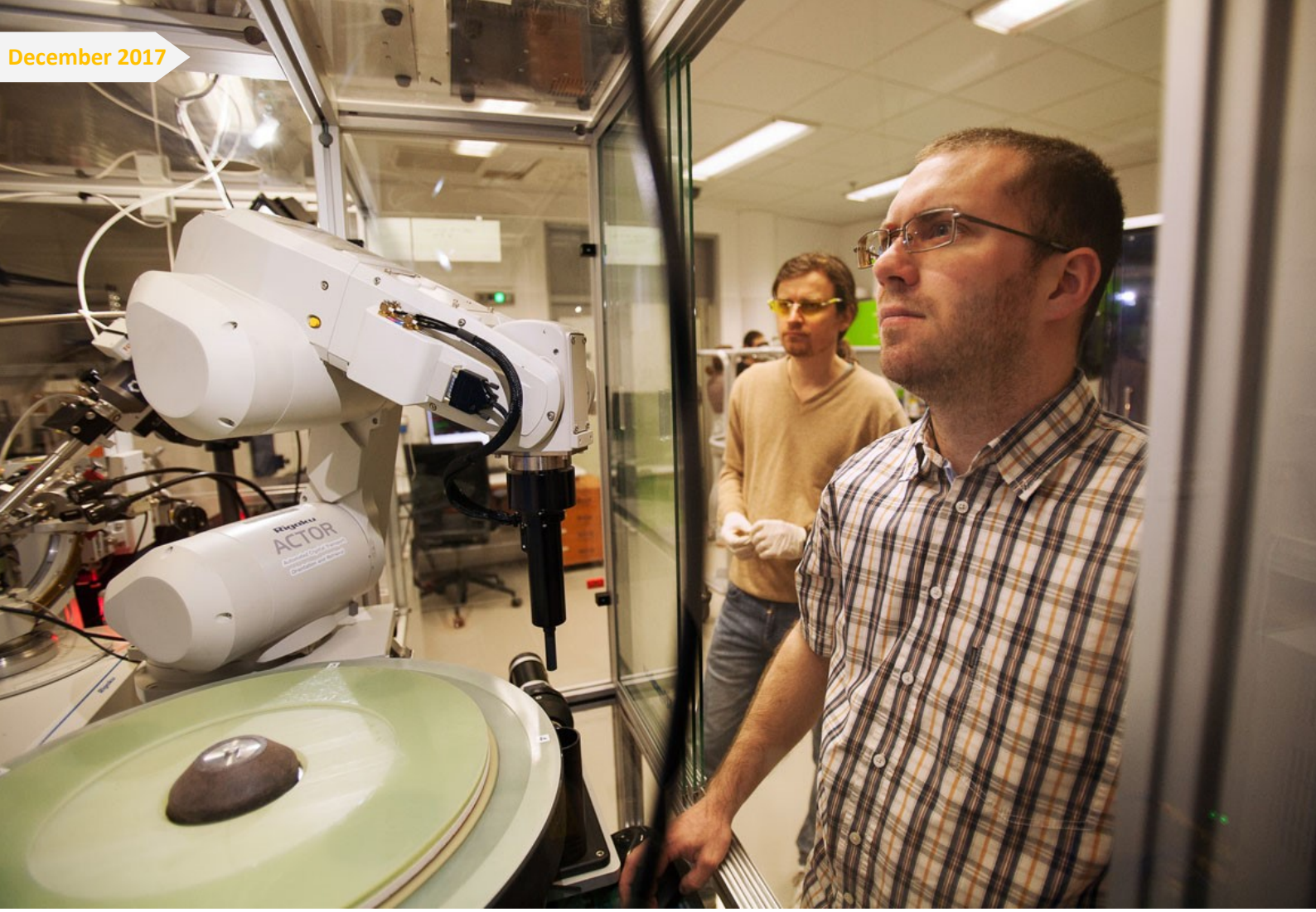

BISON NEWSLETTER Issue IV

December 2017

Dear BISON friends,

In June 2017 we had a successful mid-term project review in Brussels and passed on into the second half of the project. In the Autumn semester 2017 we continued with main BISON activities: we organized a summer school and several workshops and courses. Young researchers from CEITEC MU participated in long-term secondments at BISON partner institutions: University of Grenoble Alpes, University of Vienna, and University of East Anglia In this Newsletter we would like to share with you their experiences. We would also like to inform you about project activities planned for the next half a year, including our first conference that will take place in Brno, the Czech Republic in June 2018. The opportunity to participate in secondments will be still available. But we would like to pay your attention that the project will be running only until the end of 2018. Take your chance to participate in BISON activities!

