

Industrial mentoring for junior researchers: An enabler for personal development and innovation

Ingrid Chieh Yu ¹, David B. Cameron ¹, Ann Vølstad ², Åshild Hanne Larsen ³

¹ University of Oslo, SIRIUS Centre, Department of Informatics

² AFF

³ Equinor ASA

Abstract

The SIRIUS Centre for Research-Based Innovation, based at the University of Oslo, is a collaborative organization that addresses challenges of digitalisation in, and beyond, the oil and gas industry. It aims to produce innovation that solves operational challenges in industry through application of high-quality computer science research. The centre brings together academics from the three universities, two research institutes, large companies in the oil and gas sector, IT vendors, both global and local, and a group of specialized companies.

It is a complex task to generate industrial innovation and excellent research simultaneously. The centre brings together a diverse group of participants, with widely differing backgrounds and motivations. Effort must be made to bridge the gaps between our academic researchers and their industrial counterparts. As part of this effort, SIRIUS ran a mentoring program for junior academics in 2017 and 2018. This paper describes the program, its results and practical experience that was derived from the program. Each of the authors brings their own perspective to the paper. The lead author is the deputy director of the centre. She defined the objectives, led and ran the mentoring program. The second author was the manager in the centre with responsibility for relationships with the centre's industrial partners. He was the sponsor of the program. The third author works for AFF, a consultancy that prepared the content of the program and facilitated the meetings in the program. The final author is one of the mentors. She is also a C-level executive in the energy company Equinor.

Keywords

Mentoring, Industrial Collaboration, Energy Industry, Norway, Researcher Development

1 Introduction

The SIRIUS Centre for Research-Based Innovation, based at the University of Oslo, is a collaborative organization that addresses challenges of digitalisation in, and beyond, the oil and gas industry. It aims to produce innovation that solves operational challenges in industry through application of high-quality computer science research. The centre brings together academics from the three Universities (Oslo, Oxford and NTNU in Trondheim), two research institutes (SINTEF and Simula), large companies in the oil and gas sector (Equinor, Schlumberger, Aibel, Aker Solutions, TechnipFMC, Bosch, DNV GL), IT vendors, both global (IBM and SAP) and local (Computas and Evry), and a group of specialized companies (Numascale, OSIssoft, Dolphin Interconnect Solutions and Kadme).

It is a complex task to generate industrial innovation and excellent research at the same time. The centre, a Hybrid Autonomous Organization (Cameron and Østerlie, 2018), brings together a diverse group of participants, with widely differing backgrounds and motivations. Effort must be made to bridge the gaps between our academic researchers and their industrial counterparts. The gaps not only appear within technical or disciplinary understanding but also in the form of cognitive and emotional distance, i.e., differences in the sets of basic values, norms and mental models between universities and industry. To address these gaps, efforts span from seeing how academic research is communicated and promoted to developing a centre culture. These measures take into consideration the complex interplay and the traditional social and cultural divide between academia and industry. The centre culture and its values need to be developed across the entire centre: in individual researchers, in the collaboration with industrial partners and in the centre's management and boards.

The challenge of digitalization requires an interdisciplinary mode of research, since the solutions we want are beyond the scope of a single discipline, body of knowledge or area of research practice. It also requires involvement of problem owners and teams of researchers that can work with industrial problem owners. requires knowledge and understanding beyond tightly defined technical subjects. Our researchers, for example, need to understand business areas, organizational practices, and applied disciplines. Hence, the centre had to implement ways to develop these broader skills. This not only contributes to collaborative innovation but also supports researchers in their own professional development. However, whether a researcher wants to collaborate with an industrial problem owner depends largely on that individual researcher's personal propensity to embrace the business mindset. It is also influenced by how they experience cognitive dissonance caused by the need to reconcile conflicting aims and values in their collaboration with industry.

