BIOTECHNOLOGY SUMMER SCHOOL

4-8 JULY 2017, STĘŻYCA, Poland

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About XXIII Biotechnology Summer School

Biotechnology Summer School (BSS) is an informal event organized by Intercollegiate Faculty of Biotechnology of University of Gdańsk and Medical University of Gdańsk from the beginning of its existence. The aim of the conference is to popularize and to disseminate knowledge knowledge about the newest biotechnological achievments and building scientific network between students, PhD students and young scientists together with experienced lecturers from the leading institutions from Poland and abroad. We want to improve competences of young scientists in the area of science communication. In this year we have prepared additional activities for our participants like: integration field game, trip to The Centre for Education and Regional Promotion in Szymbark and traditional fancy dress party!

The targeted audience

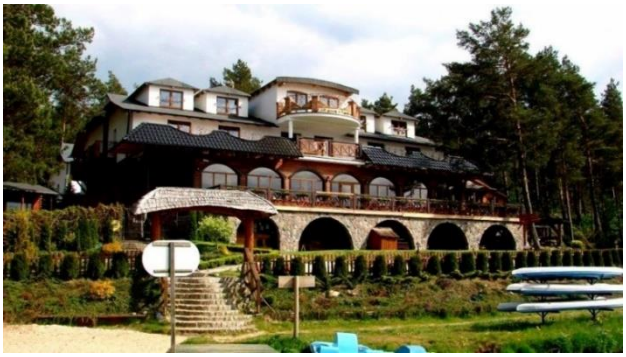
XXIII BSS is dedicated to students and young scientists interested in experimental sciences, life sciences, especially in biotechnology. The Summer School will supplement existing knowledge with valuable practical and applied training, and allow to discuss research in depth with the academics who are leading experts in their area. It will prepare and enhance appeal to potential employers and graduate schools. International study will enable to gain a deeper understanding of another culture, make lifelong friends from a wide variety of backgrounds and benefit from globally-renowned academic excellence.

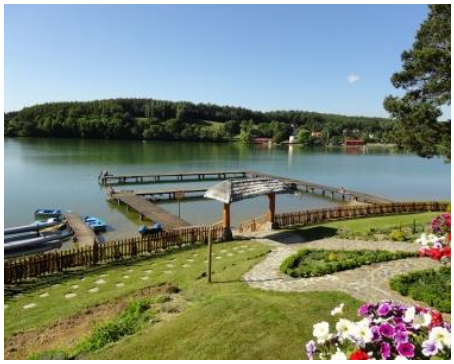
During the conference we will use colors as follows:

PARTICIPANT	SPEAKER	ORGANIZER	GUEST

Venue

XXIII Biotechnology Summer School takes place from 4th to 8th July 2017 in Adler Kaszuby – Medical SPA. The hotel is situated by the lake, among the woods. This place is an oasis of peace and tranquility. Surrounded by nature in its purest form, amongst pines close to the picturesque Raduńskie Lake.





Sponsors

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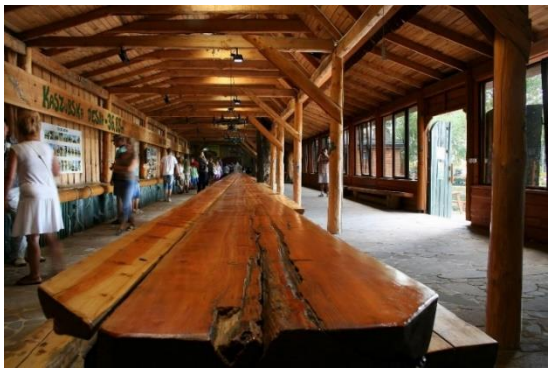
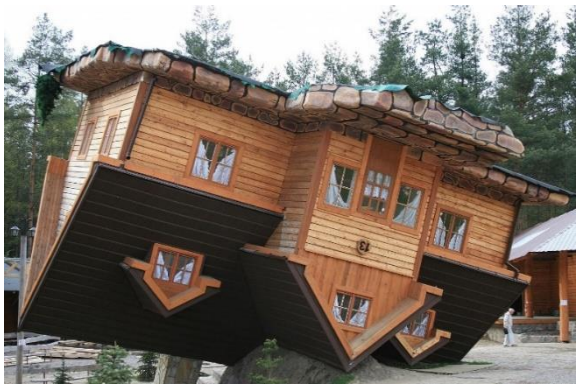
Regional Trip: The Centre for Education and Regional Promotion