BISON team

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This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 692068. This Newsletter reflects only the author's view and the Research Executive Agency is not responsible for any use that may be made of the information it contains.

BISON NEWS

The BISON consortium continues its activities devoted to educating and developing expertise among young researchers. One summer school, two workshops and several courses were organised during Autumn semester 2017. A number of secondments were undertaken. Several CEITEC researchers are currently improving their knowledge and skills at BISON partners' institutions. More details on these activities can be found in the following pages.

Summer School on RNA-protein Interactions and RNA Structure and Biology Workshop

The summer school and workshop took place on October 2nd to 6th at CEITEC MU, Brno, the Czech Republic. They aimed to provide participants with an overview on the most up-to-date topics in RNA research. The focus of the event was the molecular mechanisms of protein-RNA interactions and role of ncRNAs and RNA-binding proteins in cellular and organismal physiology. The invited lecturers included such experts in the field like Michael Sattler from Institute of Structural Biology, Helmholtz Zentrum, Kathi Zarnack from Buchmann Institute for Molecular Life Sciences, Bojan Zagrovic from The University of Vienna, The Max F. Perutz Laboratories, and many more. The event was divided into summer school lectures, which took place every morning, and practical workshop, which took place in the afternoon. The theoretical and practical activities covered the current advances in RNA and protein structure analyses, basics of RNA-sequencing and RNA bioinformatics, identification of ncRNAs, and methods for studying their functions and mechanisms. School participants also prepared presentations. As a part of the event, a Poster Session and Happy hour was organised. There school and workshop participants could get feedback on their work from their fellow colleagues and experts. The event was successful to attract participants not only from CEITEC MU, but also from various other institutions. In total almost 50 people participated in the school and 21 at the workshop.

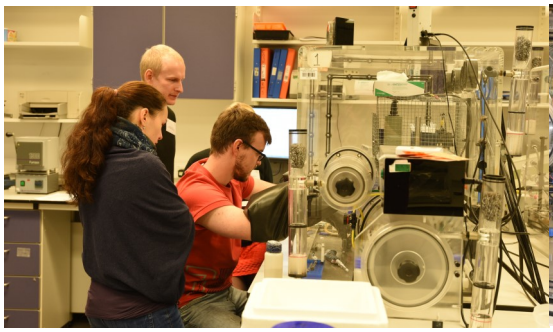
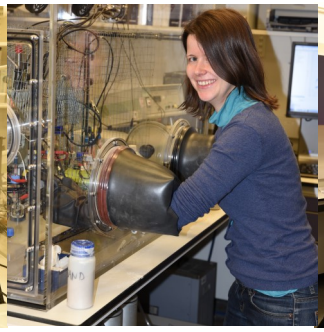
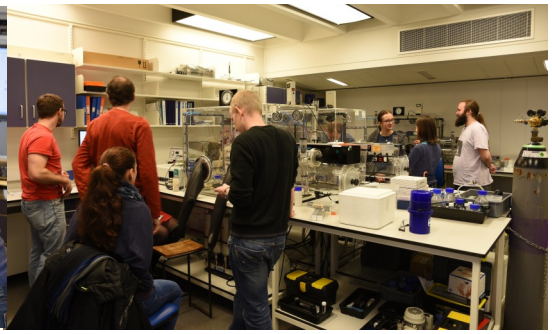
Applications Involving Synthetic Nucleic Acids and Nucleotides

The workshop that took place on December 4th – 5th, 2017 at University of East Anglia aimed to give researchers an overview of contemporary research involving synthetic and modified versions of nucleic acids and nucleotides. Lecturers from UEA, King's College London, University of St Andrews, as well as CEITEC shared their expertise with students. The two-day workshop introduced and trained young scientists, from a chemistry or biology background, in up-to-date approaches for determining structural and biochemical properties of nucleotides, nucleic acids and proteins that they interact with.