SIRIUS employs more than 30 graduate students and post-doctoral research fellows. They are both international and Norwegian. By offering researchers personal development opportunities, the centre can attract and retain highly skilled researchers while increasing researchers' performance and self-motivation. Most academic positions in the centre are temporary. This means, at some point, the researchers will have to make the tough decision whether to pursue an academic career or seek employment outside the university in industry. Academic positions are scarce. In Norway approximately two-thirds of PhD candidates choose to take jobs outside academia. Many researchers wonder how their expertise is relevant outside academia. What we have experienced at SIRIUS is that having a more developed sense of industry interests, and understanding one's own strengths, qualities and development potential beyond technical subjects is something researchers have expressed a need for when making career decisions. There are well-established personal development programs in academia, however these are often only available to those researchers or professors who have a formal leadership role. They focus also on academic leadership and excellence. Similarly, there are mentoring programs with the aim of increasing the number of female professors. Here the mentor is a professor. SIRIUS needed

a program that can support young researchers' personal development and their opportunities when they leave the centre. Moreover, if such support is given early in their research career, it is more likely that the personal mastery and individual learning can be transferred into the centre's organizational learning and development.

Increasing mutual understanding is the first step to removing barriers to the development of university-industry interaction and collaboration. To unleash the full potential of diversity and partnership, our mentoring program matches researchers (PhD students and post-doctoral researchers) with a mentor from one of the partner companies. The program was developed in collaboration with AFF and was tailor made for SIRIUS. It focuses on building a common centre identity and engaging the mentors from affiliated companies in the centre's goal. At the same time, it was important that the program was inspiring for participating mentors. By creating a contact surface for both individuals and the group of mentors, the mentoring program contributes to career development and opportunities beyond SIRIUS. By focusing on a common understanding between industry and academia, we can create a better foundation for innovation. Such a mentoring scheme will have an impact both at the individual level, for SIRIUS and for the social responsibility the centre has.

The objectives of the mentoring program are:

- Shape SIRIUS centre identity by exchanging expertise, values, skills, perspectives, attitudes, and through networking.
- Offer individual SIRIUS researchers a personal development strategy and train future research leaders in academia or industry.
- Increase mutual understanding between SIRIUS industries and academia to foster collaboration, engagement, and build career competence on both sides of the mentoring relationship.
- Promote and harness the full potential of diversity in SIRIUS: culture, age, gender, and expertise aspects.

Mentors are industry leaders who are motivated to support the personal and career development of a SIRIUS researcher

2 The Theoretical Basis of the Program

Two basic approaches to mentoring exist: formal and informal. Informal mentoring is based on mentees finding their own mentors, outside of an organized mentoring program. Formal mentoring places the mentoring relationship between mentor and mentee within a structured program. In formal mentoring programs, clear objectives are expressed, and the program is usually expected to fulfil both individual and organizational needs and interests.

Experience has shown that careful matching of the mentor-mentee pairs, usually as part of formal mentoring programs, is critical to the success of the mentoring process. Providing formal training for mentors and mentees is necessary. It is also important to organize meeting points regularly during the period the mentoring relationship is to last. This makes it possible to discover and help resolve relational issues along the way. A formal mentoring relationship is limited in time, to for example one year, but experience shows that many formal mentoring relationships continue informally after the initial organised period.

Mentoring is fostered by the emotional need to learn and to help others learn. American and European mentoring traditions differ in their understanding of the role of the mentor. American mentoring favours the idea of mentor as a wise person, preferably with a certain status, sponsoring, helping and giving advice to a younger, less experienced mentee who is building a career. In the European tradition, on the other hand, the mentor is to hold back from giving advice in favour of a larger variety of mentoring behaviours that aim at helping the mentee master transitions in knowledge, understanding, ways of thinking, and professional and personal choices. SIRIUS' mentoring program is built on the European tradition and emphasises a holistic approach to development.

Theoretically, mentoring is based on what we know about how adults learn. Important factors are the personal drive and interest in learning, the ability to reflect upon personal experiences and opportunities to apply learning to concrete tasks or problem matter.

Mentoring is a partnership between two people who are not in any reporting line to one another. It must be a safe relationship where confidentiality and bilateral trust is crucial. Help is offered on the mentee's initiative. The mentee has primary responsibility for setting goals, inviting to meetings and logging own development.

