

Research Training Group (GRK 2039) - *Molecular architectures for fluorescent cell imaging*

Newsletter 1/2016

Our first year!

We want to sum up our first year of the Research Training Group „*Molecular architectures for fluorescent cell imaging*“ (GRK 2039) started on the 1st of April 2015. I have the impression that this eventful year just flew by. First, we want to warmly welcome our new GRK-members. From the working group of Prof. Schepers Bettina Olshausen joined our GRK in the beginning of July 2015. Alena Kalyakina from the working group of Prof. Bräse followed one month later in August 2015. In November of the same year Christian Schwechheimer (Prof. Wagenknecht group) was accepted to our grad school. Alexander Braun

(Bräse group) and Ilona Wehl (Schepers group) were integrated to our program in February and March 2016. At this point we would like to congratulate Franziska Röncke to the successful completion of her doctorate. We wish you all the best and much success in your future career.

After our first Meeting in April 2015 (Waldhotel Zollernblick in Lauterbad) more Lecture and Seminar days took place periodically. For these events we have gained prominent guests (see table 1). The following table is intended to provide an overview of the Lecture days which were held in our first year.

Table 1: Summary of the Lecture days May 2015-May 2016

Lecture day	Guest	Place	Date
1 st	Prof. Dr. Nathan Luedtke (Zurich)	IOC	12 th May 2015
2 nd	Prof. Dr. Nils Metzler-Nolte (Bochum)	AOC	22 nd June 2015
3 rd	Dr. Edward Lemke (Heidelberg)	IOC	3 rd Nov 2015
4 th	Prof. Dr. Dennis Gillingham (Basel)	IOC	24 th Nov 2015
5 th	Prof. Dr. Nicolas Winssinger (Geneva)	IOC	19 th Jan 2016
6 th	Prof. Dr. Don C. Lamb (Munich)	APH	20 th May 2016

At this point we would like to thank again our guests for their presentations and fruitful scientific discussions. The next Lecture day will take place on the 25th Oct 2016 (Guest speaker Prof. Kazuya Kikuchi from the Osaka University, Japan).

Besides the numerous Lecture days the GRK-group has come together regularly during the Seminar days. These meetings are a good opportunity for the PhD students to present their work in front of all GRK-members and invited guests. The following table summarizes the Seminar days of the last year.

Table 2: Summary of the Seminar days May 2015-May 2016

Seminar day	Title	Place	Date
2 nd	<i>GRK 2039 meets ITG – Zebrafish & Mice</i>	CN/ITG Karlsruhe	21 st July 2015
3 rd	<i>Chemical Bioconjugation</i>	Hohenwart Forum Pforzheim	15 th -16 th Oct 2015
4 th	<i>Fluorescence and Single Molecule Spectroscopy</i>	Kurhaus Trifels Annweiler	15 th -16 th Feb 2016
5 th & 1 st Retreat	<i>GRK 2039 meets CLiC Frankfurt – Illumination of biological processes from different points of view</i>	Waldhotel Zollernblick Lauterbad	19 th Jan 2016
6 th	<i>GRK 2039 meets BIF-IGS</i>	Haus Lutzenberg Ludwigsburg	4 th -6 th July 2016
7 th	<i>GRK 2039 meets IPC</i>	CS/IPC Karlsruhe	26 th Sep 2016

The Kick-off meeting in April 2015 was followed by the 2nd Seminar day in July at the Institute of Toxicology and Genetics (KIT/ Campus North). Dr. Larissa Kaufmann (BIF-IGS-manager) and selected PhD students of the Helmholtz grad school BIF-IGS (BioInterfaces International Graduate School) welcomed us warmly. During this event the GRK-members got an insight into the scientific work at ITG. Franziska Rönicke, Vanessa Gerber and Mojtaba Ebrahimi presented the progress of their work. General insight of the work with zebrafishes and mice were given within tutorials by the ITG-members Dr. Thomas Dickmeis and

Prof. Dr. Ute Schepers. On this day, we were allowed to visit the mice and fish facilities on the north campus. Nadine Borel (aquarium) and Selma Huber (mice facilities) explained the handling of the animals.

The 3rd Seminar day was held on the topic *Chemical Bioconjugation* in Pforzheim Hohenwart Forum on the 15th till 16th October, 2015. On this subject we have invited three guests from the field of Chemical Biology as part of the Seminar day. Andres Jäschke, Valentin Wittman, Peter Kéle and Christof Niemeyer gave a tutorial or a lecture (see program 1).

