Karlsruhe Institute of Technology

YIN Insight 2015/16

The strong network of junior professors and junior research group leaders at KIT

Young Investigator Network (YIN)

Hot Topic
Young Investigators in the Overarching KIT 2025 Strategy
How to attract the best?

Under Review
Five years of KIT Associate Fellow

YIN Statistics 2015
9.6 million euro Subsequent Funding and
244.5 weekly course hours (SWS)

Editorial

Dear Reader,

Even as the Young Investigator Network (YIN) enters its ninth year, it remains young thanks to new, enthusiastic members. Since 2008, YIN has served as a platform to connect, educate, and promote sharing experiences and ideas among junior group leaders and junior professors at KIT. They become ever more important in the context of the *Overarching KIT 2025 Strategy* as well as the *Excellence Strategy Program* and the *Early Career Research Pact* of the federal government. On the following pages of YIN Insight 2015/2016 you will find reflections on how all three initiatives might affect young investigators at KIT.

The interdisciplinarity in YIN became even stronger this year: YIN grants fostered collaborations among young investigators from different scientific branches, alongside with project coordination initiatives for joint proposal writing. The YIN Lectures with internationally renowned speakers have become extremely popular, attracting more visitors than there are seats available in the auditorium.

The educational function of YIN, helping young investigators to acquire leading, managing and communicating skills, is without a doubt one of YIN's priorities. The courses are chosen by the YIN members in the beginning of each year, always meeting their high demands with outstanding quality. In this issue you will learn more about the YIN continuous education program and its highlights.

Being a living network, YIN faces changes mirrored in this journal through facts, figures and faces. Besides the mentioned topics, we report about successful acquisition of funding, upcoming events, and finally, introduce our new members and continuously growing list of alumni. YIN Insight has been a collaborative effort and we thank all individuals for their contributions.

We wish you an interesting and enjoyable read,
the PR Committee

Dr. Stefanie Betz Dr. Andreas Haupt Dr. Felix Löffler Dr. Julia Syurik Dr. Kathrin Valerius

Contents

Greetings

The promotion of young scientists has always been of great importance to my work as an institute director and professor. My own work has always benefited from interaction with independent young investigators because they were bringing in new ideas and approaches. And now, I am in the great position to be responsible for all matters related to young scientists at KIT.

Looking back, it is my impression that we have implemented a lot of supporting measures for young scientists in the last 10 years. And without question, the most effective and most visible one has been the implementation of the Young Investigator Network (YIN). I am very glad that my predecessor, Detlef Löhe, had campaigned for the YIN and, even more important, that the YIN members took the chance to establish a self-organized and flexible platform, corresponding to their needs. I am happy to mention that I helped a little bit since I had hosted the YIN office at my institute in its early days.

As outlined by the *Overarching KIT 2025 Strategy*, the promotion of young scientists is a main focus in the development of KIT in the years to come. The KIT participates in the upcoming *Excellence Strategy* (successor program of the *Excellence Initiative*) as well as in the *Early Career Research Pact* or "*Nachwuchspak*t" providing 1000 W1 junior professorships for the German science system. In preparation for these programs and beyond, it is time to establish defined and dependable perspectives at an early stage of the career as a scientist at KIT.

To my opinion, KIT as *The Research University in the Helmholtz Association* provides a unique setting for young scientists as they have the opportunity to be involved in the academic life of a university as well as taking part in program oriented research with its large-scale research infrastructures. YIN is of great importance to that – being the place where junior research group leaders with different scientific scopes, backgrounds and funding sources exchange their ideas and knowledge, and possibly start building a network for life.

I encourage YIN to continue to advocate for the interests of junior research group leaders and junior professors. In this spirit, I hope to see YIN to maintain its vitality and visibility for accompanying and supporting the young scientists at KIT.

Professor Dr. Oliver Kraft
Vice President Research

Overarching KIT 2025 Strategy – How to Attract the Best Young Investigators

by Dr. Julia Syurik and Dr. Kathrin Valerius

The 72-pages thick document entitled *KIT 2025 – Dachstrategie des Karlsruher Instituts für Technologie* (Overarching KIT 2025 Strategy) was released in January 2016 [1]. It arranges the future research and educational focus of KIT around the three pillars of energy, mobility, and information – thereby revealing a need for structural changes in order to obtain the best performance. According to President Hanselka, with the new strategy KIT "has achieved a significant milestone that allows us to actively shape and design the future" [2]. Young scientists, such as postdocs, junior professors and group leaders, are without a doubt part of the future of KIT – a part which so far is laid out on three pages in the KIT 2025 Strategy. As these pages evidently bear large relevance for current and future YIN members, we are eagerly awaiting to see how the corresponding catalogue of measures will be expanded and implemented.

To continue harboring high-end research, it is in the interest of KIT to attract the brightest brains on national as well as on international level. The best researchers, just as any researcher, do not only value great lab space and scientific freedom, but also seek clear career perspectives and transparent play-rules, for instance on how to eventually get a permanent position in academia. The so-called tenure track, allowing for a permanent research position after a positive evaluation, is a good tool to render career perspectives more clear. While such tenure track positions are traditionally widely implemented in the US and the UK academic systems, more and more German universities are also starting to establish specific programs. In order to remain competitive on a national and international level, it would seem vital for KIT to adopt a tenure track system, as foreseen in the KIT 2025 Strategy.

In between the upcoming round of the German Excellence Strategy program and the realization of the KIT 2025 Strategy, working schemes and measures are currently being developed. On September 1st, 2016, 12 YIN members participated in the workshop "Plannable career phases and paths for young researchers" organized by Dr. Anke Diez, Head of Personnel Development and Vocational Training (PEBA). The workshop was aimed at collecting input from young group leaders as feedback to the KIT units which are currently tasked with filling the KIT Overarching Strategy with life.

To start off the workshop, Anke Diez presented an informative review of the current state of the discussion, based on the results of an Excellence Strategy working group on "Plannable career phases and paths for young researchers". Since January 2016, a heterogeneous team of KIT employees from different institutes and administration units, among them a representative of YIN, had taken stock of the situation of KIT, had compared it to other national and international universities, and developed a preliminary overall concept. From this, two main results with tangible implications for YIN members have emerged:

Young scientists are supposed to know in advance about their career options, i.e., if a tenure track is planned for them or not.

Classical "postdoc" contracts, understood as a qualifying period, at KIT shall be strictly limited. At the end of a 3-year term, the postdoc is supposed to either have a clear and immediate career goal at KIT (e.g., prospects to become a group leader, plans for a habilitation) or leave the institution.

The work on fleshing out the detailed realization of the new KIT Strategy will now be continued in the form of several key projects. In particular, two of these projects are of special interest to junior group leaders: one dealing with the development of career phases for young scientists ("Leitprojekt 5" chaired by Vice President Oliver Kraft and Vice President Elke Luise Barnstedt), and the other with the unity of research and teaching throughout KIT ("Leitprojekt 2" under the aegis of Vice President Alexander Wanner). YIN is represented by one of its members in each of the respective committees. Both projects held their kick-off meetings in November 2016. YIN members receive continuous updates on the ongoing process by their representatives during regular YIN meetings.

[1] www.kit.edu/kit/english/pi_2016_006_kit-the-research-university-in-the-helmholtz-association.php
[2] www.kit.edu/kit/english/pi_2016_057_sustainable-solutions-for-pressing-future-problems.php

Five Years of KIT Associate Fellow

2016 marks the 5th anniversary since the KIT Associate Fellow status was officially announced. It was introduced to allow scientifically independent, not yet habilitated, young group leaders to supervise their PhD students and take part in their examination procedures as thesis reviewer and/or examiner.

Number of current (green) and former (red) KIT Associate Fellows per KIT Department. (Data from KIT Departments in November 2016)

The implementation of the KIT Associate Fellow status was delegated to the individual KIT Departments. Since 2012, they have started to adapt their doctorate regulations ("Promotionsordnungen") gradually. Until this day, however, some uncertainties around the magical "two year mark" persist: As per *official announcement 53/2011*, KIT Associate Fellows must have held their doctor titles for at least two years prior – they need *not* have led a group for two years already. While their groups have to continue for another two years or longer, the KIT Associate Fellow status itself is *not* by definition limited to two years, or even to the duration of the group, but may be granted for as long as the employment at KIT lasts. This point is handled differently across the KIT Departments. Another distinction: At some KIT Departments, KIT Associate Fellows can be first reviewers for the theses of their PhD students and are also allowed to supervise and examine their Bachelor and Master students; at others they may only be an additional reviewer for their PhD students.

From the perspective of young investigators, the introduction of the KIT Associate Fellow status was, nonetheless, a big step towards their structural and scientific recognition. Now, after five years have passed, we are curious to find out what experiences were made throughout KIT.

Presidential Committee
Vice President for Higher Education and Academic Affairs
Prof. Dr. Alexander Wanner

It is a great achievement that KIT Departments can award the status KIT Associate Fellow and it is good to see that most KIT Departments make use of this quality-assured instrument to promote young scientists. Some KIT Departments are, however, still surprisingly reluctant. I thank the YIN for addressing and questioning this observation. I sincerely hope that we will have KIT Associate Fellows throughout all KIT Departments in the future.

KIT Department of Architecture
KIT Vice Dean Prof. Dipl.-Ing. Andreas Wagner
0 KIT Associate Fellows

(+) The concept is very good as it gives an incentive for further scientific profiling after the PhD promotion, especially, in engineering sciences where a habilitation is not so much favored.
(+) I also like the selection criteria to define a junior research group by its size rather than by its funding source. Thereby, all sorts of funded groups are regarded, and not only the prominent ones, like Helmholtz or Emmy-Noether.

KIT Department of Chemical and Process Engineering
KIT Dean Prof. Dr. Harald Horn
3 KIT Associate Fellows
(+/-) There are already three Associate Fellows at the KIT Department. However, the first assignment procedure under the terms of the official KIT regulations has just been initiated. Therefore, experience in this respect is sparse.

KIT Department of Chemistry and Biosciences
KIT Dean Prof. Dr. Willem Klopper
7 KIT Associate Fellows

(+) We think it is great that the KIT Associate Fellow status was established and that young scientists, thereby, are granted more autonomy and independence. In my experience, KIT Associate Fellows usually aspire a habilitation, and I think it should in general be possible to complete the KIT Associate Fellowship with a habilitation.
(+/-) So far, we have had no applications for a prolongation of the status in our KIT Department. It would be interesting to see how the ad-hoc commission would respond when a KIT Associate Fellow would intend to hold the status more or less permanently.
(-) In practice, applications for the status of KIT Associate Fellow are usually submitted at a rather late stage of the applicant's career. Then, the respective PhD students have already been doing doctoral research for quite some time. Thus, these students already have doctoral agreements (defining topic and timeframe) with some KIT Department member who has the right to supervise. Once the KIT Associate Fellow status is granted, a new doctoral agreement needs to be negotiated. Wouldn't it be better to confer the status of KIT Associate Fellow directly after the approval of a young investigator group (e.g. Emmy Noether) or directly after the funding of at least two PhD positions?