The mentor role, as described by Clutterbuck (2014) and Ekeland (2014), includes four different kinds of behaviour aimed at helping the mentee to help him- or herself. In all these behaviours the mentor's most important tool is to ask questions instead of offering answers. The four behaviours are:

- (1) The *coaching role* addresses the mentee's intellectual need to deal with tasks and situations. It is the role of critical friend and sparring partner who challenges the mentee by offering feedback and new perspectives through dialog. The role is not to be a professional expert supervisor.
- (2) The *networking role* helps the mentee become aware of networking possibilities, and sometimes opening doors by providing access to own network or building bridges.
- (3) The *counselling role* addresses emotional needs providing support, opening the mentee's eyes to own resources, talents and potential. This role also provides encouragement by just being available, listening and supporting.
- (4) The *guiding role* encompasses being a role model, telling stories and sometimes giving advice (when asked).

While the mentoring relationship is based on the needs of the mentee, it must also satisfy the mentors' interests. The mentors want to be of help and learn through the reflective mirroring effect implicit in such a helping partnership.

3 The Mentoring Program

The SIRIUS mentoring program is a formal, one-on-one program that offers individual participants a *personal* development strategy where the mentor facilitates development of the mentee. The program provides a framework for a mutually beneficial learning relationship and contributes to the professional and personal development on both sides of the relationship and access to a wider network of resources.

The program provides training and support, and has the following structure:

- Each mentor-mentee relationship lasts for approximately 12 months
- The mentoring program will match mentors and mentees based on their profiles
- Mentors and mentees are expected to meet 1-2 times a month
- The mentoring program organizes:
 - Mentor master class
 - Mentor program Kick-off for new pairs.
 - Seminars on topics that facilitate personal development. These meetings also provide arenas for networking, social interactions between all pairs to share knowledge and expertise.
 - A common closing seminar

The pilot program was run over a year, from mid-2017 to mid-2018, after a period of planning and preparation that began in late 2016. The program was met with appreciation and positivity by many of the main contact persons in our partner companies, who also assisted with mentor recruitment within their own organization. All centre junior researchers could apply to the program. Based on profiles, interviews, selection and an iterative matching process, the program matched ten mentees (4 PhD students and 6 post-doctoral researchers) from the University of Oslo and Norwegian University of Science and Technology with ten mentors. In this pilot program, mentors were senior managers recruited from Equinor, Schlumberger, Evry, Numascale and IBM. The program had 60% female mentees.

Prior to program kick-off, the mentor and mentee groups respectively received training in their roles at dedicated workshops. The training allows the mentors and the mentees to establish a common understanding of the mentoring model adopted in the program, including the different rolls, obligations, responsibilities and expectations of the program. Having a mentor master class is crucial for the success of the program. It gave mentors

an introduction to role understanding, mentor competencies, communication training and networking. As noted above, during the one-year period, the program organized five workshops or gatherings: a kick-off, a mid-way events, two mentee seminars and a concluding celebration. The seminars covered various topics, including the roles of mentee and mentor, a mentoring toolbox and structure, facilitation of communication input, communication training and exchange of experience. The seminars provided support, gave inspiration and ensured momentum in the mentoring relationships and networking.

Between these common events the mentor and mentee pairs had regular monthly meetings. Where possible, some of these meetings were held at the mentor's offices, so that the mentee could get some insight into the mentor's company and its concerns.

4 The Mentor's Perspective

Taking on a mentor role is a commitment both when it comes to the time and effort invested in the program itself and in developing the mentor-mentee relationship. As the mentors held senior professional or management positions in the partner companies they represented, this commitment came on top of an already demanding agenda. So, what was it about the program that made it valuable for the mentors to invest time in?