The Centre for Education and Regional Promotion (CERP) in Szymbark (Pomeranian Voivodeship) is a magical and unique place, located in the heart of Kaszuby, at the foot of Wieżyca Mountain. Every year thousands of tourists come here for recreation, accommodation, regional cuisine and to learn about the local culture. From year to year CERP is becoming more popular. In this great tourist complex can be seen an interesting attempt to join Kashubian history and folklore with the difficult history of the Polish community. To these difficult issues is dedicated very realistic exhibition covering e.g. Siberian House, barrack from the Soviet gulag or bunker "Ptasia Wola" of the Secret Military Organisation "Gryf".



You will find here also the "Scout House", which was reconstructed from approximately 700 elements, including the longest board in the world, the famous The Upside-Down House – an allegory of modern life, and an unreal, abstract building, as well as the Polish Insurgent's House from Adampol, the Canadian Kashubian Trapper's House, the Old Kashubian Cottage, St. Rafał's Chapel, the World's Largest Playing Piano and many more. Moreover in this location we can find Poland's only Museum of Tobacco.



Additional attractions include fishing in the trout fishery and then enjoying your catch for a meal, excellent regional and traditional Polish dishes, winter sleigh rides with torches and bonfires with sausages, and summer trips in the scenic surroundings Szymbark. Thrill seekers will find something for everyone in the Rope Park with four specially prepared paths with different levels of difficulty.

http://cepr.pl/o-nas

Organizing Committee

Workshop Scientific Coordinators

Michał Obuchowski

Vice Dean for Science at IFB UG&MUG. Head of the Laboratory of Molecular Bacteriology. His research is related to protein phosphorylation and the formation of spores and spore application for the use as carriers of antigens, a research model is *Bacillus subtilis.*

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Robert Czajkowski

Associate Professor at Intercollegiate Faculty of Biotechnology UG&MUG. Molecular plant pathologist and microbiologist from the bottom of his heart. Positively fixated on bacterial viruses (bacteriophages) and their interaction with environment. He believes that the world would be a better place if people smiled more!

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Rafał Dutkiewicz

Associate Professor at Intercollegiate Faculty of Biotechnology UG&MUG. His research is related to molecular mechanisms of iron-sulfur cluster biogenesis. He aims to reconstitute protein complexes that are responsible for FeS synthesis de novo using purified proteins. His research model is *Saccharomyces cerevisiae*.

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IFB Organizing Team

Patrycja Tucholska

Head of Dean's Office. Performs administrative tasks supporting the work of the Dean and Vice Deans. Also involved in organisation of diverse conferences, conventions, symposiums and faculty meetings.

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Maja Maria Pega

The Dean's Office worker. She is responsible for finances of IFB and involved in realization of strategic projects. Works as the front-end developer of IFB. Numbers, maths are her friends.

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Elżbieta Moroz

Research Project Specialist involved in realization of strategic projects at IFB UG&MUG and media activities. Her main interest is focused around agile project management based on teamwork and creative problem solving applications.

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Angelika Michalak

Founder of Cultural Biotechnology Project, PhD student at the Laboratory of Biologically Active Compounds, activist involved in: integration of young researcher community, organization of scientific events, meetings and workshops. From 2013 involved in organization of BSS.

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Marta Matuszewska

PhD student at Laboratory of Biological Plant Protection. Microbiologist by day, amateur graphic designer by night. Ex-vice president of Students' Scientific Association Bio-Med, involved in organization of various scientific events and festivals throughout her time at the University of Gdańsk.