KIT Department of Civil Engineering, Geo- and Environmental Sciences
KIT Dean Prof. Dr.-Ing. Stefan Hinz
4 KIT Associate Fellows
(extra) Right to be main reviewer for PhD examination; guest in the KIT Department's council
(+) A great advantage of the KIT Associate Fellow is that it unites different junior research group leaders under one roof and gives them the same rights and obligations. That seems necessary, as there are huge differences between the selection criteria and third party funding for group leader positions.
(-) Yet, as a purely KIT internal concept, the Associate Fellow will never be as far reaching as a habilitation. To habilitate is still the only way to get unrestricted examination rights at all universities in German-speaking countries.

German Research Foundation (DFG)
Program Director Dr. Anjana Buckow
The Emmy Noether program provides an alternative to the traditional professorial track requiring a habilitation. Talented young researchers are given the opportunity to achieve equivalent qualifications by leading an independent junior research group and assuming relevant teaching duties. Taught lectures or seminars should be self-developed and offered independently. As Emmy Noether awardees select PhD students for their groups and work with them closely, the DFG advocates that they be granted the right to officially supervise the theses of their students and be responsibly involved in the examination process.

In 2006, the DFG opened the Emmy Noether program to junior professors with the aim to achieve benefits in both directions: Successful junior professors, on the one hand, gain access to the advantages offered by the program. A junior professorship, on the other hand, self-evidently entails full teaching and examination rights being granted to an Emmy Noether awardee. They might also profit from given tenure track regulations or at least from a liberalized prohibition to be appointed professor at the same institution. Furthermore, they are part of the professorate and the faculty. In this regard, the DFG is very pleased if Emmy Noether group leaders are appointed junior professor by their host institution or are attributed an equivalent legal standing. The DFG encourages the universities to create the appropriate conditions within their institutions and to make use of this facility.

KIT Department of Economics and Management
KIT Dean Prof. Dr. Frank Schultmann
0 KIT Associate Fellows

(+) The concept of KIT Associate Fellows encourages young researchers who are leading junior research groups to be more visible. The procedure to become KIT Associate Fellow is well implemented at the KIT Department of Economics and Management and KIT Associate Fellows have successfully completed their research path at the KIT Department already. Currently, the KIT Department of Economics and Management does not host a KIT Associate Fellow, but a number of young researchers leading research groups and doing their habilitation in order to obtain their *Venia Legendi*. The requirements for a habilitation are close to the requirements for KIT Associate Fellows so young researchers can choose between both career ways.

KIT Department of Electrical Engineering and Information Technology
KIT Dean Prof. Dr.-Ing. Thomas Leibfried
0 KIT Associate Fellows

(+/-) It seems appropriate for junior group leaders to officially supervise PhD students of their research group and to be summoned as an additional referee in the PhD examinations of those students. We will change our examination regulations in order to include junior researchers into this procedure.

KIT Department of Humanity and Social Sciences
Head of doctorate examination board Prof. Dr. Ulrich Ebner-Priemer
0 KIT Associate Fellows

(+) Our KIT Department supports the idea and, in its new doctorate regulation, explicitly recognizes the participation of KIT Associate Fellows in the examination process. The requirements for application and assignment of the status are sensible and sufficient.
(-) It needs to be said, however, that the proceedings to obtain the KIT Associate Fellow, in compliance with the KIT regulations, are not less than and possibly even more extensive than a habilitation. Furthermore, there are scarcely any junior research groups in the historic-philological fields of the KIT Department. In the foreseeable future, acquiring the status of associate fellow will probably not be an alternative to habilitating for most of our scientists.

KIT Department of Informatics
KIT Dean Prof. Dr. rer. nat. Hannes Hartenstein
3 KIT Associate Fellows

(extra) right to supervise and be main reviewer for theses of own Bachelor/Master and PhD students, examination of own lectures/courses
(+) Carrying responsibility at an early career stage is considered to be positive for the personal development and the career of young group leaders who have been carefully selected by the KIT Department of Informatics. We so far only had very good experiences: There were no noticeable differences in performance compared to scientists with a habilitation or to professors. Furthermore, our two former KIT Associate Fellows have directly been appointed by other universities to take on a professorship.
(-) The concept itself, however, entails the same structural problems that go along with any time restricted granting of examination rights (e.g. junior or shared professorships). Thus, the KIT Department needs to take into account that the respective person might leave the institution and how this would affect supervised students. As KIT Associate Fellows generally hold their status for an even shorter time than junior professors, the problem becomes more severe. So far, the contingency plans, prepared upfront by our KIT Department, have always worked out well.
(-) The definition of one's own students might potentially lead to further problems. If young group leaders finance their students, the case is clear. It is not so obvious, if the group is independent, but the student is paid from the budget of a hosting professor.
(-) In practice, it can also be difficult to assign the KIT Associate Fellow status within three months, especially between terms and because external reviewers are involved.

KIT Associate Fellows...
...LEAD independent research groups with at least two post-graduates
... MAY supervise own PhD students, be thesis reviewer and/or examiner
...HOLD PhD for 2+ years prior
...ARE not habilitated yet.

KIT Department of Mathematics
KIT Dean Prof. Dr. Willy Dörfler
0 KIT Associate Fellows
(+) Especially in larger scientific projects, to us the KIT Associate Fellow seems a worthwhile alternative to junior professorships.

KIT Department of Mechanical Engineering
KIT Dean Prof. Dr.-Ing. Jörg Bauer
5 KIT Associate Fellows
As the concept of the KIT Associate Fellow is still very young, we cannot yet say whether it will prove itself. The selection criteria to apply for the status are sufficient from our point of view. At the moment, we see no need for changes in this respect.

KIT Department of Physics
KIT Dean Prof. Dr. Martin Wegener
5 KIT Associate Fellows
(extra) right to supervise own Master students
(+) The concept has been applied for a certain period of time, it attributes largely similar rights and duties to scientists that do not have the status of professor or junior professor, such that they can research and teach quite independently. At our KIT Department the status has been assigned several times to young scientists leading an Emmy Noether Group or an equivalent there of.

Helmholtz Association of German Research Centers
Nina Löchte
former Head of Promotion of Young and Early-Stage Researchers at the Helmholtz Association
Referent for Oldenburg-Groningen Cooperation and Structural Affairs

Since its beginning in 2003 the Helmholtz Young Investigators Group program has enabled about 200 excellent young scientists to build up their own research group while fostering their scientific independence and developing their academic career. Close cooperation of grant recipients with their hosting university and integration into academic structures form central objectives of the program. On the one hand, both partners benefit from synergy effects in common areas of research, thus helping to promote their scientific excellence. On the other hand, this cooperation offers the young group leaders the chance of qualification for an academic career: teaching of classes, participation in PhD examinations and getting involved with academic committee work will support the professional and personal development of the young scientists. Where possible, the junior research group leader should be appointed to a joint professorship [1]. Practice has shown, however, that these aims have not (or cannot) always been realized to full extent. This shortcoming is partially due to regulations in the individual State University Law (Landeshochschulgesetz) of certain federal states, but can also have origins internal to the respective university or faculty.

Counting up to now, for the major share of Helmholtz Young Investigators Group leaders either a joint appointment to a professorship with the partner university could be realized, or an opportunity to take up an attractive professorship elsewhere arose during the grant period. Among the current grant recipients about 60% hold a professorship. Networking events – both within the Centers and across the Helmholtz Association – facilitate and encourage exchange of experience with appointed junior research group leaders. In a dedicated course tailored to the needs of junior group leaders [2], the Helmholtz Management Academy also offers mentoring, individual coaching and training for appointment negotiations.

[1] Position paper of the German Rectors' Conference (HRK) and the Helmholtz Association on cooperation in the promotion of young scientists (2004)
[2] Helmholtz Management Academy, Course "Leading your group"

Advanced Functional Materials at YIN Fireside Chat

As Editor-in-Chief of Advanced Functional Materials (Wiley-VCH), Dr. Jörn Ritterbusch is the first person to read a submitted paper. It´s on him to decide if a paper is declined or sent out to reviewers of his choosing. On November 2nd, 2016 YIN was honored to welcome Dr. Ritterbusch at a YIN fireside chat for a talk about "Scientific publishing: Do's and Don´ts". Many YIN members and alumni accepted the invitation, participated in a lively discussion, and listened even closer to many insider tips, followed by a get-together with even more time for questions.

YIN connects with Industry

Coming from diverse disciplines, YIN members are interested in shaping the future of industry and society by tying in their competences with successful cooperative projects and by providing novel technologies.

YIN Industry Portfolio – a Bouquet of Expertise

Young Investigators look to industry cooperations to advance the economic application of scientific results from their research groups.

YIN at the Theme Day Additive Manufacturing

The KIT Business Club initiates industry-funded. As an interaction platform, it connects representatives of major industries with scientists at the forefront of their respective fields. Special theme days and expertise portfolios facilitate the identification of new enabling product and process concepts. At the most recent theme day on additive manufacturing and rapid prototyping techniques, YIN member Dr. Bastian Rapp introduced a new method for the generation of three-dimensional glass components via an additive manufacturing technique. This is an enabling tool effectively paving the way for glass as a rapid prototyping material in various branches of industry.

YIN Day – Connect with Alumni

At the YIN Day 2016, members and alumni connected, celebrating the 8th anniversary of the network together. Starting deliciously with the workshop *Etiquette at Business Luncheons*, the day continued with news about YIN and an interactive poster session and was finally topped off with an inspiring talk given by Prof. Georg von Freymann. As a former YIN member and current professor of physics at the University of Kaiserslautern, Freymann reflected on his detouring efforts to become professor, gave insights into bizarre appointment procedures and offered advice on how to deal with setbacks. Inspired by the talk, curious YIN members could ask their questions during the closing get-together.

YIN dominates KIT Ehrenabend
At the KIT Ehrenabend, the Presidential Committee honored 15 recipients of external prizes in 2015. Among them were the YIN members Dr. Stefanie Betz (Wrangell), Dr. Christian Greiner (DGM Masing Memorial Award), Dr. Lars Pastewka (Emmy-Noether), Dr. Bastian Rapp (GMM Prize) and Dr. Martin Weides (ERC) as well as the YIN alumnus Dr. Pavel Levkin (Heinz Maier-Leibnitz Prize). Congratulations!

YIN with two talents at Helmholtz Horizons
Dynamics through talents: At the symposium *Helmholtz Horizons* selected junior and senior scientists presented their research. With the YIN members Dr. Stefanie Speidel and Dr. Damian Cupid, two innovative minds represented KIT. Their topics: computer assistance in the operating room of tomorrow and advanced lithium batteries for energy storage. A final podium discussion addresses new ideas, talent management and an innovative environment.

YIN members connect networks
Young Academy of Academy of Sciences and Literature | Mainz
Dr. Andreas Haupt has been elected member. What were his motives for joining?

