

ISBE WP5 report on task 5.5:

**System for continuous/on-going transfer of knowledge on
applicability of systems biology and ISBE to local communities and to
extended European area**

Deliverable No: D5.5

**An ISBE report on the workshop:
“International Workshop on systems biology in the extended
European area”**

July 2015

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Workshop in Ljubljana, Slovenia

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1. Summary

The workshop “Systems biology and its impact on science, economy, individuals and society” took place in Ljubljana, Slovenia, on October 17, 2014. To this free three-hour workshop teachers at all levels of education system, representatives of ministries and pharmaceutical industry, medical doctors, media and others were invited. At the workshop it was shown how new knowledge obtained by using systems biology approaches has already contributed to new solutions in biotechnology, health, pharmacy, agriculture and environment. The official language of the workshop was Slovene and the information was presented on the level acceptable for the general public. For the workshop the informational printed material was prepared and the information about SB in Slovene was released on-line. The workshop was a event linked with the 9th CFGBC Symposium “From arrays and sequencing to understanding diseases”. As such this workshop is a model that can be easily transferred also to other environments across Europe and can serve as an efficient mean to raise awareness and understanding of systems biology in general public.

2. Organization

The workshop “Systems biology and its impact on science, economy, individuals and society” took place in Ljubljana, Slovenia, at the Faculty of Computer and Information Science (University of Ljubljana) on October 17, 2014. It was organized together with the 9th CFGBC Symposium "From arrays and sequencing to understanding diseases". For both events a mutual web page was set in Slovene and English (http://cfgbc.mf.uni-lj.si/2014anniv9/isbe_workshopeng.html). The printed official invitation flyer (see pdf version in 5.) was sent to 399 addresses and its electronic version to 294 e-mails. The registration for the event was electronic.

The workshop included a presentation of systems biology, its comparison with the synthetic biology, its association with pharmaceutical industry and agronomy and its association with medicine through the presentation of the case study of virtual liver. There were one informal discussion coffee break and a formal discussion at the end of the workshop.

The workshop officially opened the director of the National Institute of Biology Prof. Dr. Tamara Lah Turnšek. The workshop was chaired by Prof. Dr. Marina Dermastia.

3. Participants

The workshop attended 96 participants: 63 from universities, research institutes and the University Medical Centre Ljubljana; 15 teachers from primary and secondary school, 10 representatives from different ministries, 4 from the pharmaceutical industry and the event was covered by 4 journalists.

4. The workshop

At the beginning Prof. Dr. Kristina Gruden from the National Institute of Biology, Prof. dr. Aleš Belič from the Faculty of Electrical Engineering at the University of Ljubljana and Lek Sandoz d.d., and Drdr. Jure Ačimovič from the Medical School, University of Ljubljana together presented the idea of system biology in their interactive lecture entitled Mathematics + Biology = Systems Biology?

The comparison between systems biology and synthetic biology was presented by Prof. Dr. Roman Jerala from the The National Institute of Chemistry in his lecture Modular engineering of natural molecules and processed.

In the second part of the workshop some case studies were presented. Prof. dr. Damjana Rozman from the Medical School, University of Ljubljana showed the official ISBE case on the Virtual Liver Network - pan-German program of systems biology. The presentation was prepared together with director of virtual liver Adriano Henney. Some examples of use of systems biology in the pharmaceutical industry (based on the use case prepared in ISBE) and how systems biology can help agriculture were shown by Prof. Dr. Kristina Gruden and Dr. Špela Baebler from the National Institute of Biology.

During the open discussion the questions were specifically related to how included specific topics of systems biology in the high school curricula and of broader perspectives of systems biology for the everyday life.

Abstract of presentations are available on-line together with the abstracts of the CFGBC symposium: http://cfgbc.mf.uni-lj.si/2014anniv9/AbstractBook_2014.pdf.

5. Feedback


The response to the workshop was extremely good. The organizers received many verbal and written commendations. Among the most frequent ones were that the workshop was timely and needed as the understanding of the newly emerging scientific fields like systems biology and synthetic biology is currently very low and the workshop provided basic explanations accessible to everyone. There was a report on the workshop by the Slovenian Press Agency (Fig. A) and at NIB website (Fig. B). The systems biology in agronomy and an interview with Prof. Dr. Kristina Gruden were broadcasted at the national television in the show "Ljudje in zemlja" (=People and soil). The virtual liver case and an interview with Prof. Dr. Damjana Rozman will be presented in the January 2015 issue of the Slovene journal "Zdravje" (=Health).