Topic: "Chemical Bioconjugation"

Thursday, Oct 15 th	Topic	Who is speaking
until 13:30	Arrival and check-in	
13:30-14:00	Welcome coffee and opening 3rd seminar day	Hans-Achim Wagenknecht
Tutorial	Chair: Tobias Kabbeck	
14:00-15:30	<i>Bioconjugation on surfaces.</i>	Christof Niemeyer
15:30	Break	
Lecture	Chair: Katharina Becker	
15:45-17:00	<i>Cycloadditions and cross-coupling reactions for bioconjugation.</i>	Andres Jäschke Universität Heidelberg
17:00	Break	
Lecture	Chair: Heidi Walter	
17:15-18:30	<i>Application of the Inverse-Electron-Demand Diels-Alder Reaction in Glycobiology.</i>	Valentin Wittmann Universität Konstanz
18:30	Dinner	
20:00	<i>Project cooperation meetings</i>	
Friday, Oct 16 th	Topic	Who is speaking
07:30	Breakfast	
Tutorial	Chair: Mathilde Bichelberger	
9:00-10:30	<i>Organic Reactions for Bioconjugation of nucleic acids.</i>	Hans-Achim Wagenknecht
10:30	Break	
Lecture	Chair: Franziska Beyle	
10:45-12:00	<i>Double the force: Combining fluorescence with bioorthogonality.</i>	Péter Kele Hungarian Academy of Sciences
12:00	Lunch	
13:30-14:00	Short summary and outlook	Hans-Achim Wagenknecht
14:00	Graduates program and departure	

Program 1: Seminar day in Pforzheim (Oct 2015)

The 4th Seminar day (*Fluorescence and Single Molecule Spectroscopy*) took place in the middle of February 2016 at the Kurhaus Trifels. On the first day Prof. Ulrich Nienhaus gave a Lecture on *Fluorescence Microscopy with Single Molecule Sensitivity*. This was followed by two guest lectures. The first was given by Prof. Andreas Zumbusch from the

University of Konstanz. He spoke about imaging in cells. The second lecture about FRET was given by Prof. Claus Seidel from the University of Düsseldorf. Thereafter, there was a get-together in the club room with billiards, darts and music from a jukebox. On the morning of the second day the new GRK-members Alena Kalyakina (A1), Christian Schwech-

heimer (B3) and Bettina Olshausen (C2) presented their work. Prof. Thomas Basché from the University of Mainz

closed the session with his talk about *Photophysics and photochemistry of Single molecules* (see program 2).

Topic: "Fluorescence and Single Molecule Spectroscopy"

Monday, Feb 15 th	Topic	Who is speaking
until 13:30	Arrival and check-in	
13:30-14:00	Welcome coffee and opening 4 th seminar day	Hans-Achim Wagenknecht
Lecture	Chair: Mathilde Bichelberger	
14:00-15:00	<i>Fluorescence Microscopy with Single Molecule Sensitivity.</i>	Ulrich Nienhaus
15:00	Break	
Lecture	Chair: Stephan Münch	
15:30-17:00	<i>Imaging protein modifications in cells.</i>	Andreas Zumbusch Universität Konstanz
17:30	Break	
Lecture	Chair: Jeannine Steinmeyer	
18:00-19:30	<i>Watching structure and dynamics of biomolecules and protein complexes by high-precision FRET in vitro and in live cells.</i>	Claus Seidel Universität Düsseldorf
19:45	Dinner	
21:00	<i>Project cooperation meetings/Get-together</i>	
Tuesday, Feb 16 th	Topic	Who is speaking
07:30	Breakfast	
Tutorial	Chair: Heidi-Kristin Walter	
09:00-09:15	<i>Novel lanthanide-based probes for bioapplications.</i>	Alena Kalyakina (A1)
09:20-09:35	<i>Synthesis of Novel Cyanine-Styryl-Dyes for Nucleic Acid Labelling.</i>	Christian Schwechheimer (B3)
09:40-09:55	<i>Novel fluorescent compounds for the early detection of melanoma.</i>	Bettina Olshausen (C2)
10:00	Break	
Lecture	Chair: Zbigniew Pianowski	
10:30-12:00	<i>Photophysics and photochemistry of Single molecules</i>	Thomas Basché Universität Mainz
12:30	Lunch	
13:30-14:00	Short summary and outlook	Hans-Achim Wagenknecht
14:00	Departure	

Program 2: Seminar day at the Kurhaus Trifels (Feb 2016)

The [fifth Seminar day and simultaneously our first Retreat](#) were held in beginning of April in Lauterbad. As guests we welcomed the graduate school CLiC from the University of Frankfurt. All GRK-members and some CLiC-PhD students presented their single projects within the three-day meeting. After each presentation a lively discussion arose.