I like the idea of being a part of a scientific community and not only part of a community for my field of study. But it is hard to find places where other members of the overall community interact and share their ideas and perspectives in a way, so that others can grasp at least their core. Like the YIN, the Academy of Sciences and Literature | Mainz is such a rare place. It complements my YIN experience because it has a large share of members from humanities, social sciences, literature, and music. Since its founding in 1949 it consists of highly acclaimed scholars each claimed one of the best within their field. I am representing sociology within the newly founded Young Academy consisting of 36 postdocs or junior professors. During my first year as a member I learned about the causes of gravitational waves (and how to measure them), the social interactions of bacterial cultures, the problematic legal status of physicians working for the IS, Goethe's theory of colors, and current problems of computer algorithms – to mention only a few of my experiences. In the long run, I have the impression of being a more complete and circumspect scientist, because I learn what kind of problems are seen by other scholars and how they solve them. That is exactly the kind of interdisciplinary encounter I hoped to find.

Facts and figures 2015

The following data was compiled from the YIN survey 2015: 34 out of 50 members participated

Members

The number of YIN members has slightly decreased from around 60 in 2010-2014 to 50 members in 2015, as shown in Fig. 1. This decline reflects the drop in numbers of young investigator groups (YIGs) at KIT in general. By contrast, we have observed a slight rise in the share of female members over the years. In 2008, when YIN was founded, there were 13% of female members and from then onwards the share continuously increased to 30% in 2015.

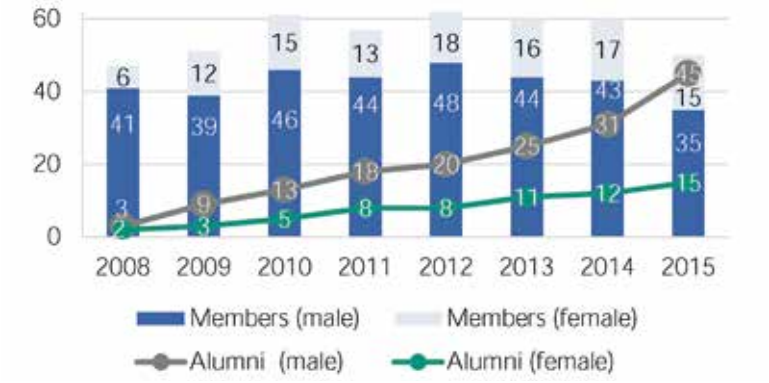


Fig.1: Number of YIN members and alumni from 2008 until 2015 (YIN database, Dec 2015)

The majority of our YIN members come from Germany; however, 22% have an international background, mostly European, but also American, Mexican, Russian, or Australian. All YIN members are leaders of scientifically independent third-party funded research groups with personnel responsibility and all have temporary contracts. The average age of YIN members at the start of their junior group is 32, with the youngest member being 27 years old and the oldest 38.

Before YIN members obtained their current position, most of them 76% had a postdoc position, 18% a PhD position, and 6% had a fixed term assistant professorship. 31% of all YIN members have been abroad (Europe and North America) before coming to KIT, 28% come from other German universities and 41% from KIT itself (Fig. 2).

As expected the number of alumni constantly grows reaching a value of 60 by the end of 2015 and exceeding the number of active members for the first time (Fig. 1). The success of YIN promoting young research group leaders in their scientific career can be seen in the number of alumni holding a professorship or are private lecturer at University. In late 2015 47% of YIN alumni held a professorship and 11% had a private lecture position.

Areas of expertise

YIN members cover four areas of research: the majority (46%) works in the natural sciences, followed by 28% working in the engineering, 22% in computer science and mathematics and finally 4% being employed in social sciences and economics. The distribution is shown in Fig. 3.

Types of Junior Research Groups

YIN unites a variety of different group types and funding sources (see Fig. 3). In the past many groups where funded by KIT itself, as Young Investigator Group (YIG), KIT Shared Research Group (SRG) or KIT Research Group (RG). However, this has significantly changed. The number of KIT funded groups within YIN has decreased by 48% in comparison to 2014 to 9 groups. In addition, currently there are 8 Helmholtz Young Investigator Groups which are co-funded by the Helmholtz Initiative and Networking Fund, the KIT and their hosting institute.

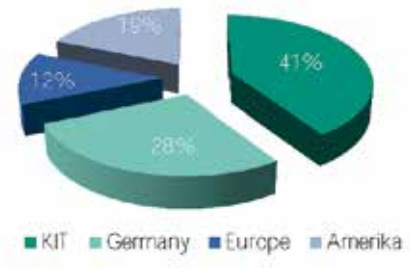


Fig. 2: Locations of positions of YIN members before coming to KIT (Data from survey 2015 based on 32 responses out of 50)

Many YIN groups are entirely funded by external sources such as the Federal Ministry of Education and Research (BMBF) (5), the German Research Foundation (DFG) via its Emmy-Noether program (5), and the European Research Council (ERC) via Starting or Consolidator Grants (3).

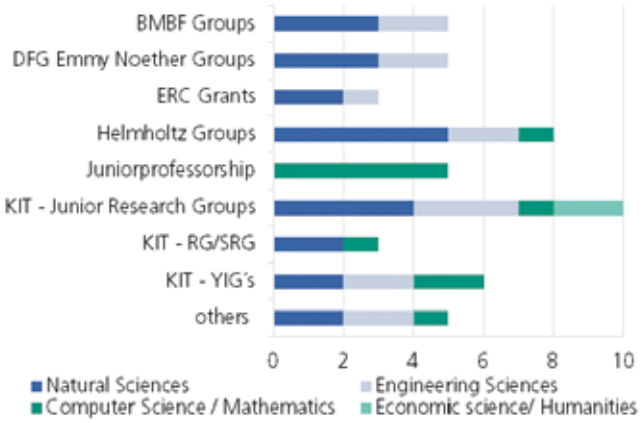


Fig.3: Distribution of types and number of YIN groups and areas of expertise (YIN database Dec 2015)

There are 5 junior professors and 10 KIT Junior Research Group leaders ("KIT-Nachwuchsgruppenleiter") in YIN. Other YIN groups are funded by the state Baden-Württemberg, DFG, or private foundations (Margarete von Wrangell Program), the DFG (Heisenberg Stipendium), the Center for Functional Nanostructures (CFN), and the Carl Zeiss Foundation for example. An overview is shown in Fig. 3.

Initial Funding

The amount of initial grant money for the different funding types varies from 30 000 euro for one year to 2.0 million euro over five years. The duration of the junior research groups at KIT is between three and six years. The largest funding is granted by the ERC Starting Grant, followed the by BMBF, DFG Emmy Noether and the Helmholtz program.

Our survey shows that junior research groups contribute a total of roughly 29 million euro, distributed over 3 to 6 years, towards research at KIT by their initial funding. This leads to a contribution of 7 million euro per year. As some of the junior groups are totally or partially funded by KIT roughly 6 million come from KIT, whereas the remaining 23 million euro are externally funded.

Subsequent Funding

In addition to the initial funding of the groups, YIN members have acquired a substantial amount of additional funding, in total 9.6 million euro for 2015. The majority, about 52% of these grants, is provided by external funding agencies such as the DFG followed by industrial partners with 41% and the remaining 7% by KIT.

Staff

The average size of a junior research group represented in YIN is 11 members including the group leader. A detailed look at 34 (out of 50) YIN groups shows that these groups comprise a total of 341 members including 27 postdoctoral researchers, 130 doctoral candidates, 76 Diploma/Master students, 54 Bachelor students and 36 student assistants. In addition, the groups employ 8 technicians, 8 guest scientists and 2 trainees, as shown in Fig. 4. Among the doctoral and postdoctoral researchers within the YIN groups, the majority comes from Germany. However, the groups are very internationally staffed; there are researchers from Europe, Asia, North and Central America, Africa and Australia.

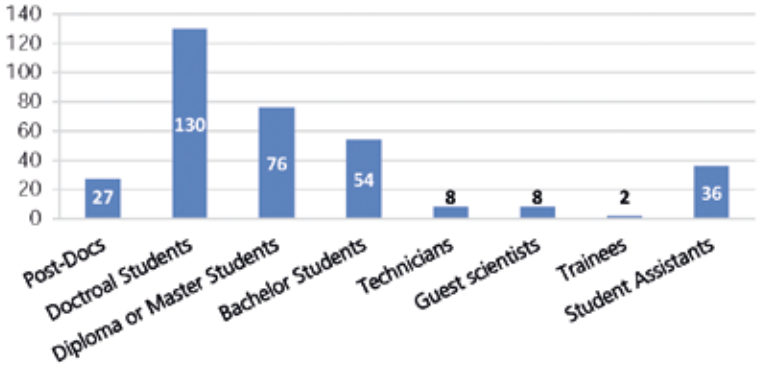


Fig 4: Number of people working in YIN groups

Teaching and supervised theses

About 79% of YIN members contribute actively to teaching at KIT. The majority of this group, 44%, is committed to teaching out of their own interest and on their own account, as only 6% get paid extra for teaching, for 29% teaching is obligatory, as shown in Figure 5.

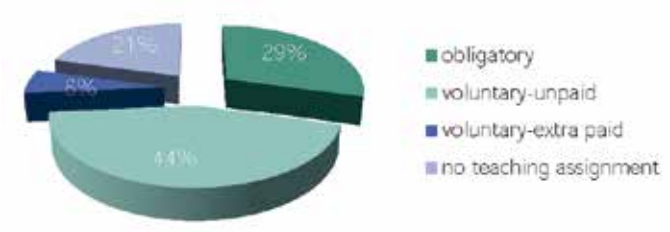


Fig.5: Lectureship assignment at KIT

Among the teaching YIN members 68% are satisfied with the amount of teaching, 26% would like to teach more and 6% less than they do now. In the summer term 2015 and winter term 2015/16, YIN members contributed a total number of 244.5 weekly course hours (SWS) of

regular teaching at KIT. These can be split up into 103.5 SWS of lectures, 71 SWS of practical training courses, 17 SWS of tutorials and 53 SWS of seminars. On average, this yields 7 weekly course hours per YIN member. In comparison, a full professor in Baden-Württemberg teaches 9 weekly course hours [1]. YIN members also supervise PhD students, Diploma/Master and Bachelor theses.

In 2015, 34 doctoral theses, 55 Diploma and Master as well as 43 Bachelor theses were written by students in YIN groups (Fig. 6). Although the contribution to supervising theses is quite high the number of examination entitlements is only 11 out of 34 participants of the survey.

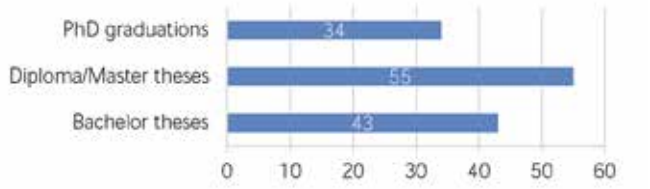


Fig 6: Number of theses supervised by YIN members in 2015

KIT Associated Fellow

5 years ago KIT implemented the instrument of an Associate Fellowship to give junior research group leaders the chance to take full responsibility for their personnel and gain experience in human resource management. Thereby, they may not only contribute to supervising their group members but also to take part in the doctoral examination of their doctoral students.
Young group leaders of 6 out of 11 KIT Faculties are currently offered this chance, which is an important step on their way to professorship. For more information about the KIT Associate Fellow please go to chapter Under Review (p. 6ff).