Based on discussions with and feedback from the participating mentors during the program, the following areas stood out as important criteria for participation:

- To have the chance to convey industry- and company-specific information and knowledge to the mentees was a benefit. The opportunity to act as industry ambassadors and hosts for visits by the mentees to the partner companies was also important. This meant that they could describe and discuss business specific challenges and needs, which the SIRIUS program should be aware of or could help address as part of their research and innovation activities.
- To be able to adapt and share own personal and professional experiences and reflections to contribute to the personal development of the mentees, while at the same time learning from them, was key. Expectations within this area included mentees sharing their personal or professional knowledge and perspectives, but also included obtaining an increased understanding of similarities, differences and challenges between the SIRIUS industries and academia.
- To participate in a personal learning journey while expanding their professional network by being a mentor in the program. This was especially related to what the Mentor Master Class provided. The seminars also delivered this, as did the informal dialogue and sharing of experience that was facilitated through the program. In addition, the program provided an opportunity to form relationships between mentors across companies, which was viewed as an additional incentive.

Based on mentor feedback, the program delivered well on the expectations and criteria outlined above. In hindsight, however, the thing that mentors perhaps appreciated the most was the personal relationship that developed between mentor and mentee. There was a sense of being on a journey together, of learning and sharing together, and not least the joy of experiencing being challenged by your mentee and seeing him or her develop and take strides. This was extremely rewarding.

This is perhaps at the core of what really makes a mentor-mentee relationship or program worthwhile: when it enables a development journey for both parties, where different perspectives, experiences and viewpoints are shared and reflected upon resulting in learning for all participants. This was a key success factor that the SIRIUS mentor programme achieved, and which set it apart and made it valuable for both mentors and mentees.

5 The Mentees' Experience

The mentees pointed out that they achieved personal development and awareness, and a better understanding of industry culture. In contrast to previously, when researchers may have had to rely on their professors to reach industry contacts, they were now given their own strategic network to further expand on and maintain.

“Building networks with key people in industry gives me a unique skill and makes me more attractive on the job market.”

“I have visited [partner company] and have extended my previously limited industrial network”

When asked how useful being a mentee in this program has been, they all replied to have had a positive experience with various personal gains.

“It is quite different from all the other things I do as a PhD. It has been useful in the sense that it prepares me better for the life after my PhD.”

“The program opened possible collaboration opportunities with industry”

“Understanding and overcoming cultural difficulties. Have an idea of the industrial working environment from the inside...”

Most of the researchers gained a greater understanding of challenges and possibilities within the areas of research and innovation in the centre and they all expressed having increased their sense of belonging to SIRIUS.

“I had a better understanding of the industrial agenda. Thanks to my mentor I also got involved in an additional project”

“I had a discussion with my mentor about this topic. We shared our different points of views on the same technology in terms of different working cultures and expectations”

“After one of the mentee sessions I said to some of the other mentees: “Do you feel the SIRIUS identity?”

Overall, mentees gained industry insight and a better understanding of the bridge between academia and industrial needs and interests. At the same time, the mentees grew on a personal level, gaining greater confidence and self-awareness and becoming closer as a group of colleagues. Ultimately, they obtained an understanding of the value of their research in an industrial context.

6 Conclusions and recommendations

The mentoring program was assessed upon completion. Both mentors and mentees were satisfied with the program and believed that it gave professional and personal benefits to both parties. We have also observed that our researchers have matured in their understanding of industry and ability to communicate their research to non-experts. During the external mid-term review of the centre, the external reviewers noted that this program was an excellent initiative, that should be replicated in the university and in other centres for research-driven innovation. We have now started the second mentoring program, using the same model and methods.

We conclude that a formal and structured mentoring program that connects senior industrialists with junior researchers is a valuable tool for building collaborative innovation. The junior researchers develop in maturity and communication skills. They also increased their own strategic networks. The mentors gain a better understanding of the academic mind-set and work style. All are mutually strengthened by an enjoyable, social and educational program.

References

- Cameron, D.B. and Østerlie, T. (2018) Sirius: Collaboration across the digital divides in the oil and gas supply chain' In: Meerman, A. (ed.) Practitioners Proceedings of the 2018 University Industry Interaction Conference; Held June 20th-22nd 2018 in London. Amsterdam: UIIN: 91-101
- Clutterbuck, D. (2014) Everyone Needs a Mentor, 5th edition. London: CIPD
- Ekeland, J. (2014) Mentoring. Lærende allianser i ledelse. Oslo: Fagbokforlaget. (in Norwegian)