In the beginning of the second day, the two spokespersons Prof. Hans-Achim Wagenknecht (GRK 2039) and Prof. Alexander Heckel (CLiC) presented the respective approaches of their graduate schools. Apart from the presentations by doctoral two theories were held, given by the invited guests. In the afternoon of the second day, Dr. Alexandre Specht from the University of Strasbourg gave a tutorial about design and applications of photochemical tools. Thereafter, a poster session was held. All PhD students (GRK 2039 and CLiC) had the opportunity to present their projects within the poster session directly to the others. They explored their work to each other and talked at length about the aims and feasibilities. The poster session was a good opportunity for graduate students to network with each other. Following this session we take a two hour hike to a mountain hut (Berghütte Lauterbad) where the dinner was served. During the walk, and the dinner a close exchange between the two graduate schools emerged.

The last day of Retreat started with three PhD student talks followed by the lecture about *Red light responsive reagents for control of gene expression and detection of nucleic acids* of Prof. Andriy Mokhir from the University of Erlangen-Nürnberg. After lunch the session was closed by Hans-Achim Wagenknecht and Alexander Heckel.

Besides the annual evaluation and feedback discussions with the doctoral the election of the new doctoral speaker also took place. At this point we adopt Tobias Kabbeck from his position as doctoral spokesperson and thank him for his cooperation. The graduates and associates elected their new spokeswomen Franziska Beyle from Prof. Marcus Elstner's group (IPC). She will also assist the organization of events within our GRK. For example she has already established the [GRK 2039 regulars' table](#). The next meeting will take place in the Prinz-Max-Palais on 09/06/2016. Franziska Beyle and Violetta Schneider support me currently in organizing the seventh Seminar day at the IPC.

The next meeting (6th Seminar day) will be held together with the BIF-IGS from 4th-6th July 2016 in Ludwigsburg. This event is organized entirely by the students from GRK 2039 and BIF-IGS. They were supported mainly by Larissa Kaufmann.

As part of our graduate school the PhD students participate to soft skill courses from the Karlsruhe House of

Competence ([KHYS](#)), National Institute of Science communication ([NaWik](#)), and other providers. In addition, we

have organized two major internal GRK-workshops (see table 3).

Table 3: Internal GRK-soft-skill-courses 2016

Soft-skill course	Title	Place	Date
1 st	Special Communication and Presentation Skills Exemplified for Entrepreneurship	CS/IOC	8 th -9 th March 2016
2 nd	Interdisciplinary Competence	CS/10.11/111.2	9 th -10 th May 2016

I would like to express the trainers of soft skill courses a big compliment for the great cooperation. Thanks to Tabea Send and Dr. Wolfgang Runge (Entrepreneurship-workshop) as well as to Alexandra Kessler, Simone Brandstädter and Jan Schittenhelm (InKo-workshop).

The following table 4 provides an overview of further activities of the graduate school.

Table 4: Facts and figures 2015-2016

Topic	number
GRK-members	21
Pubs	34
Contribution to conferences	15
Soft-skill courses	37
Lab rotation	9
Stay abroad	2

As part of the [equal opportunity](#) we have succeeded to install a so called parent-child office. The opening is planned for mid-June 2016. The office is available to the GRK-members at all times to ensure optimal care for

their children in exceptional situations. The DFG (Deutsche Forschungsgemeinschaft) supports this project strongly.

Another great event takes place this year on July 14, 2016. Prof. Dr. Ute Schepers will present our GRK 2039 as part of a so called [Insight Lecture](#) to a KIT external audience. The idea behind the GRK Insight Lectures is to inform young people about the activities of the GRK and to show how research is influencing our everyday lives. The presentations are specifically designed for scholars at the end of the gymnasium time and teachers who are interested in life science research and who want to make cutting-edge research a part of their biology/chemistry lessons. The aim is to raise the interest of young students in these topics to encourage, in particular female students, for a career in natural sciences. Therefore, particularly the female participants of the GRK will be encouraged to present these insight lectures as role models for young students. We are pleased to welcome

around 50 scholars of the Markgrafen-Gymnasium and Wilhem-Hausenstein-Gymnasium in Karlsruhe. In addition to the talks of Ute Schepers and selected graduate students, scholars are allowed to practice laboratory work independently at the Institute of Organic Chemistry.