Habilitation

The status of a junior group leader was thought to replace the habilitation in future. However, the significance of the habilitation versus a junior group leader position is perceived in extremely diverse ways in different disciplines, universities and countries. By consequence, 32% of the participants are undecided if they want to habilitate or not, 47% still plan on writing (41%) or have completed (6%) their habilitation and 21% of the YIN members see the habilitation as dispensable for their career, (Fig. 7), which is a rise of 6% towards 2014.

[1] Lehrverpflichtungsverordnung – Verordnung der Landesregierung über die Lehrverpflichtungen an Universitäten

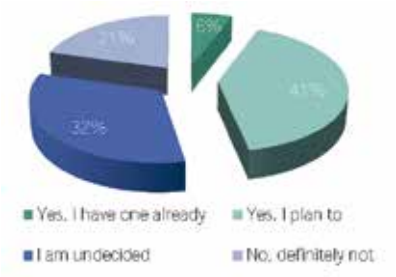


Fig.7: Estimation of requirement of habilitation

Publications, h-index, Conferences

A total of 166 papers and articles were published in 2015 for the 34 (out of 50) groups that participated in this survey. Some of the papers are published in high-ranking journals such as Nature communication, Advanced Materials, or Physical Review Letters which results in an average h-index of YIN members of 16. There is a difference in distribution that should be interpreted in light of different publication customs across the various disciplines represented in YIN. In addition to publications, YIN members present their scientific work – and also represent KIT – at numerous occasions. In 2015, the 34 participants of this survey presented their research results at 138 international conferences. Furthermore, 7 patent applications were filed by YIN members in 2015.

Distribution of working hours

At this stage of their careers, the time young group leaders spend in their labs or writing papers has diminished to 27% as other activities take more and more time and precedence. As all YIN members have personnel responsibility, 28% of their time is taken by supervising and mentoring, 14% by teaching and 15% by grant writing. Since all YIN members are third party funded this last point is a very important part of their job. Furthermore, there are increasing administrative duties they have to fulfill, which takes 16% of their time on average, as shown in Fig. 8.

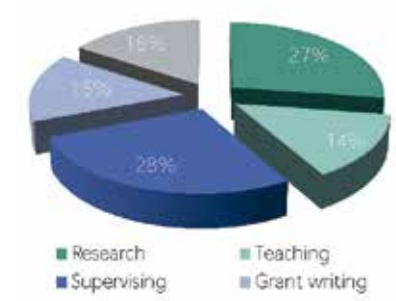


Fig.8: Distribution of working hours of YIN members

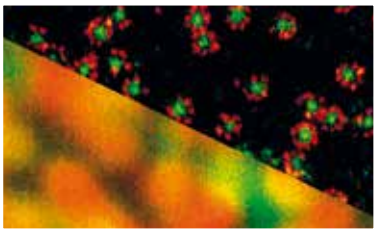
YIN Lecture Series continues

World leading researchers attract and strengthen the scientific community at KIT across disciplines, generations, and institutions. They inspire young researchers, enable discussion about current research trends, and encourage collaboration across disciplines. In the scientific year 2015/16, YIN has hosted three lectures with very prominent speakers.

YIN Lecture No. 2 with Chad Mirkin
After the inaugural talk of Prof. Metin Sitti, our second guest was Prof. Chad Mirkin. The world leading expert in nanoscience is best-known for the invention of dip-pen nanolithography and his discovery and development of spherical nucleic acids. The latter are applicable in immuno therapy, in genetic detection and cell manipulation and, thereby, span the gap between nanoscience and nanomedicine.

YIN Lecture No. 3 with Harald zur Hausen
With his lecture on red meat and milk from dairy cows as risk factors for cancers and neurological diseases, our third lecturer Nobel Laureate Prof. Harald zur Hausen attracted a crowd of about 500 enthusiastic attendees. The complete lecture is now available on YouTube.

YIN Lecture No. 4 with Stefan W. Hell
From microscopy to nanoscopy: Optical microscopy has overcome the resolution-limiting diffraction barrier of light. By inducing fluorescent and dark states, optical lenses are enabled to discern details much smaller than half the wavelength of light (200-400 nm), actually resolving features down to molecular dimensions. Molecules residing closer than the diffraction barrier could not be differentiated as they were all reflecting light. However, by transferring them to different (quantum) states – usually a bright fluorescent state and a dark state – they become discernible for a brief period of detection. Thus, the resolution-limiting role of diffraction is overcome, and the interior of transparent samples, such as living cells and tissues, can be imaged at nanoscale.



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For the development of Stimulated Emission Depletion (STED) Microscopy Stefan W. Hell was awarded a Nobel Prize in Chemistry in 2014. After a couple of years spent abroad, in 1997 he got the chance to prove his theories as a group leader on a five year contract at the Max Planck Institute for Biophysical Chemistry in Göttingen where he still works today as director of the Department of NanoBiophotonics.

Coming up next

YIN Lecture No. 5 with Nobel Laureate Prof. Jean-Marie Lehn
(Chemistry 1987, ISIS Strasbourg, France) on April 18, 2017

ProCo – Proposal Coordination Meetings

Bring scientists together, give them an incentive and see what happens – the new ProCo meetings are a melting pot for ideas. The goal is to foster cooperation between YIN members in reply to a third-party funding call. "In 2016, we started off with the calls *ProMatLeben* by the BMBF and *Additive Fertigung* by the Baden-Württemberg Stiftung", says Dr. Lars Pastewka, current speaker of the YIN transdiciplinary committee.

We believe that the focused nature of the ProCo meetings will help to build and sharpen research links among YIN members. And even if not all meetings lead to a joint proposal, future collaborations will be highly facilitated because a mutual understanding of overlaps between the respective fields of research has already been established.

We encourage all YIN members to send in interesting calls from German or European funding agencies alike. The ProCo meetings are also open to YIN alumni and, thus, provide a framework to connect with more senior scientists.

YIN Grants 2016

Visualizing complex relations for distributional analyses
Dr. Andreas Haupt, Jun.-Prof. Boris Neubert

AFM measurements of capillary forces between micro particles in gaseous and liquid environments
Dr. Erin Koos, Dr. Julia Syurik

Integration of electron-beam and optical lithography, for the development of quantum coherent electronics
Dr. Ioan Pop, Dr. Martin Weides

YIN Award for best scientific project

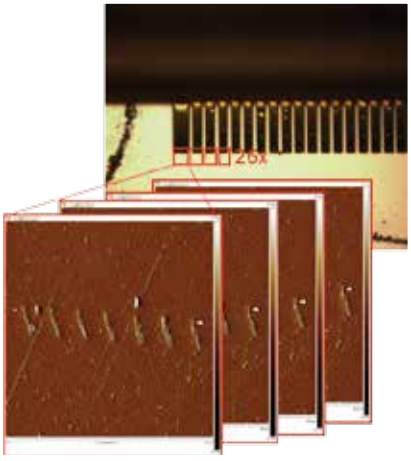
In addition to the traditional YIN Grants, 2016, the first YIN Award was given away to honor the project that received the highest score in the review process. The winners receive formal appreciation and a certificate signed by the Vice President for Research Oliver Kraft. Addressing all YIN Grant winners 2016, he said: "*Complex social and scientific problems call for interdisciplinary approaches. KIT fosters innovative solutions by bringing scholars from different fields together. The YIN Grants are a splendid tool to that aim. All the awarded research projects were of very high scientific quality and will contribute to KIT as an interesting and excellent research institution. It is my particular pleasure to grant Jun.-Prof. Boris Neubert and Dr. Andreas Haupt with the YIN Award 2016 for the best interdisciplinary research project. Their collaboration on* Visualizing Complex Relations in Distributional Analysis *combines quantitative social science with a focus on poverty research with newly developed data visualization techniques from informatics. The project is a perfect example of how the collaboration of YIN members will contribute to the big challenges mentioned above. I wish all YIN Grant winners a very productive and insightful time working on the shared project.*"

Towards Massively Parallelized Electrochemical Dip-Pen Nanolithography

Electrochemical Dip-Pen Nanolithography (E-DPN) is a versatile process for creating miniature electronics. Devices can be made from different metals and with high precision. Due to limitations such as area coverage, process duration or wear of the tip, it is, however, only used on laboratory scale. To switch from writing with only one tip to a parallel process with 1D or even 2D tip arrays, may overcome these drawbacks.

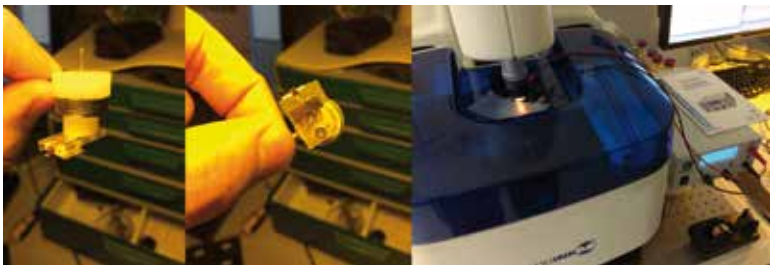
DPN-specialist Dr. Dr. Michael Hirtz and Dr. Julia Syurik, an expert in Electrochemical Atomic Force Microscopy (E-AFM), got the idea during a traditional "Get-together" part of the YIN meeting und successfully applied for a YIN grant.

In the project, we have proposed to demonstrate the potential for upscaling E-DPN by establishing a parallel E-DPN setup for reproducible writing of metal nanodots for nano-electronics and other applications.



Towards Parallelization - Ni pattern written with a cantilever with 26 tips by E-DPN within 5 minutes. Scan size is 30.2x30.2µm2

As commercially available DPN systems do not feature a field source and isolated sample and tip holder, a modification of the system was required. In addition, a precise control over the distance between the cantilever and the surface, was not allowed by the standard DPN system due the absence of feedback loop and workarounds had to be found. Therefore, a big part of the project was to find feasible technical solutions and optimizing the designs based on feedback from the experiments until parallel writing could be achieved.
The customized E-DNP system was tested by writing of dots and lines of Ni from a 20% aqueous solution of Nickel Chloride-Hexahydrate ($NiCl_2 \cdot 6H_2O$) with varying tip-sample voltage, distance and speed. The best structures were created at 3V and 10nm/sec with the resulting height of about 1.5nm. The shape and the distance between the structures could be well controlled during the process, resulting in significant increase of area coverage without losing the quality.