Figure A

O-STA.com
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V okviru evropskega projekta ISBE je potekala delavnica SISTEMSKA BIOLOGIJA IN NJEN VPLIV NA ZNANOST, GOSPODARSTVO, POSAMEZNIKA IN DRUŽBO KOT CELOTO, ki jo je organiziral Nacionalni inštitut za biologijo.



V petek, 17. oktobra 2014 je v prostorih nove Fakultete za računalništvo potekala delavnica z naslovom **SISTEMSKA BIOLOGIJA IN NJEN VPLIV NA ZNANOST, GOSPODARSTVO, POSAMEZNIKA IN DRUŽBO KOT CELOTO**. Delavnico je organiziral **Nacionalni inštitut za biologijo** v okviru evropskega projekta ISBE (Infrastruktura za sistemsko biologijo Evrope). Namenjena je bila širši zainteresirani javnosti. Delavnice se je udeležilo več kot 100 predstavnikov Ministrstva za izobraževanje, znanost in šport, Ministrstva za okolje in prostor, učiteljev z vseh ravni izobraževanja, fakultet, študentov, farmacevtske industrije in medijev.

Na delavnici je bila predstavljena sistemsko biologija, in sicer kot novo raziskovalno področje in tudi kot sprememba v razmišljanju. Sistemsko biologija in njeno sprejetje v javnosti sta eden od ključev prihodnjega razumevanja biologije. Sistemsko biologija omogoča povezovanje raziskovalnih področij, ki doslej niso imela veliko skupnega. Njen poseben interdisciplinarni značaj vključuje sodelovanje med molekulskimi biologi, genetiki, kemiki, fiziki, računalničarji in matematiki. Sistemsko biologija tako omogoča zelo inovativna sodelovanja in nove pristope k reševanju pred tem neobvladljivih težav. Sistemski biologi s svojimi raziskavami posegajo predvsem na področja ved o življenju in področja, povezana z zdravjem. Cilj njihovih raziskav pa so tudi energija, okolje, proizvodnja hrane. Do zdaj je sistemsko biologija dosegla največji napredek v medicini in farmacevtski industriji; v zadnjem času se uveljavlja tudi na drugih področjih. Rezultati raziskav sistemske biologije že danes nakazujejo, da bomo na njihovi podlagi lahko sprejemali informirane odločitve na področju kompleksnih bioloških vprašanj, pa naj bodo to zdravje ljudi, rastlin ali živali, okolje, varna hrana in vse povezave med njimi.

Sistemsko biologija kot novo raziskovalno področje si že uspešno utira pot tudi med slovenskimi znanstveniki. Na delavnici so svoje izkušnje s sistemsko biologijo predstavili prof. dr. Damjana Rozman in doc. ddr. Jure Ačimovič z Inštituta za biokemijo Medicinske fakultete UL, prof. dr. Aleš Belič s Fakultete za elektrotehniko UL in Lek d.d., prof. dr. **Kristina Gruden** in dr. Spela Baebler z **Nacionalnega inštituta za biologijo**. Prof. dr. Roman Jerala s Kemijskega inštituta je osvetlil področje sintezne biologije in njeno povezavo s sistemsko biologijo.

3

Figure B.



NIB
NATIONAL INSTITUTE OF BIOLOGY

Home | Contacts | Slovenian

SEARCH...

Vocabulary

ABOUT US | DEPARTMENTS | SERVICES & EQUIPMENT | EDUCATION | LIBRARY | MEDIA | MULTIMEDIA

Home / Multimedia / News / Workshop Systems Biology and its impact on science, economy and society

Workshop Systems Biology and its impact on science, economy and society


Date: 20.10.14

New Faculty of Computer and Information Science hosted on Friday, October 17 2014 a workshop Systems biology and its impact on science, economy and society. The workshop was organized by NIB in frame of the ISBE (Infrastructure for Systems Biology Europe). About hundred participants from the governmental ministries, elementary and high schools, University of Ljubljana, institutes, pharmaceutical industry and media participated at the event.

The main topic of the workshop was to present systems biology as a new rapidly evolving discipline that seeks to determine how complex biological systems function by integrating experimentally derived information through mathematical and computing solutions and as a paradigm change to understand biology in future. Its unique interdisciplinary character involves collaborations between molecular biologists, geneticists, chemists, physicists, mathematicians and computer scientists. Systems biology enables innovative collaborations and new approaches to previously intractable problems. Systems biologists mainly orientate their research towards life sciences and health-related research. However, other applied areas (energy, environment, food production) are also addressed by systems biologists. The overarching profit in bringing systems biology to full fruition is the enabling of informed decision-making in complex biological matters, whether for health, plants and animals, the environment, food safety, and their interconnections.