The following table 5 gives an overview of the next GRK-events.

Table 5: Other events in 2016

Planned event	Date
GRK-Stammtisch	9 th Jun 2016
6 th Seminar day	4 th -6 th Jul 2016
Insight Lecture	14 th Jul 2016
PhD-meeting (black forest)	Aug 2016
7 th Seminar day	26 th Sep 2016
7 th Lecture day	25 th Oct 2016
Hard-skill course HPLC	Oct/Nov 2016
International Conference	Sep 2017
Training Assessment Center	Oct 2017

In the end we would like to congratulate Pinar Sancar to the birth of her son in April 2016. Since Mrs. Sancar has left us, we are kindly supported by Claudia Sommer until her return. We would also like to congratulate Mirja Köhn for their professorship, for that she has left the GRK 2039.

Finally, I would like to mention our [GRK 2039 homepage](#). Please use this link to get more information about our GRK (contacts, members and their projects, GRK-events, important documents). The website provides information on duties and rules, upcoming appointments and events and offers of the KIT (especially KHYS).

Until the next report, we wish all our GRK-members success in their ongoing projects and we hope you will enjoy the upcoming events in 2016.

Appendix: Pics

GRK-members



1st Retreat and 5th Seminar day in Lauterbad



4th Seminar day in Trifels





Figure 1: Hohenwart 1st day: GRK-members during the lectures.



Figure 2: Lecture of Prof. Dr. Andres Jäschke.



Figure 3: Prof. Dr. Peter Roesky (PI), Prof. Dr. Hans-Achim Wagenknecht (Speaker), PD Dr. Andreas-Neil Unterreiner and Tobias Kabbeck (PhD student Speaker).



Figure 4: Get-together in the evening!



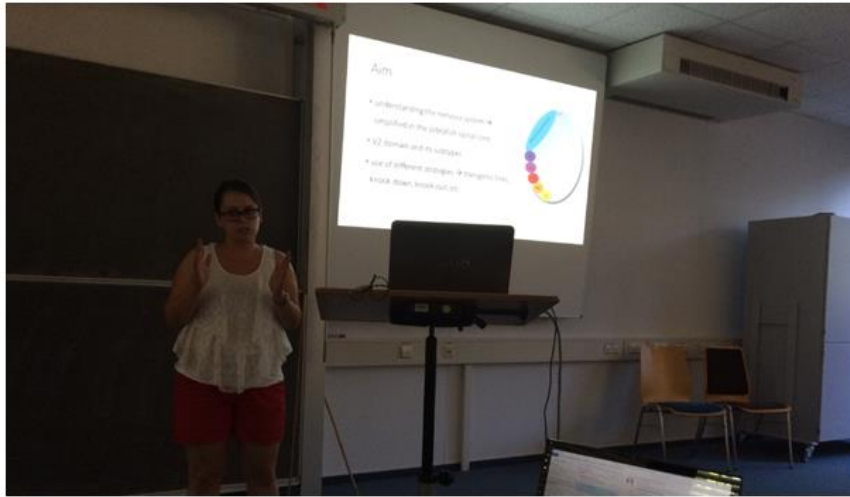


Figure 1: Vanessa told us something about the CNS of zebrafishes.



Figure 2: Franziska held her presentation about *In vivo* screening of a cell-penetrating library to isolate organ specific transporter molecules.

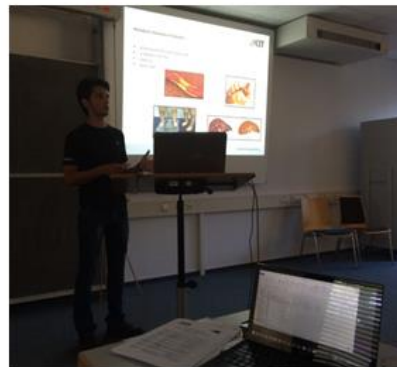


Figure 3: Mojtaba about Zebrafish as a model for metabolic diseases.



Figure 4: Our GRK PhD Students (v.J. Benjamin Lehmann, Franziska Röncke, Arnold Leidner, Franziska Beyle, Violetta Schneider, Mojtaba Ebrahimi, a Guest Bachelor Student of AK Wagenknecht, Mirella Wawryszyn).