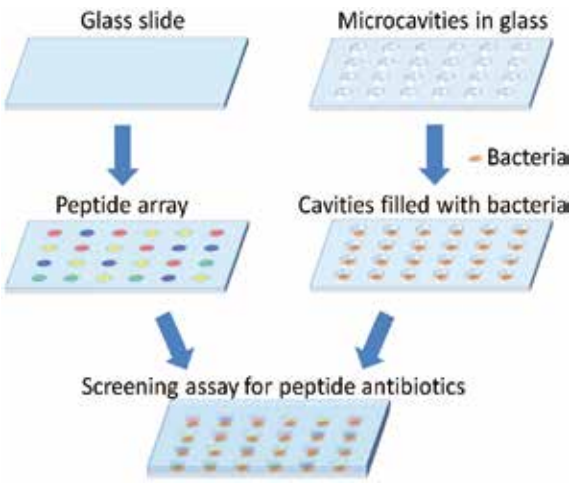
Customized cantilever holder and an overview of the set up for the parallelized E-DPN lithography.

Such structures with highly defined shape and position are very promising to address such problems as adhesion of Carbon nanotubes (CNTs) when they are made of transition metals (like Ni) or they can serve as photonic nanodots for example for water splitting. The described project has demonstrated the general feasibility of parallel E-DPN and elucidated the needed adjustment to presently available equipment, the research studies of the Ni nanodots as catalytic centers are ongoing and will be a first step towards application of the new technique.

Micro Peptide Arrays for High-Throughput Antibiotic and Biofilm Inhibitor Screening

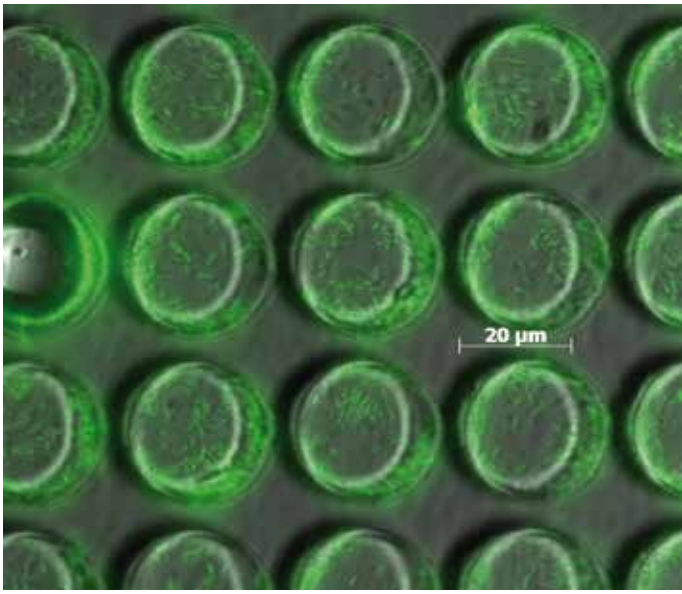
Increasing bacterial drug resistance and the lack of new antibiotics have the potential to inflict a major burden on society and the health care system: Bacterial infections, easily treatable since the discovery of penicillin in the 1940s, turn into life threatening diseases. The formation of highly antibiotic tolerant biofilms is one of the major resistance mechanisms in bacteria. To tackle this problem, the physicist Dr. Felix Löffler (l.) and micro biologist Dr. Jörg Overhage (r.) develop a novel in vitro assay for high-throughput screening of peptides as highly effective antibiotics and biofilm inhibitors.

In this grant, a novel and highly flexible high-density array technology was used for the production of peptide arrays on glass substrates. By cleaving the peptides from the substrate in a gas phase, the peptides are able to diffuse and interact with human pathogens. In the next step, human pathogens were transfected to express a fluorescent marker, which is only expressed if the bacterium is alive.



By positioning two glass slides, the first with peptide spots, the second carrying reporter bacteria, on top of each other, each peptide is screened for its antibiotic properties. (Image: Institute of Microstructure Technology, KIT)

These "reporter" bacteria were deposited into microstructured cavities of a glass substrate. Contacting the cleaved peptides of the array with the bacteria, cultured in the microcavities, we initiate the interaction of these bacteria with the peptides and monitor the bacterial viability status and biofilm growth via fluorescence signals.



Reporter bacteria in the microcavities of a glass slide, expressing a green fluorescent protein. Fluorescence is only expressed in living bacteria, which "reports" the viability status of bacteria in each cavity. (Image: Institute of Functional Surfaces, KIT)

This novel assay will allow us to screen several ten thousands of potential peptides for their activity as an antibiotic and biofilm inhibitor. As a result from these preliminary experiments, we have submitted a joint grant proposal, which is currently under revision. We believe that this technology has a very high potential to become an important tool in pharmaceutical drug discovery screenings.

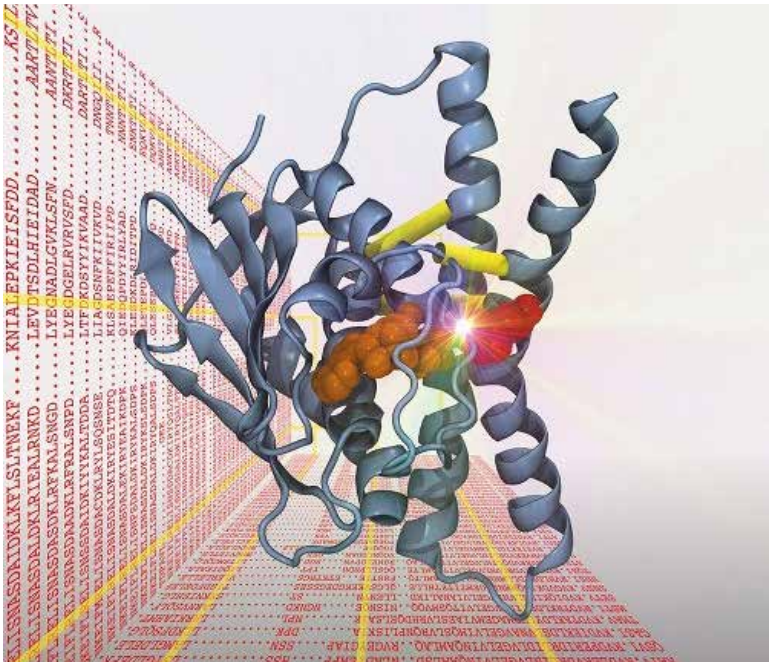
Protein Structure Prediction by Tracing Amino Acid Co-Evolution via Graph Theory

On the molecular level, proteins and RNAs are the Swiss army knives of life. They underlie all basic functions such as oxygen transport in the blood stream, providing stability to a spider's web, muscle activity or enzymatic function in cells. Typically, their function is closely tied to their 3d structure. Yet the 3D structural characterization of many important biomolecules is experimentally challenging. At the same time, genomic databases containing raw sequential ("1D") data about biomolecules grow exponentially. So why not exploit such databases? Over a few mugs of coffee, Dr. Alexander Schug (l.) and Jun.-Prof. Henning Meyerhenke (r.) put their heads together. Combining their complementary expertise in biophysics and computer science, they developed a algorithmic framework for mining these vast amounts of raw sequence data with the goal of predicting biomolecular structures based on residue and contact co-evolution that are experimentally poorly accessible.

Alexander Schug has worked with a powerful statistical methodology called Direct Coupling Analysis, which can analyze evolutionarily closely related sequences to accurately predict pairs of residues in spatial contact within biomolecules. This information can guide the prediction of biomolecular structures when used in combination with molecular simulation. These methods are currently revolutionizing the field of molecular structure prediction, yet the molecular simulations remain computationally very expensive.

Henning Meyerhenke, in turn, is working on graph algorithms usually applied to analyze large complex networks. Two examples of such networks would be the friendship graph of a social network or the link structure of the world wide web. NetworKit, a highly performant open-source tool suite for scalable network analysis driven by Henning's group, sounded well suited to process distance networks, which are similar to the data provided by co-evolutionary analysis, into biomolecular 3D models.

As a first step, Henning and Alexander managed to reproduce biomolecular 3d models in NetworKit in few seconds based on their distance networks. This is computationally considerably less expensive than biomolecular simulations, which are often running for days. In parallel to this work, they composed a long list of candidates for co-evolutionary analysis and structure prediction. Currently, both laboratories work on efficiently integrating the noisy co-evolutionary data into NetworKit and are also thinking about applying it to NMR data.



The integration of inferred co-evolutionary couplings into molecular simulations allows predicting protein and RNA structures with high accuracy.

Should we care about teaching evaluations?

Dr. Andreas Haupt talks about the issue with Jun.-Prof. Tobias Wolbring (University of Mannheim)

Teaching is seen as an integral and important part of the work for YIN members. Most like their current teaching situation or even prefer to teach more (Fig. 1). It is commonplace for the staff at KIT Faculties to be evaluated by their students during the semester. The primary aim of teaching evaluations is to give us feedback in order to find out what already works well for the students and in which way teaching could be improved. Without doubt, this purpose makes perfect sense. We could be able to evaluate, whether students cope with pace and content of the curriculum, where difficulties occur and thus immediately react and optimize our lessons. But what do these evaluations actually account for – the quality of teaching or the quality of students? Are there problems with the evaluation technique itself and are we able to solve them? With such questions in mind, YIN member ***Dr. Andreas Haupt*** (r.) had the pleasure to talk with **Jun.-Prof. Tobias Wolbring** (l.), a widely acclaimed expert for evaluation techniques in the social sciences.

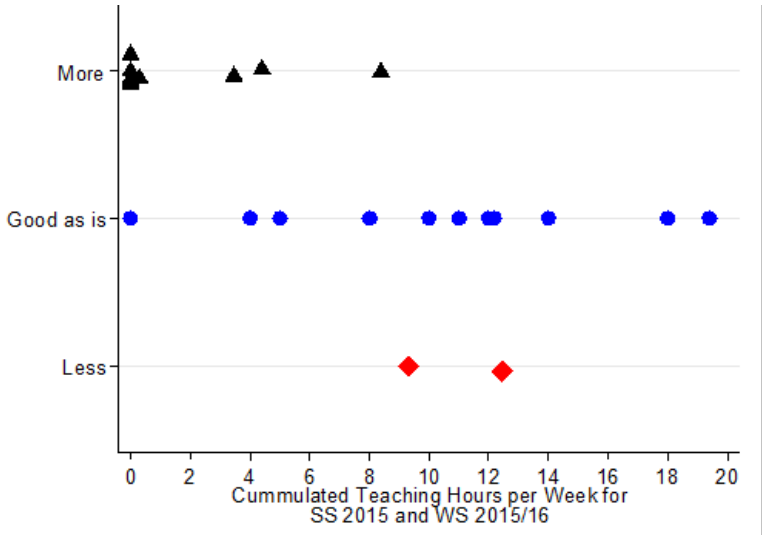


Fig. 1: Preference for teaching in correlation with teaching hours (YIN-Survey 2016)

Teaching evaluations have attracted a lot of very sound critique in past years. The most prominent is that we do not measure teaching quality itself. On basis of the current YIN survey it is crystal-clear that almost everyone expects the quality of teaching to play at least some role for future career decisions (Fig. 2). I wonder, whether teaching evaluations as they are commonly implemented, not only at KIT, do us more harm than good.