Systems biology has been already part of the Slovenian science. At the workshop Slovenian scientists Prof. Dr. Damjana Rozman and Asašai, Prof. dr. Jane Adamič from the Institute of Biochemistry, Medical Faculty, UL, Prof. Aleš Šalič from the Faculty of Electrical Engineering, UL, and Lek d.o.o. and Prof. dr. Kristina Gruden and Dr. Spela Sečler from NIB shared their experiences on systems biology. In addition Prof. Dr. Roman Jerala from the Institute of Chemistry demonstrated the field of synthetic biology and its relations with systems biology.

Gallery:



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Nacionalni inštitut za področje mrežna
znanj v trani raziskovalnega inženira

Nacionalni referenčni laboratorij za
določanje GDO v trani in trani

SI
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SI
100 001 - 000

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6. Workshop material

6.1 For the workshop a printed invitation **flyer** was prepared:



Program

- 13.45 – 14.15** Registracija
- 14.15 – 15.15** Splošna predstavitev sistemske biologije (*Gruden K., Belič A., Ačimovič J.*)
- 15.15 – 15.25** Povezava sistemske in sintezne biologije (*Jerala R.*)
- 15.35 – 15.55** Odmor s prigrizkom
- 15.55 – 16.55** Predstavitev primerov sistemske biologije
- 15.55 – 16.10** Izbrani primer: Virtual liver (*Rozman D.*)
- 16.10 – 16.25** Povezava sistemske biologije s farmacevtsko industrijo (*Gruden K.*)
- 16.25 – 16.40** Povezava sistemske biologije s kmetijstvom (*Baebler Š.*)
- 16.40 – 17.00** Splošna razprava

Gradivo

Udeleženci boste na delavnici prejeli brezplačno gradivo v pisni obliki.

KOTIZACIJE NI.

Komu je delavnica namenjena

Vsem, ki bi želeli izvedeti, **KAJ JE SISTEMSKA BIOLOGIJA** in **KAKO JE POVEZANA Z VAMI IN VAŠIM DELOM.**

Prijava

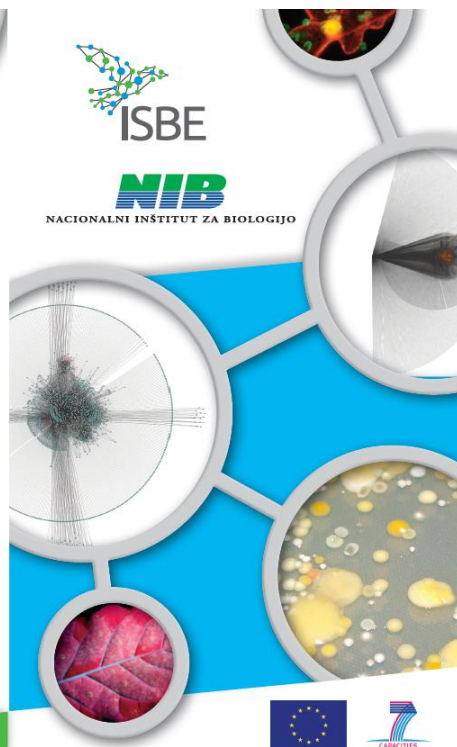
Elektronska prijava:
http://cfgbc.mf.uni-lj.si/people/rokosir/2014anniv9/isbe_workshop.html

Prijave sprejemamo do dne pred izvedbo seminarja.



Informacije

Za vse dodatne informacije nam pišite do 20. septembra 2014 na e-naslov:
spela.baebler@nib.si
 in
 po 20. septembru 2014 na e-naslov:
marina.dermastia@nib.si

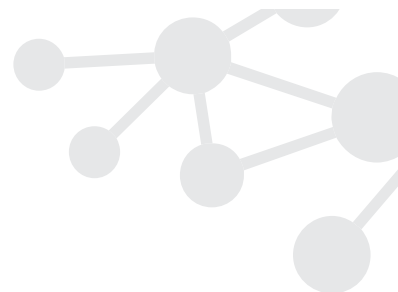
VLJUDNO VABLJENI!



ISBE
NIB
 NACIONALNI INŠTITUT ZA BIOLOGIJO

Sistemska biologija
in njen vpliv na znanost,
gospodarstvo, posameznika
in družbo kot celoto



All participants received a folder with **material about systems biology**:



Workshop in Nove Hrad, Czech Republic

1. Summary

The ISBE/C4Sys international workshop on systems biology was held in Nové Hrad, Czech Republic on June 18, 2014 and was organized within the **4th Visegrad Symposium on Structural Systems Biology** held at the [Institute of Nanobiology and Structural Biology](#), Global Change Research Centre, Academy of Sciences of the Czech Republic. The whole 3-day symposium was organized by universities from the Visegrad 4 (Poland, Slovakia, Hungary and Czech Republic).