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All questions on conference you can also send to e-mail:

bss_contact@bss.ug.edu.pl

About Intercollegiate Faculty of Biotechnology UG&MUG

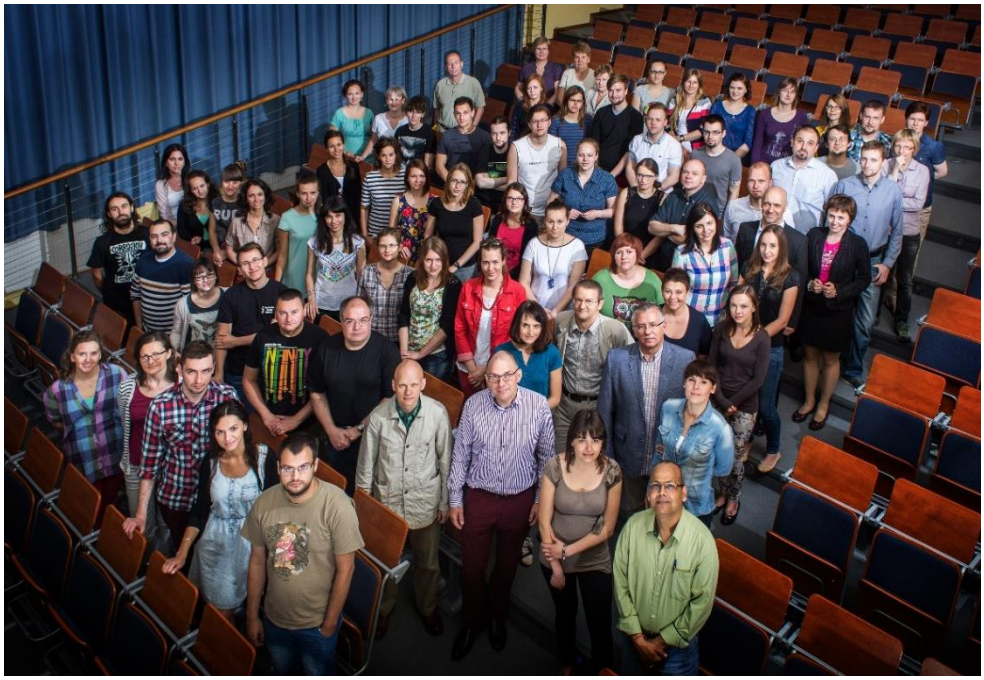
The Intercollegiate Faculty of Biotechnology of the University of Gdansk and Medical University of Gdansk (IFB UG & MUG) has been established in 1993 by the decision of the Senates of both universities. The initiators of the Faculty were Prof. Karol Taylor, Prof. Anna Podhajska and Prof. Wacław Szybalski. The idea of the Faculty was based on conviction that close interaction between research and teaching activities of the two universities will form a special, creative academic centre, using innovative methods of education and basing on top-level standards of research. Integration of the local scientific community remains a key element of our mission. Faculty continues tradition of molecular biology introduced in Gdańsk by Prof. Karol Taylor.

The Faculty is an unique institution in Poland created by two universities. This leads to the **interdisciplinary character of the conducted research and teaching by combining biomedical and bio-molecular issues and their applications in biotechnology for health and life quality**. The intercollegiate character of the Faculty allows for the use of infrastructure and expertise provided by two universities, and therefore combining the best international standards of research with the highest quality of teaching. Our research and teaching is performed in well-equipped modern laboratories at the Institute of Biotechnology and the Tri-City Central Animal Laboratory.

The aim of our Faculty is to provide possibly the highest standard of education based on early integration of students into research activities of the faculty units. Since 1999, the IFB has had the rights to confer the degree of doctor, and since 2010 – the scientific degree of habilitated doctor in the area of biological sciences – discipline of biochemistry. We are leaders in research at **molecular level** in the area of chaperone proteins, molecular

virology, neoplasm growth and metastases, bacterial plant pathogens, and in developing new therapeutic and diagnostic methods.

Both the research and the educational programs at IFB have an interdisciplinary character and are based on international cooperation. Our strategic partners are: the International Institute of Molecular and Cell Biology (Poland) and the association ScanBalt BioRegion. Moreover, IFB cooperates with numerous international and regional research centers like: Karolinska Institut, CIB Madrid, University of Wisconsin, Cornell University, Polish Academy of Sciences.