A recent survey by the German Rectors' Conference showed almost every university in Germany uses student evaluations of teaching (SET) and many rectors perceive them as a core component of their quality management system. However, bad evaluation results do usually not have severe consequences for instructors or departments. So at first glance it appears that we can neglect the harms.

Assuming that teaching evaluations do not become more important in hiring decisions.

True. The German higher education system is moving in the direction of the U.S. where SET results are used as a basis for decisions about hiring, tenure, funding, and payment. This incentivizes certain behaviors and can have serious unintended consequences such as manipulation of SET results, removing difficult contents from courses, and most importantly grade inflation. In this regard, the quality of measurement becomes important: Do we really measure teaching quality with SET? We certainly measure one dimension of it, namely the satisfaction of students with a course, and this dimension is also correlated with other measures such as peer evaluations and teaching quality. However, SET are also influenced by variables which are not directly related to teaching or which can hardly be influenced by instructors: student interest and prior knowledge, physical attractiveness of the instructor, and composition of course participants. Departments in the U.S., thus, have a strong incentive to be

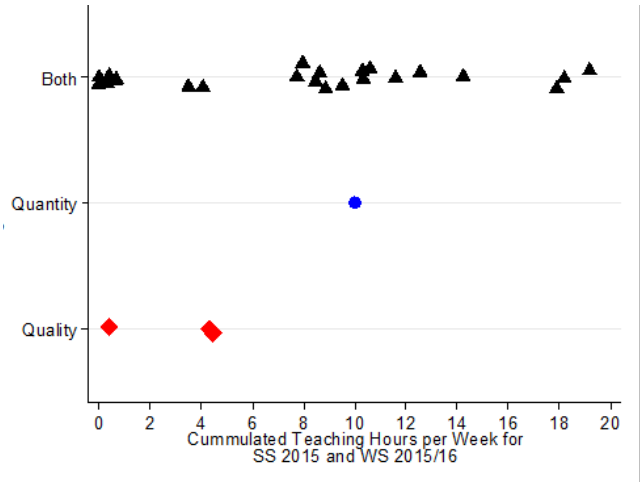


Fig. 2: Expectation whether quality, quantity, or both matter to future employers of YIN members (YIN survey 2016).

selective and admit only highly motivated students with excellent grades, because they usually give more favorable ratings. Hence, the more we rely on such an incentive system for "good" teaching, the greater are the potential harms of SET as well.

If SET are getting more important for hiring decisions a follow-up question appears: Are the evaluation scores comparable between universities, over time, or even within the same university?

It is usually not a good idea to compare SET collected at different institutions and it is often also problematic to compare ratings of different courses in a department. There are several reasons for that. The first is varying composition of the course participants: You can give the same lecture in two different universities and can get pretty different feedback from the audience. For example, here in Mannheim students like my statistics lecture much more than in other sociology departments. The second issue is selection into courses. Sometimes students have to attend your course because it is mandatory, sometimes they can choose between different electives. This can make a huge difference for evaluation scores, in particular if most students are not very interested in the course topic. On average mandatory courses are rated less favorably than electives, in particular if the course topic is not very entertaining. Apparently, the instructor has hence only a certain influence on the course rating. A third problem limiting comparability is that not all course participants participate in the SET survey: If you conduct a paper-and-pencil survey, some students won't be in class anymore and you miss to include their feedback. However, it is likely that those students are less satisfied with the course.

What is your best practice advice for this?

Online SETs provide an advantage here but the problem is that we often have very low response rates. That is why I recommend to conduct online SET in class securing a high response rate and to invite absent students via email to also participate in the survey.

I can see that this improves the sample for SET. But what are your suggestions for improving teaching evaluations in general?

In an ideal world we would use all the empirical evidence on measurement problems in SET to adjust student ratings for these biases. However, I think the gains from this do not outweigh the huge efforts necessary to remove this noise from the measurement. So my recommendation is to acknowledge that SET have certain limitations which cannot be easily cured and thus to avoid them as a basis for making important decisions. However, I think SET can nonetheless be a valuable input for instructors. They should be used as an instrument for formative instead of summative evaluation. This means that they can be pretty useful to monitor and improve the ongoing process of teaching but not to make a final assessment of how good or bad a certain course or instructor is. In order to use them in a formative way, I recommend conducting SET already after a few weeks, to discuss results with the class, and to consider changes or other ways to address dissatisfaction and critique. My experience is that taking students seriously and responding to their assessment increases students' motivation to participate in the evaluations and fosters a cooperative atmosphere in the classroom.

Ioan Pop (33)
Group leader with Sofja Kovalevskaja Award (Humboldt Foundation)
Postdoc in Yale University, USA – Doctorate from University of Grenoble, France

Did your postdoc years in the U.S. prepare you in any way to lead your own research group?
In large groups, such as the one where I worked, you are encouraged to take on some management duties, to start your own team of a few students. My professor had around 10 PhD students at a time, who were scientifically supervised by two to five postdocs working as middle managers.

Why did you choose to come to Germany after those years?
I wanted to have the U.S. experience because I knew it was a very different system, a very different society. It is one thing to travel and another to live and work in a system for a longer time. The goal was to go to the States when I'm young and unattached and, then, come back to look for a more permanent position in Europe.

What were the biggest differences?
Generally speaking, the U.S. system is more pragmatic and competitive. I tend to like that. However, there are drawbacks: If you have a system where you constantly have to proof yourself, you can either do that or you can simply focus on showing that you are better than your neighbors. In time management classes, they teach you to spend a surprisingly large amount of time on making sure other people notice your work and that you are working. Another thing is the structure of universities. In Germany it is much more top-down management, whereas in the U.S., at least where I was, it was more bottom-up. For example, when the university wants to hire a new person, it feels like in the U.S. the emphasis is on recruiting young talent, whereas here, it is more about attracting established professors with their accompanying staff. Obviously, these two strategies imply very different financial commitments.

You wanted to come back to Europe, why choose KIT?
I chose KIT because I thought it is the best scientific opportunity for my career. Also, we have family ties in Germany.

Is KIT well suited to integrate Sofja Kovalevskaja awardees?
I think German universities are doing their best to find arrangements for young investigators. Still, sometimes it feels weird because that is what they are: arrangements. The whole German system is in transition and between the different laws and traditions it sometimes seems unclear what we are allowed to do and if we can get credit for it. Nonetheless, I am very happy with my current position at KIT and especially grateful to my host Professor Alexey Ustinov whose generous efforts made me feel very welcome here.

Erin Koos (36)
Associate professor at KU Leuven, Belgium
ERC group leader at KIT – Postdoc at KIT – Doctorate from California Institute of echnology, USA

Why did you decide to come to Germany for your postdoc years?
I wanted to experience the world. I came to Germany for the research. I was also looking for something that's culturally not so far away from what I was used to – modern western culture basically.

Did you consider going back to the USA after your postdoc years?
I did, but I found that Germany was preferable. Here, there are more positions and funding opportunities for young group leaders and I successfully applied for a starting grant by the European Research Council (ERC). In the U.S. you have mainly assistant professor positions. The tenure evaluation can be quite difficult, however. In some cases U.S. universities hire two assistant professors for one full position. The research community is also different: In Germany, people tend to be a lot more collaborative – at least in my field. The grants are designed in such a way as to encourage joint research. In the U.S., funding is mainly for individuals.

Are the German system in general and KIT in particular well suited to integrate ERC awardees?
I feel that other countries and even other universities in Germany might be a little more lenient with granting examination rights. It is a bit ambiguous if I am the principal investigator of a project, but not the PhD supervisor for the students working on the project. If the supervisor and I disagree, for example, on the experiments a student ought to do, it is unclear to whom he or she is supposed listen. For me, there really haven't been any problems, but this could become a source for dispute quite easily. Technically, I was independent. But there wasn't quite full independence.

What could the different research systems learn from each other?
It would be nice if they would come closer together and make it easier to move around. You see a modernization towards an international standard, such as the German system changing towards junior professors as opposed to habilitants, but it is still a long way off. Yet, I'm not sure if going completely towards the U.S. system is good. For assistant professors, it is sink or swim sometimes. Mentoring systems are also more like a passive resource that leave the young researchers essentially on their own. In Germany, research group leaders are tied to a department, to a professor. You are less independent, but there is also a good side to it: You have someone who is really invested in your success for help and guidance. Learning to manage a research group is not easy. Sometimes it is great to have an experienced professor to talk to.

Peter P. Orth (36)
Assistant Professor at Iowa State University, Ames, USA
Postdoc at the University of Minnesota, USA – Young Investigator Group leader at KIT – Doctorate from Yale University, USA

Is it advisable to move to the U.S. before applying for an assistant professorship there?
I think it is more likely to get a professorship in the U.S. when you have already established a network there. In my field, there are up to 300 applications for one position. Hence, it is advantageous to have letters of recommendation from U.S. professors and if your name rings a bell. Once you are invited to a campus interview, they want to find out if you – especially as an European – are likely to move there to take the position. It helps if this is not an issue.

What are the terms for an assistant professor in Iowa?
Assistant professor means that you are not tenured yet. This decision will typically be made after six years. With regard to salary and research funding, I think it is comparable to a W2 position in Germany. The university gives you a start-up budget which covers your expenses for the first few years. But then, in order to get tenure, in order to establish a research group on longer terms, you need to secure an external research grant. If you succeed and you are doing fine in terms of publications and teaching, you are likely to get tenured. Again similar to a W2, I have full teaching and examination rights and am obliged to offer one lecture per semester.

Is the tenure perspective important to you or do you plan to come back to Germany anyway?
The possibility that I can stay is actually the reason why I prefer this position over an Emmy-Noether group in Germany. The DFG invited me to present my research, but I decided not to go. An Emmy-Noether group is a great opportunity of course, but would mean that after four to five years, I would have to leave again and be in a similar situation as I am in now, looking for a permanent position. I don't want that; I want at least the option to stay. This also affects the general atmosphere at the department, where people support you and want you to succeed and stay.

In your opinion, what could the German and the U.S. research system learn from each other?
From the perspective of a postdoc, the possibility to lead a young investigator group at an early career stage, like right after the Ph.D., is a unique opportunity. Being able to secure funding and hire my own students made me much more independent; being responsible for students made me learn a lot and grow as a teacher and mentor. I also profited immensely from the YIN leadership courses that were open to me. In the other direction, it is mainly the tenure track system that I think is very attractive and fair to people. I also find it more sensible to apply for a grant once you got a position, instead of the other way around. To work out what you might contribute to a potential host institution in terms of science and teaching, for example, takes time and effort on both sides prior to the application.

Continually towards Leadership Excellence
Highlights and News from 2016

One major advantage for YIN members is having access to a high-quality continuing education program. The courses are exclusively for young research group leaders and junior professors, thereby providing an atmosphere of understanding and trust. While being specially tailored for young scientific leaders, the modular program also flexibly adapts to the current needs of YIN members. The courses themselves are conceptualized, organized and implemented by the service unit *Personnel Development and Vocational Training (PEBA)* of KIT.