Electrochemical Methods to Study Macromolecular Interactions

Electrochemical Methods to Study Macromolecular Interactions practical workshop was organised after the Applications Involving Synthetic Nucleic Acids and Nucleotides on December 8th—6th December. Electrochemical techniques can be used to study interactions involving macromolecules, such as proteins interacting with DNA or metals. The workshop described the underpinning theory and involve practical experience of relevant methods. The workshop included lectures on electrochemistry of redox-active metalloproteins as well as "hands on" experiments on the following topics:

- Potentiometric Titration monitored by UV-vis electronic absorbance spectroscopy;
- Catalytic Protein Film Electrochemistry;
- Advanced Tools for Enzyme Analysis by Protein Film Electrochemistry.

Dynamics of disordered proteins course

The main focus of the Dynamics of disordered proteins course organised at CEITEC MU from 4th until 7th September 2017 was intrinsically disordered proteins and their dynamic features, including different measurement methods, computational analysis and concept of protein meta-structure. The course included lectures of invited experts, such as Martin Blackledge and Nicola Slavi (Grenoble Alpes University), Robert Konrat (University of Vienna), or Tiago Cordeiro (ITQB NOVA). Almost 50 participants attended the lectures. The lectures were then followed by practical sessions at NMR spectrometers at CEITEC NMR facility and on computers.

Communicating Science to Diverse Audiences

This workshop which took place on October 2nd – 4th at UEA aimed to improve understanding of how science is disseminated to diverse audiences, including those with limited scientific knowledge. Workshop attendees were informed about different models of science communication and will highlight how science communication has been shaped over the last 300 years, going on to review current models surrounding science communication. The workshop will evaluate how scientific culture interfaces with the public, leading to an improved understanding about learning and communication theories of science.

Presentation skills workshop

Additional workshop on presentation skills was organized on December 14th for CEITEC MU researchers. An expert in presentation skills taught the workshop participants how to define the aim of the presentation, make audience analysis, prepare strong arguments and content of the presentation. They got acquainted with various tips and best practices for preparing a presentation, as well as received basic training on non-verbal communication.

BISON Guest lectures at CEITEC MU in Autumn semester

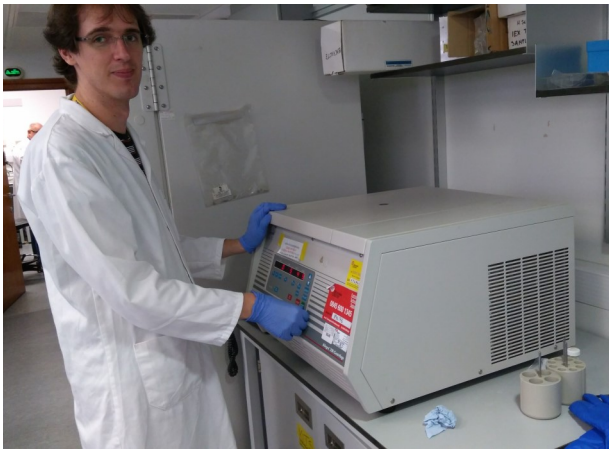
Several guest lectures took place at CEITEC MU in Autumn semester 2017. Renee Schroeder (UNIVIE) delivered a talk on *Regulation of transcription elongation in E. coli by the RNA polymerase – RNA interactome* in September which was followed by another lecture of UNIVIE researcher — Emmanuel Mikros, *Heterocovariance a new tool for the efficient detection of bioactive compounds in complex mixtures.* The last lecture was organised specifically for CEITEC researchers interested in viruses. Pauline Macheboeuf was one of the invited speakers who came from UGA in the Autumn. She give a talk on *Entry and budding of enveloped viruses*. During her stay she could also listen to presentations from several CEITEC MU researchers and students and give them feedback.

BISON Secondments and joint supervision

More and more young CEITEC researchers use opportunities provided BISON joint supervision and secondment programmes. PhD students have travelled to their co-supervisors in BISON institutions. Several long-term secondments took or are taking place now. Researchers who have already travelled to BISON partner institutions share their experience below. The opportunity finishes at the end of this year 2018 with the end of the project. If you are interested in a short or long term secondments to BISON partner institutions, please contact Jana Sloukova.