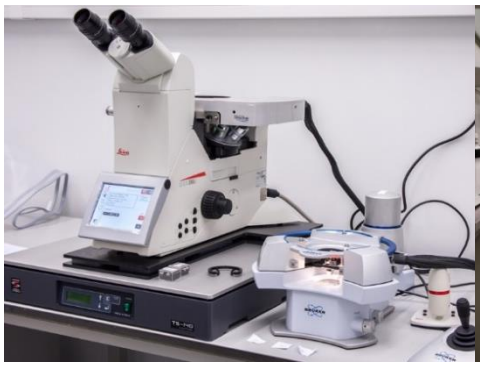


We have created an unique education system in which students are involved in research and teaching based on international cooperation. We believe that involvement of the students in the specific projects greatly supports the individualized system of study and facilitates formation of a unique, well-integrated academic community. IFB is a leading research and teaching institution that since 2002 has had the status of the **European Centre of Excellence in Molecular Biomedicine**. In 2014, in a parametric assessment of the Ministry of Science and Higher Education regarding scientific effectiveness, the Faculty was granted **category A** status and earned **the third place.** The quality of teaching at the Faculty is evaluated as the highest in Poland.

In 2011, the Polish Accreditation Committee awarded the Faculty with a **distinction for the quality of teaching**, and in 2012 the Ministry of Science and Higher Education granted the specialty of BIOTECHNOLOGY at the IFB the title of **The Best Major**.

IFB staff members are also laureates of prestigious programmes and awards, including awards for young scientists (EMBO YIP, HHMI, Polish national programmes such as: LIDER, InnoDoktorant, TOP 500 Innovators, MISTRZ, START, HOMING PLUS). Publications by IFB staff have received numerous awards and distinctions for the best work conducted in Polish laboratories, granted by the Committee of Microbiology of Polish Academy of Science, Polish Genetic Society or Polish Biochemical Society.

From 2016 Faculty has new premises. The new building is one of the most modern research and teaching buildings, including core facility laboratories such as: Bioinformatics Laboratory, Laboratory of Biomolecular Analysis, Laboratory of *In Vitro* Plant Breeding, Phytotron Facilities, Laboratories for work in BSL3 standard, Isotope Laboratory Type III. The building will guarantee a modern space for students and PhD students. The new building is situated on the premises of the Gdansk University campus in Gdansk-Oliwa close to the Chemistry and Biology buildings. It contributes to the integration of the university and facilitate the conducting of joint programmes and research work.



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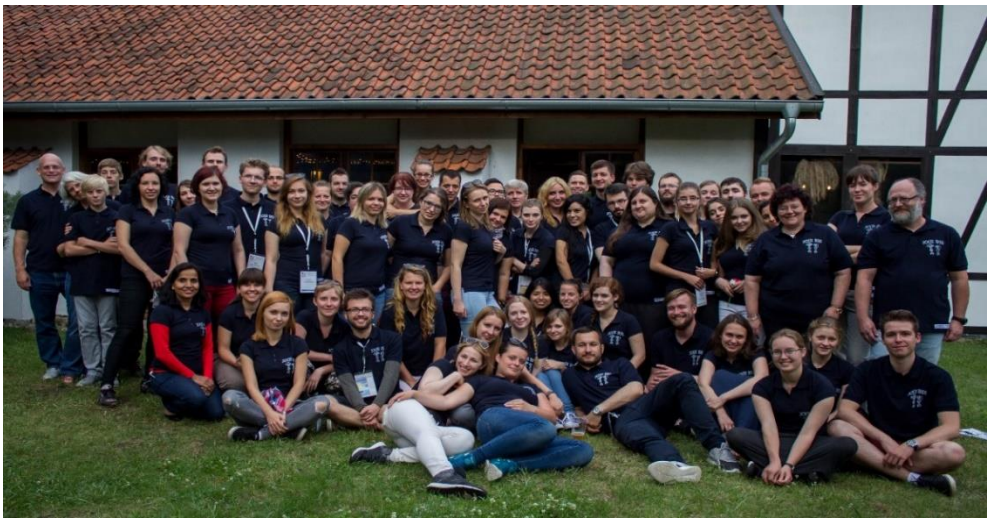
Brief history of Biotechnology Summer Schools

Biotechnology Summer Schools are organized annually since 1994. The idea of Biotechnology Summer School (BSS) came from Professor Anna J. Podhajska, who implied that students and young scientists should actively participate in obtaining knowledge and establishing contacts with scientists from all over the world, not only in formal conditions but also outside the University. That is why the participants of BSS are not only biotechnology students but also students in related biological fields from Poland and from abroad, young scientists and even advanced pupils interested in this topic.