Dr. Julia Syurik
Institute of Microstructure Technology

The Art to Present Yourself was my absolute favorite among the 12 YIN workshops I attended so far. Given by a real theater and opera director, the 2-days workshop was imbued with a spirit of art, play-acting and mystery. With a small group of 6 people, the workshop started with presenting ourselves and our research in a way we would do it during a conference, so that our couch could estimate the field of "work". Afterwards, he proposed to start from the beginning. We learned and re-learned to say hello, shake hands and go to the stage. I never realized that a presentation starts before the talk – by going onstage, greeting the audience, choosing a pose and a place to stand, etc. Another surprise was how many things one can do wrong without even noticing them. Unlike other similar courses, no camera recordings were needed, as our tutor could easily mimic gestures, tones and mistakes of any participant. Over a year has gone by and I can still remember mine very well… Step by step we worked on every tiny detail to make our stories vivid, real and colorful. Instead of taking science, we were explaining how to make ice, *Borsch* and bake baguettes. The miracle happened at the end of the workshop when we were able to implement the obtained knowledge in our scientific presentations. They were, similar to baguettes and ice, tasty and colorful. The whole group decided to also participate in the continuing course **The Art to Present Yourself Part Two: Dramaturgy of Attention**. Here, we have learned not to lose ourselves in front of presentation slides. To me it was a surprise that giving presentation with slides is actually harder than without. We finished the workshop with greatly improved presenting skills and presentations. The intimate warm atmosphere during both courses would never have been possible without the outstanding personality and on-stage experience of our director and coach.

Karin Funk
Personnel Development and Vocational Training (PEBA)

Since October 2016, I take care of the further education program that is specifically offered by PEBA to the YIN members. I enjoy working with the young scientists in this important phase of their scientific career and to support them in their individual further education. I am convinced that the path to success and personal satisfaction for each scientific leader is not limited to the predominant subject of "Leading my scientific research". It is also very important to develop the themes "Leading me" and "Leading my team" and I can contribute to this.

Dr. Anke Diez
Head of Personnel Development and Vocational Training (PEBA)

In October 2016, Karin Funk became Alexandra Hund's successor as contact person and organizer for YIN further education. Karin Funk has a Master's degree in vocational education and is an expert in personnel development. She has over 16 years' experience in corporate learning from a variety of companies and branches and has worked as a manager, coach, and trainer. The expertise and experience she has gathered throughout her career will allow her to provide the needed support to individual YIN members, as well as to the YIN network as a whole.

Two YIN Certificates awarded

Leading and managing at academic top level requires professional, methodical, social and personnel skills. Within the YIN advanced qualification program, YIN member Dr. Christian Greiner and YIN alumnus Ass. Prof. Martin Nöllenburg have reflected, improved and demonstrated their respective qualities. After many seminars, workshops and coachings – mounting up to 200 academic units – they have proven themselves as exceptional leader personalities worthy of the YIN Certificate *Academic Leadership*.

Dr. Stefanie Betz
Institute of Applied Informatics and Formal Description Methods

I can fully recommend the **YIN Writing Retreat** – having three days to concentrate only on writing projects like proposals or publications without interruptions was perfect. There is not much time for that during the usual day-to-day business. The retreat started with a short introduction that helped us to get in the right "mood" by letting us reflect on our goals and writing habits. What enables and what hampers writing routine can vary quite a lot from person to person: Some need silence, others only work at special hours, and a third group just wants to follow a well-structured writing schedule. After having been made aware of our preferences, we had the freedom to organize ourselves in a way we thought most reasonable. We all had different plans ranging from structuring papers to preparing grant proposals or finalizing resubmissions. Amazingly, between the inspiring set-up with its largeness and reclusiveness and the support of a writing coach everyone managed to get the things done he or she had set out to write during the retreat. The coach went through difficult passages with each of us individually, looking for the common thread and checking the textual quality. Furthermore, the peer-group helped very much in staying focused on writing Even during breaks, the scientific discussions with the other participants were not only a nice diversion but lead also to new proposal ideas.

Alexandra Hund
Personnel Development and Vocational Training (PEBA)

In 2008, during the Excellence Initiative, a group of individuals including Professor Dr. Detlev Löhe, the Young Investigators Dr. Timo Mappes and Dr. Chris Eberl and I developed the idea of supporting the KIT Young Investigators (YIs) in a special way. We asked ourselves what the Young Investigators all had in common and came up with the answer that this was the first time in their careers that they were responsible for supervising others and leading a research group. We decided to use the allocated money to finance a further education program and invited several organizations to present a concept. In the end, PEBA, a KIT service for staff development and professional education, won the competition. At that point in time, I was not yet at KIT. I was still self-employed in the fields of higher education and leadership, although I had already begun working with scientists. I received a phone call and was asked to apply at KIT. A mere 10 days later, I found myself in front of 30 very critical YIN members, trying to convince them that I was the right person to create, develop and manage such a program. At this time, the program just was an idea laid out in three powerpoint slides. I was offered the position and accepted it – a decision I have never regretted. During these eight years, I have had the privilege of working with more than one hundred fascinating people. I have had the opportunity to help the members in both their personal and professional development, which was not only a great pleasure, but also enriched my life in many ways. I am still in touch with many of the participants and alumni and enjoy frequent contact. I think the Leadership Excellence Program, especially the follow up, shows the quality and value of the program. More than half of the participants are alumni, who continue to return and participate in events. They often report that there is nothing like this offered in their own organizations. For me, this is very clear feedback and an expression of the quality of the program. I would like to thank all YIN members very much for the time I was able to spend with the network, for the experiences we enjoyed together, and for the ideas, doubts and hopes I was privileged to discuss with them. The YIN also helped to create a very fruitful program for scientists at KIT, a program that is widely known and imitated in many other universities and scientific institutes. YIN is just great!

New Members

Dr. Stefanie Betz
Institute of Applied Informatics and Formal Description Methods

Margarete von Wrangell habilitation program
Software and Systems Engineering

Dr. Frank Biedermann
Institute of Nanotechnology

Emmy-Noether Group
Nanomaterial-based Artificial Receptors

Dr. Christian Brandl
Institute for Applied Materials

KIT-Junior Research Group
Computational Nanomechanics of Materials

Jun.Prof. Dr. Andreas Braun
Institute of Regional Science

Juniorprofessorship
Risk Oriented Regional Development

Dr. Manuel Hinterstein
Institute for Applied Materials

Emmy-Noether Group
Functional Electroceramics

Dr. Daniel Hoang
Institute for Finance, Banking and Insurance

KIT-Junior Research Group
Finance and Business Economics

Dr. Ulrich W. Paetzold
Institute of Microstructure Technology

Helmholtz-Young Investigator Group
Advanced Optics for Photovoltaics

Dr. Ioan Pop
Institute of Physics

Sofja Kovalevskaja Startup Grant
Superconducting quantum circuits

Dr. Manuel Tsotsalas
Institute of Functional Interface

Helmholtz-Young Investigator Group
Hierarchically structured biomaterials and nanomembranes

Dr. Lars Bauer
Research Group Leader
Karlsruhe Institute of Technology

previous:
YIG Young Investigator Group
Methods and Architectures for emerging dynamically reconfigurable systems

Dr.-Ing. Ingmar Baumgart
Senior Scientist
FZI Forschungszentrum Informatik, Karlsruhe

previous:
YIG Young Investigator Group
Service-oriented, decentralized and secure social networks

Dr. Stefan Hey
Manager
movisens GmbH, Karlsruhe

previous:
KIT-Junior Research Group
Body and mind coaching

Dr. Dr. Michael Hirtz
Research Group Leader
Karlsruhe Institute of Technology

previous:
KIT-Junior Research Group
Bioactive surfaces and sensor functionalization by Dip-Pen Nanolithography and related techniques

Dr. Jubin Kashef
System Integration Specialist
Strategic Biomedical AG

previous:
YIG Young Investigator Group
Cell migration

Dr. Patrick Jochem
Research Group Leader
Karlsruhe Institute of Technology

previous:
KIT-Junior Research Group
Interaction of Science and Technology with Society | Energy, Transport, and Environmental Economics

Dr.-Ing. Steven Peters
Manager Technology Management Group Research
Daimler AG, Stuttgart

previous:
KIT-Junior Research Group, Industry Fellowship
MigProTech – Migration of production systems with innovative production technologys

Dr. Alexander Schug
Research Group Leader (Tenured)
Karlsruhe Institute of Technology

previous:
Helmholtz-Young Investigator Group
Multiscale Biomolecular Simulation

Prof. Dr. Erin Koos
Associate Professor
KU Leuven (Belgium)

previous:
ERC Starting Grant
Capillary suspensions for versatile, cost efficient and environmentally friendly material design

Dr. Ralf Ulrich
Research Group Leader
Karlsruhe Institute of Technology

previous:
Helmholtz-Young Investigator Group
Interpretation of Ultra-High Energy Cosmic Ray Data Using LHC Measurements

ERC Grants: From Start to Consolidation

Scientific excellence, five year time frame, and 2 million euros – ideal conditions for the "QuantumMagnonics" project to thrive. For his idea to generate and detect individual spin waves by coupling spin waves with superconducting quantum circuits, Dr. Martin Weides has received a Consolidator Grant. With it, the European Research Counsil (ERC) supports outstanding scientists with seven to twelve years of experience since completing their PhD. But how to become one of 15 applicants who is selected by the council? Dr. Martin Weides has been on both sides and shares his experience.

When you first applied to the ERC for a starting grant in 2012, your project idea just missed being ranked as an A-proposal. What was it lacking and what did you learn from that round in regard to your application for the consolidator grant?
My first application (for the ERC starting grant) was focused on quantum computing circuits: I proposed improving their core element, the superconducting tunnel junction, regarding scalability, tunability, and robustness. The panel recognized the very relevant question for future quantum computing, but missed a discussion of potential drawbacks of the proposed solution.

Be prepared to discuss potential drawbacks.

This is a quite difficult question to answer before you actually run the experiment. I was, however, able to get the project started later and by a different funding agency.

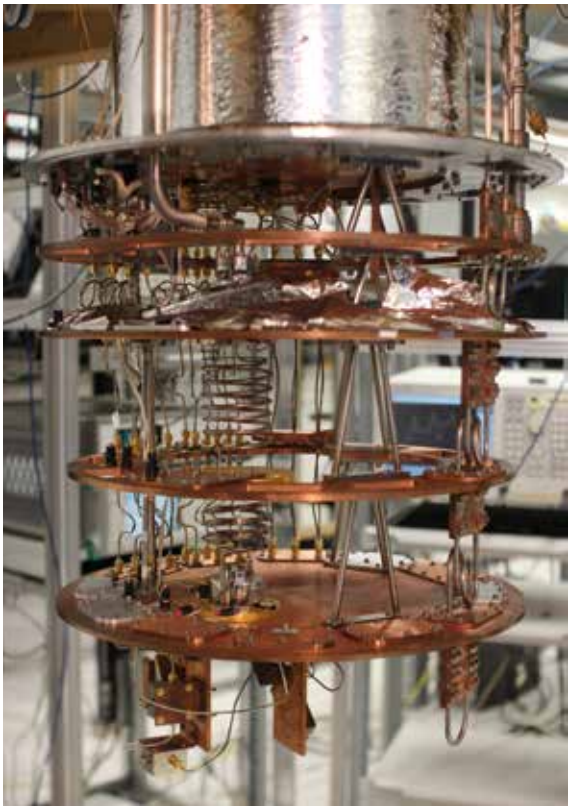
Research wise, in what way was your second project "superior" to the first?
The second try, this time for the consolidator grant, was on something different. I felt a more fundamental study would be even better suited for the ERC. Also, in the time between both proposals my group had made significant progress in setting up highly-coherent quantum circuits, operating, controlled and manipulated at milliKelvin temperatures and microwave signals. We were ready to do something 'useful' with it!

