citizen Science or Open Source software projects, which we show to have a powerful effect on the way research is conducted and which in turn pose new requirements for the Fraunhofer infrastructure and the overall research organization.

Also, like many academic institutions, Fraunhofer is currently implementing a CRIS system whose objectives and project status we will present briefly. “DSpace-CRIS” is used as the CRIS solution and within the mature corporate information management structures and ERP systems it is the first infrastructure item built upon open technology.

In the second part, we will present Fraunhofer’s industry and RTO view: More than 70% of the revenue is derived from contract research with industry and from publicly financed research projects. Compared with other German technology producers, Fraunhofer comes out on top with the highest number of inventions, new patent applications, and total number of patents held. RTOs collaborate with the industry and face the challenge of being both a member of the scientific system and acting within the economic context. Logically, the protection of IPR (Intellectual Property Rights) is vital for RTOs to be able to create value with their project partners and to secure their knowledge to gain competitive advantage and convert knowledge into technological innovations. In addressing the key question, “Does intellectual property and patenting automatically outlaw Open Science?”, we will

show how Fraunhofer assesses the Open Science potential and which designs are needed to bridge the apparent gaps between Open Science and Open Innovation.

The second part will summarize how Open Science can be beneficial for RTOs: Besides the possibility of extensive access to research results for their own work, they need high visibility for their expertise and technology portfolio to be identified as a collaboration partner for science and industry. Open Science will be beneficial for RTOs by making scientific results as open as possible, yet as closed as necessary. Consequently, new business models in the context of data reuse must be developed by and for RTOs. We therefore envision a future balance between open and restricted access to research data where profound dissemination and data governance strategies are key.

The overall conclusion of the talk/paper will not provide ready-made solutions but aims to envision a large organization on the way to open research and better, digitized research processes. We will provide some insights into organizational processes, activities, and decision making that may be universally applicable in research organizations and for RTOs: Firstly, we will shed light on the organizational demands and implications associated with a growing OA-publication infrastructure, such as the need for business process modeling and a proficient author support. Secondly, we summarize our lessons learned in the CRIS implementation: In what way must “DSpace CRIS” prove that it is a living example of the promises held by the Open Source paradigm? A desirable evolutionary step for the Fraunhofer-CRIS would be to enable an open layer for showcasing research results to the world and by doing so also enabling state of the art research profiling for both the academic corridor and the industry partners. This could prove to be a clear opportunity for Fraunhofer to better disseminate research into society and help the open paradigm.

Another and possibly even more important issue than the organizational question is the human factor: How do Fraunhofer scientists and authors “come of age” in the world of Open Science research and what challenges do they face? Both the Open Science shift and the CRIS introduction challenge a long-standing research organisation from a cultural and social point of view. With messages of “open” versus “closed” and “collaboration” versus “competition”, there is the danger of forcing an unsound divide within the research culture into “sharers” vs “hiders”, “scholars” vs “performance guardians”. Therefore, the key challenge is wise and goal-oriented communication aimed at winning researchers and management stakeholders over and of course providing easy-to-use-systems.

## Ulrike Küsters

Has served since 2010 as head of the Competence Center “Research Services & Open Science”, which is part of the Stuttgart-based Institute Fraunhofer IRB. She has a degree in Earth Science and further training in IT-Management, database and web service programming. The 16 members of her team are responsible for the Fraunhofer publication infrastructure and a specialized IT-infrastructure for 70 Fraunhofer libraries, and for the recording of science indicators and provision of a current research information system (CRIS). The Competence Center acts as a “science service provider” for the entire Fraunhofer community. Fostering Open Access and Open Science at Fraunhofer as well as supervising scientific-political developments is an overarching objective of the group.

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