The main aim of this event is to provide students a wide range of courses which are not available in the standard syllabus. We create a relaxed learning environment and give Polish and foreign students a chance to meet highly renowned specialists during lectures as well as in rather informal circumstances. Moreover, Biotechnology Summer Schools give Polish and foreign scientists chance to develop cooperative relationships and create a forum for integration.



Topics of BSS vary from year to year. Prof. Anna Podhajska gained many people's support over her initiative. The number of sponsors increased every year and thanks to all these companies and institutions the organization of Biotechnology Summer School has been possible (read – Historical facts about BSS).

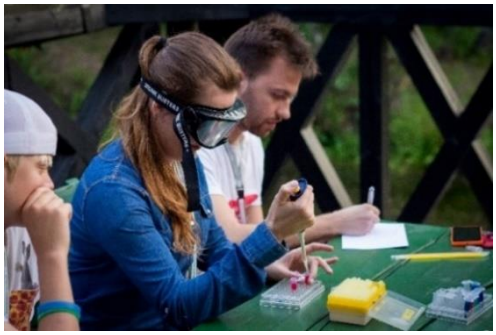
Biotechnology Summer Schools were honored with the presence of many eminent scientists such as professors: Ewa and Ernest Bartnik, Stanisław Bielecki, Klaus Halhlbrock, Waleria Hryniewicz, Robert Huber (Nobel Prize winner in Chemistry in 1988), Berndt Jastorf, Adam Jaworski, Roman Kaliszan, Władysław Kunicki Goldfinger, Andrzej Legocki, Janusz Limon, Mirosław Małuszyński, Jerzy Paszkowski, Andrzej Płucienniczak, Richard P. Sinden, Piotr Stępień, Wacław Szybalski, Tomasz Twardowski, Jacques H. Weil, Robert Wells, Brigitte Wittman - Liebold, Maciej Zenktler, Maciej Żylicz.

No less important than learning is having fun. Many entertaining activities for Summer Schools are always planned. A fancy-dress party, a bonfire with singing, field games, sports, playing on words, integrational workshops are the part of every School. These events are conductive to socializing among the participants. We also organize some visits in local, historical places and regional trips.

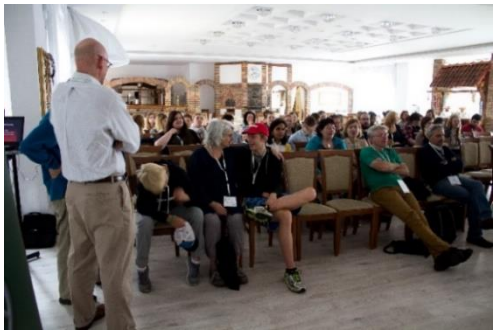
We hope that this year's Biotechnology Summer School will be as successful as previous ones and will be an unforgettable experience for all participants.