For the second application I proposed to use this technology to research and manipulate electron spins in ferromagnetic materials. Hereby, the fields of 'superconducting quantum circuits' and 'spintronic' are going to be connected, probably for the first time.

Besides the research subject, where there more fundamental differences between your applications for the starting and the consolidator grant?
Being involved in more grant applications on a national and international level helped to 'learn' and 'master' the peculiarities of high-risk and high-gain proposals. As a PhD or Postdoc researcher the focus is mostly on the next (little) steps in your very own experiment. Those 'details' can be very tricky though, of course.

Draw the 'big picture'.

For high-level proposals one has to draw the 'big picture' while evaluating quickly its complexity. Accepting some uncertainties in the project while working out the proposal is an art I got and still am getting better in.



Dilution refrigerators reach very low temperatures near absolute zero of minus 273°C. (Photo: Dr. Martin Weides, KIT)

What was the best advice you got while preparing your application for the consolidator grant?
Actually, I did not consult many colleagues for the second one. Probably just one. For the first one I asked more colleagues, though.

Were you in exchange with ERC awardees?
After getting invited to the interview I spoke to two ERC awardees about the presentation in Brussels. They recommended running lot's of trial presentations before different audiences and polish every single part of it. Furthermore, they described the interview setting, the atmosphere, and what kind of questions they received.

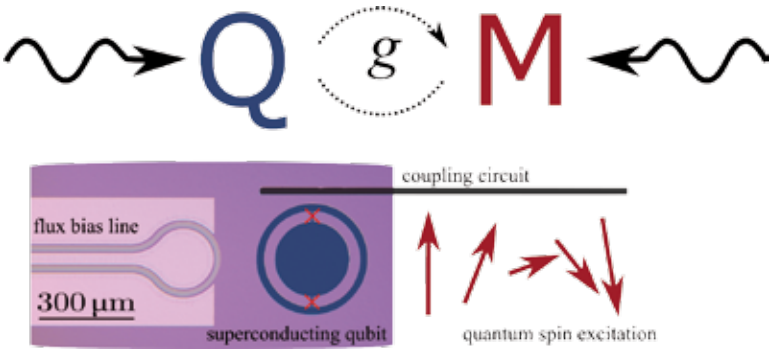
What official information did you get?
The panel at the interview is not known beforehand. Communicated are just the allowed time and the number of slides for the presentation. I was allocated 12 minutes accompanied by an unlimited number of slides. Other panels are stricter.

How did you prepare for the interview?
Between submission and invitation to the interview my KIT position was running out, and I was offered a deputy professorship at University of Mainz. There as well as at KIT, I gave several test talks. I also participated in an 'ERC-Interview-coaching' in Berlin, organized by the Helmholtz headquarter, and did a couple of test talks at home. By consolidating all the feedback the slides were polished a lot. Actually, people not within my field were much more critical. For instance, white text on black background – something I used for 5 years – was not well received outside the KIT group. Also, they shifted the focus towards general aspects and implications of the proposal. One particular health care researcher offered very constructive input, I am very grateful to her and everybody who helped!

Also ask people from outside your field.

Turned the interview out as you expected it?
The interview was very good, better than expected! 12 minutes presentation and 13 minutes discussion. The presentation set-up was quite unusual: There were two screens, one with a clock counting down and the other on with the actual slides. It is a busy but friendly atmosphere, short answers are expected. Not much could have been asked or discussed, of course. About 5 experts from the panel were asking questions, focused on science: Is the main focus of the proposal …, or rather…? What kind of dynamical excitation do you plan to study? What systems to study after 5 years of funding? Drawbacks of your approach? How mitigated? What about your method is new?

Think beyond the five-year-frame.



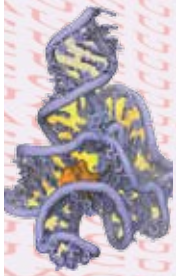
Superconducting qubits: quantum manipulator and detector of electron spin dynamics. (Image: Dr. Martin Weides, KIT)

What feedback did you get from the council?
The panel recommended to connect closer with the spintronic community. I kept my position at Mainz, and even started a research project there for that particular reason. The ERC project itself is hosted at the KIT.

In hind side, is there anything you would have done differently? What advice would you give?
As it worked out well, no! There is always room for improvement, but the outcome was pleasant anyways. To younger colleagues: keep applying!

Grant applications are like research: persistence pays off – mostly.

QuantumMagnonics – Coupling of Spin Waves with Superconducting Quantum Circuits for the Generation and Detection of Individual Spin Waves
The project aims to generate a single spin wave excited by an electromagnetic impulse. To measure the dynamic processes of the excited state, quantum bits (or qubits) are applied as detectors and information units. This fundamental research may be relevant for magnetic material science, data processing and storage, or quantum computing.



Google Faculty Research Award

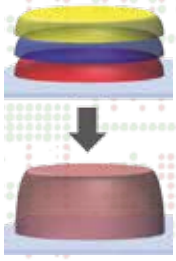
for Predicting 3D Structure of Biomolecules

Without biomolecules no life: In each cell of an organism, legions of miniature machines are working around the clock. They transport oxygen, utilize nutrients, or repair damage of genetic information. The function of these molecular tools depends on their spatial structure. Experimental methods to solve this three-dimensional puzzle have become rather elaborate but are still subject to technical restrictions. The research group of Dr. Alexander Schug, YIN alumnus of late, has developed an effective method to predict the 3-D structure of biomolecules by analyzing large amounts of experimental sequence data that are readily available. Therein, algorithms search for mutation patterns and, on that basis, predict the structure of respective biomolecules. "Our work is a good example of interdisciplinarity: We transferred methods from theoretical physics and computer science to a problem in the molecular life sciences," says Alexander Schug. "We hope that our detailed structural predictions will not only be of relevance to basic research, but can also be applied in pharmacological and medical research, as many diseases are caused by functional disorders of biomolecules." Google awarded this project with a Faculty Research Award of 50.000 dollars.

GMM Prize

for Soft Lithography Compatible Polystyrene

Polystyrene is a chemical stable polymer that is widely used for consumer goods such as plastic cups or CD-covers. For mass production, there are several industrial processing techniques to structure the thermoplast. Microsystem research and life sciences, however, work with prototypes. YIN member Dr. Bastian Rapp and his group present the first simple process to produce single items made from polystyrene: Their newly developed intermediate material *Liquid Polystyrene* (liqPS) can be poured at room temperature and cured with light. In the process, it transforms into pure polystyrene which is easily structured using soft lithography. Thus, the scientists combine the outstanding chemical properties of polystyrene with the easy processability known, e.g. from silicone (PDMS). Even more interestingly, liqPS cures within minutes and might, hence, be used as negative photoresist. Fundamental biological researchers, will profit immensely from these findings as polystyrene has long been their material of choice. For the publication in *Lap on a Chip*, Dr. Bastian Rapp was awarded the GMM Prize by the Society for Microelectronics, Microsystems and Precision Engineering within the Association of German Engineers VDE/VDI.



Nature Communications

Chemical Synthesis in a Very Small Space

Testing 5,000 chemical reactions per square centimeter: The cLIFT process systematically embeds different molecules in nanometer thin layers of material and stacks them up. cLIFT stands for combinatorial Laser-Induced Forward Transfer. By heating or adding solvents, these layers, separating the different chemicals, become liquid so that the contents mix and react with each other – just like in a traditional chemical reaction. "All reactions proceed simultaneously as in thousands of little test tubes," says YIN member Dr. Felix Löffler, first and corresponding author of the publication in Nature Communications. Thus, small amounts of expensive source materials suffice to assess a multitude of potential ways for syntheses. One aim of this new technology is to read out the immune system and for the first time map all antibodies in the human blood. This will allow the identification of important antibodies in patients e.g. with rheumatism or multiple sclerosis, or the detection of unknown infectious disease antigens for developing new vaccines against malaria or dengue fever.

doi: 10.1038/ncomms11844

What we stand for

YIN connects research group leaders and junior professors on an early stage of their scientific careers.

Dr. Achim Rettinger
Representative

As in 2008, when YIN was initiated, we, the members, still occupy a very critical career niche between postdocs and tenured professors. As YIN, we speak with a single voice and our voice is heard. For example, YIN representatives are involved in the shaping of the upcoming Overarching KIT 2025 strategy, which aims to bring clearness into career perspectives of young scientists besides other issues. The continued existence of YIN is a testament to the role it plays within the academical hierarchy and to the services it provides for members. Our mission, comprised of the following three statements, has and will continue to guide YIN.

Dr. Julia Syurik
Representative

We encourage each YIN member to become a better group leader. YIN members can take part in continuing education courses tailored to the needs of young group leaders in cooperation with PEBA. These courses include topics such as developing leadership abilities, improving research and teaching performance, as well as personal coaching. Rather than a static offering of courses, our members suggest and vote on desired themes to ensure that these courses directly meet their needs.

Dr. Frank Schröder
Alumni

We represent the interests of independent young investigators at KIT. Young group leaders and untenured junior professors face an uncertain future given the changes in higher education politics, the academic landscape and leadership priorities at KIT. YIN represents our interests by working with and persuading the administration to best define our official standing, the supervision of doctoral students, and other rights and responsibilities. YIN has also hosted discussions with representatives from Baden-Württemberg and various funding sources to understand and shape the policies affecting our members.

Dr. Manuel Hinterstein
Finance

YIN strives to make KIT an ideal place for young scientists. YIN helps its members thrive in their research pursuits by encouraging collaborative discussions and projects. Interdisciplinary proposal coordination meetings help to bring members of related disciplines together to share their respective expertise and resources. YIN Grants provide a further incentive to pursue these collaborative projects. In addition, YIN has invited leading scientists to speak to YIN members directly and to an open audience as part of the YIN Lecture Series. The network also maintains connections to alumni and contacts with industry to exchange ideas and can discuss research opportunities.

Dr. Lars Pastewka
Transdisciplinary

While our three mission statements have remained relatively unchanged throughout the years, our interpretation has evolved in response to member interests. We sincerely hope that YIN will continue to help our members grow, prove their independence and receive recognition in their respective fields. We also want KIT to remain an attractive place for young investigators. These goals require the active participation of our members and the support of the KIT community. To that end, this newsletter has been prepared to provide you with an update on our membership and activities.

Dr. Kathrin Valerius
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