2. Organization

ISBE/C4Sys international workshop on systems biology was part of the this symposium with almost 90 participants mainly focused on various computational methods used in the study of biologically relevant macromolecules ranging from quantum calculations via atomistic models to coarse-grained molecular dynamics of biological systems. The other main topic was focusing on experimental techniques, mainly spectroscopic methods that complement the simulations or can be used for verification.

Organization

Institute of Nanobiology and Structural Biology – C4Sys

Global Change Research Centre

Academy of Sciences of the Czech Republic

3. Participants

As mentioned above, this year the symposium organizers added a special section dedicated to Systems Biology in a European context (in collaboration with [ISBE](#)) to which attended outstanding experts in systems biology from the central/eastern European region, and whose research topics presented were from Gene expression noise and robustness of transcriptional response, Experimental and computational approaches for advanced understanding of cyanobacterial cells in natural and controlled environments , specific interactions at the helical 2 domain interface to Cation homeostasis examples in yeast.

In two separate sessions there were presenting systems biologists from the Czech Republic (Rudiger Ettrich, Jost Ludwig, David Safranek, Jan Cervený, David Safranek and Josef Komenda) from Greece (Dimitris Thanos -Research Foundation Academy of Athens) and other contributor from Laboratory of Genomics and Proteomics of Disease Vectors Biology centre of ASCR, Institute of Parasitology in Ceske Budejovice (James Valdes).

4. The workshop

*The main organizers:
from left Babak Minofar,
Rudiger Ettrich and David Reha*



Poster discussions



Section organized by ISBE/C4Sys:

Chairperson: Rüdiger Ettrich

09:00-09:30 **Dimitris Thanos (Athens)**: Gene expression noise and robustness of transcriptional responses

09:30-10:00 **David Šafránek (Brno)**: Computer-Scientific Approaches to Modelling and Analysis of Biological Systems: Applications to Cyanobacteria

10:00-10:30 **Jost Ludwig (N.Hrady)**: Cation homeostasis in yeast - Non invasive methods for time resolved measurements of ion fluxes and pH changes.

Chairperson: Jost Ludwig

11:00-11:30 **Jan Červený (Brno)**: Experimental and computational approaches for advanced understanding of cyanobacterial cells in natural and controlled environments

11:30-12:00 **Jana Kopečná (Třeboň)**: Acclimation of the cyanobacterium *Synechocystis* 6803 to high light is accompanied by an enhanced production of chlorophyll that is preferentially channeled to trimeric PSI.

12:00-12:30 **James Valdes (Č.Budějovice)**: The dynamics of tick salivary proteins

Other talks related to systems biology:

Victor Guallar (Barcelona): Mapping Enzyme Engineering (and drug delivery) by computational tools

Alexandra Carvalho (Uppsala): Phosphoryl transfer reactions and DNA epigenetic modifications

Ján Štěrba (Č.Budějovice): Glycosylation – from proteins to an organism.

Sarah Harris (Leeds): Mesoscale Modelling of Proteins using Fluctuating Finite Element Analysis

5. Feedback

The participants enjoyed the workshop well! We received many verbal positive comments, such as that it was a great way to learn about systems biology and that there were a mix of professionals and it was enlightening to hear their perspectives on some of the challenges scientists encounter while working on specific projects. Although the Czech Republic has several institutions with laboratories producing data that can be used as inputs for systems biology, an infrastructure for systems biology that would offer the individual researchers needed core services and modeling tools and expertise, is quite missing. Therefore, the workshop about systems biology and learning about research infrastructure ISBE in connection with C4SYS that will provide efficient, cost effective, and desired support to increasingly complex research in life sciences in the three major regions of biological and biomedical research in the Czech Republic (Prague, Brno, and South Bohemia) was beneficial. It is understandable that with support of these regions, C4SYS will trigger the spread of systems biology approaches within the life science and biological communities targeting scientists in many different areas of: biophysics, biochemistry, environmental microbiology, microbial ecology, fungal ecology, bioinformatics, computational biology, computational systems biology, mathematical modeling etc.

6. Workshop material

Book of abstracts published at:

http://nh.cas.cz/vsssb14/wp-content/uploads/2014/07/VSSSB14_book_of_abstracts.pdf