Website of BSS: www.bss.ug.edu.pl
E-mail contact: bss_contact@bss.ug.edu.pl

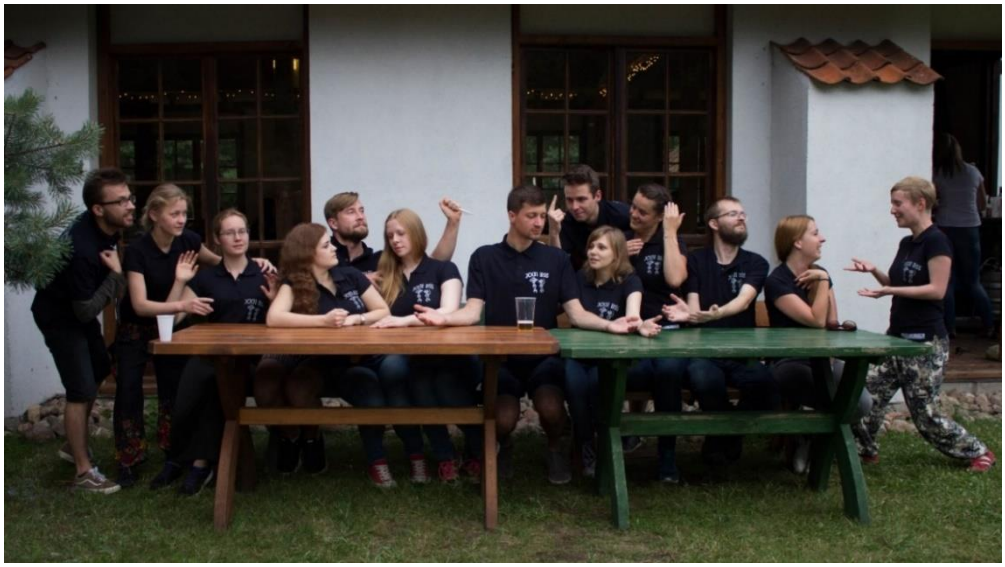
Memories from the XXII Biotechnology Summer School in Wielimowo



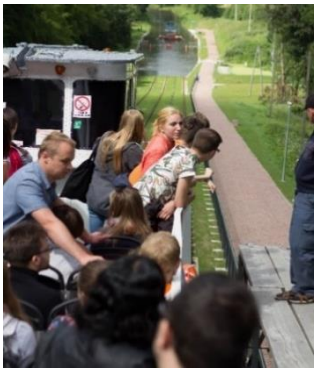
Field game



Lectures



'The Last Supper' performed by Participants of XXII BSS



Regional trip

Open Discussion Panels

Historical facts about Biotechnology Summer Schools

No	Summer School	Thematic Modules	Sponsors	Organizers
I	Wilga 1994	Miscellaneous	Beckman	Prof. Anna Podhajska (Vice-Dean of IFB), Marian Kawczyński (Beckman)
II	Łączyno 1995	Miscellaneous	Beckman, Promega, Tempus Programme EU	Prof. Ewa Łojkowska (IFB), Prof. Anna Podhajska (Vice-Dean of IFB), the group of biotechnology students, International Relations Office of MUG
III	Stegna 1996	Miscellaneous	Beckman, Promega, Tempus Programme EU, KBN	Prof. Ewa Łojkowska (IFB), Prof. Anna Podhajska (Vice-Dean of IFB), the group of biotechnology students, International Relations Office of MUG
IV	Stegna 1997	Miscellaneous	Beckman, Promega, Tempus Programme EU, UNESCO/PAN MCBN Network, KBN	Prof. Ewa Łojkowska (IFB), Prof. Anna Podhajska (Vice-Dean of IFB), the group of biotechnology students, International Relations Office of MUG
V	Gołuń 1998	1. Biotechnological processes 2. Molecular medicine 3. Plant biotechnology	Beckman, Promega, Tempus Programme EU, UNESCO/PAN MCBN Network, MEN	Prof. Wiesław Makarewicz (Dean of IFB), Prof. Ewa Łojkowska (IFB), Prof. Anna Podhajska (Vice-Dean of IFB), the group of biotechnology students
VI	Łączyno 1999	1. New techniques for protein purification and identification 2. Fundamentals for bioprocess engineering	Promega, Bio-Rad, Kendro, UNESCO/PAN MCBN Network, MEN	Prof. Wiesław Makarewicz (Dean of IFB), Prof. Jacek Bigda (Vice-Dean of IFB), the group of biotechnology students, International Relations Office of MUG