Matej Adamik, joint supervision secondment at UEA

DNA ligases from E. coli, Paracoccus denitrificans (largely undescribed, possibly uniquely studied in the UK lab) and T4 were tested on their enzymatic activity under various conditions. Growth experiments with bacterial strains targeting the DNA ligase activity were performed as well. The goal was to probe whether Paracoccus denitrificans, a bacterium undesirably degrading agricultural fertilisers, could be suppressed by specifically inhibiting its DNA ligases. DNA ligases are proteins needed in DNA metabolism and as fellow DNA-binding proteins to p53, familiar principles to the ones in Brno could be used. Quite a few people in the hosting lab did explain to me how they perform their experiments. A partial overseeing of a undergraduate student was welcome as well, as this allowed for more contact with native speakers.



Over the stay I learned several twists to protein purification as done in the hosting laboratory. The DNA-ligation assays provided data on the novel/unpublished DNA ligases as well as for me a better insight into DNA-ligation optimisation when used as a technique in recombinant plasmid preparation. A few results were already presented as a poster on a local intra-university conference over my stay in Norwich. The researched topic still needs more effort, but the results acquired so far will hopefully lead to a joint publication. Another joint publication is currently under revision.

It is hoped that more short-term stays will be possible through BISON project or other possibilities in the future. It is published that p53 (topic in Brno) influences DNA-ligation (topic in Norwich) but there is still room to combine these areas of interest and work on a joint project. Also a few other ideas including trinucleotide repeat sequences or RNA-protein interactions were discussed to be conceivable for future collaboration and visits.

UPCOMING EVENTS

Conference on Bioelectrochemistry and Bioelectronics of Macromolecules (JW70)

WHEN: 12 — 16 June 2017

WHERE: Brno, the Czech Republic

TOPIC: The conference will cover the following topics:

- electrochemistry and chemical modification of biopolymers (nucleic acids, proteins, carbohydrates);
- aptamers and aptasensors;
- bioelectrochemical devices and arrays;
- electrocatalysis in nucleic acids and protein sensing;
- electrochemistry at membranes;
- micro- and nanomachines;
- electrode materials and modifications;
- nanomaterials in electrochemical biosensing;
- analytical applications.

INTERESTING SPEAKERS: Miroslav Fojta (CETEC MU, the Czech Republic, organiser), Emil Paleček (The Cyech Academy of Science, organiser), Lital Alfonta (University of Nrgrv, Israel), Serge Consier (Université Grenoble Alpes , France), Alberto Escarpa (University of Alcalá, Spain), Lo Gorton (Lunds University, Sweden), Eugeny Katz (Clarkson University, USA), and many more.

Updates on the event will be posted Upcoming events.

Tutorial in Macromolecular Crystallography course

WHEN: 2 February— 2 March 2018

WHERE: Grenoble, France

TOPIC: Fundamental aspects of crystallography will be treated in theoretical sessions and 3 practical sessions of 2 h each, which will treat case studies including data collection on a synchrotron beamline. The tutorial will be given in English. The theoretical sessions will be a mix of lecture and problem solving (rather basic, more of the pencil and paper type).

CEITEC students and researchers have an opportunity to participate in the course.

Updates on the event will be posted Upcoming events.

Structural glycosciences course

WHEN: 2-4 July 2018

WHERE: Grenoble, France

TOPIC: Glycoscience is a rapidly expanding and exciting field that is relevant to many areas of chemistry, biology and medicine. Structures of Glycan or Protein/Glycans complexes are of direct importance since they are key structural elements in cell and in signalling events on their surface.

CEITEC students and researchers have an opportunity to participate in the course.

Updates on the event will be posted Upcoming events.

CEITEC PhD retreat

WHEN: 26 — 27 April 2018

WHERE: Telc, the Czech Republic

TOPIC: The CEITEC PhD Retreat aims to bring together PhD students from the fields of life sciences, material science, chemistry and physics and create a friendly and stress-free environment where the participants will be able to present and discuss their research and also listen to talks of several internationally recognized speakers. PhD from all BISON institutions have an opportunity to participate in the event.

Updates on the event will be posted Upcoming events.

PROJECT DISSEMINATION

Information about the TWINFUSYON project is actively disseminated at the project schools and workshops as well as by TWINFUSYON researchers traveling to other events.

As a part of the established tradition, BISON researchers from CEITEC MU participated in Researchers' Night which took place in September, as well as other events organized at CEITEC (e.g. Open days). CEITEC researchers prepared an interactive game where visitors could enter a cell as a virus and find out what happens to it afterwards.

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