No	Summer School	Thematic Modules	Sponsors	Organizers
		3. Molecular aspects of cancer biology		
VII	Twardy Dół 2000	1. Modern techniques of cell structure and cell function analysis 2. Genetic modifications in animals 3. Genetic modifications in plants 4. Transgenic food 5. Commercialization of biotechnology 6. Bioprocess control 7. Possible applications of DNA chips	Promega, Bio-Rad, Kendro, UNESCO/PAN MCBN Network, MEN	Prof. Jacek Bigda (Dean of IFB), Prof. Ewa Łojkowska (Vice-Dean of IFB)
VIII	Łączyno 2001	1. Modern methods of molecular biology and biotechnology 2. Molecular neurobiology 3. Ethical aspects of biotechnology	Kendro, Promega, UNESCO/PAN MCBN Network, Bio-Rad, KBN, KAWA.SKA	Prof. Jacek Bigda (Vice-Dean of IFB), the group of biotechnology students, International Relations Office of MUG
IX	Sobieszewo 2003	1. Plants biotechnology 2. Molecular diagnosis of neoplastic disease 3. Bioinformatics – molecular evolution and protein structure	Alab, BioMoBil Centre Of Excellence, University of Gdańsk, UNESCO/PAN MCBN Network	Prof. Jacek Bigda (Dean of IFB), Prof. Ewa Łojkowska, the group of biotechnology students, International Relations Office of MUG
X	Sobieszewo 2004	1. Genomics, microarrays, molecular diagnosis of cancer	BioMoBil Centre Of Excellence, UNESCO/PAN MCBN Network	Prof. Jacek Bigda (Dean of IFB), Prof. Ewa Łojkowska, the group of biotechnology students, International Relations Office of MUG

No	Summer School	Thematic Modules	Sponsors	Organizers
		2. Biotechnological applications in agriculture 3. Biotechnological applications		
XI	Sobieszewo 2005	1. Bioprocess engineering 2. Proteomics 3. Molecular biology of signal transduction	BioMoBil Centre Of Excellence, UNESCO/PAN MCBN Network	Prof. Jacek Bigda (Dean of IFB), Prof. Ewa Łojkowska, the group of biotechnology students, International Relations Office of MUG
XII	Łapino 2006	1. Immunotherapy of cancer research and clinical stages 2. Molecular diagnosis and cancer treatments 3. Molecular diagnosis and treatment of human and plant pathogens 4. Legal and administrative aspects of research project (in polish)	BioMoBil Centre Of Excellence, 5th Thematic Programme Eu	Prof. Jacek Bigda (Dean of IFB), Prof. Ewa Łojkowska, the group of biotechnology students, International Relations Office of MUG
XIII	Łapino 2007	1. Cancer causes, diagnosis and therapy 2. Others	"Scan Balt" Campus Project Interreg III	Prof. Ewa Łojkowska, Prof. Andrzej Składanowski, BIO-MED, the group of biotechnology students
XIV	Sobieszewo 2008	1. Virology, mostly involved with HCV 2. "Secret life of B. Subtilis" – application oriented microbiology 3. Biomarkers of environmental pollutions	Marie Curie Programme, 6th Thematic Programme	Prof. Ewa Łojkowska (Dean of IFB), Prof Krystyna Bieńkowska-Szewczyk, BIO-MED, the group of biotechnology students
XV	Gdańsk 2009	1. Plant resistance to biotic and abiotic factors	European Social Fund (INNOpomorze), Polish Academy of	Prof. Ewa Łojkowska (Dean of IFB), the group of biotechnology students

No	Summer School	Thematic Modules	Sponsors	Organizers
		2. Plants as a "green factory" for pharmaceutics, nutraceutics and colorants 3. Microbe - plant systems 4. New trends and hot topics in plant biotechnology	Science, Russian Academy of Science	
XVI	Gdańsk Sobieszewo 2010	1. HCV - pathogenesis, disease, therapy 2. Influenza virus. AH1N1 influenza. Viral research 3. Absorption, distribution, metabolism and clearance of drugs 4. Information about EU fund	6th Framework Programme: HEPACIVAC; European Social Fund (Human Capital Programme): PRO-GOS	Prof Krystyna Bieńkowska-Szewczyk, BIO-MED, the group of biotechnology students
XVII	Gdańsk Górki-Zachodnie 2011	1. Biochemistry and biotechnology of plant lipids 2. Bacterial genetics	European Social Fund (Human Capital Programme): PRO-GOS	Prof. Antoni Banaś, prof. Igor Konieczny, dr Anna Gwizdek-Wiśniewska, the group of biotechnology students
XVIII	Jurata 2012	Current scientific research and its practical application – the possibilities of using the findings in any sector of industry	European Social Fund (Human Capital Programme): PRO-GOS	Prof. dr hab. Igor Konieczny (IFB UG & MUG), dr Anna Gwizdek-Wiśniewska (IFB UG & MUG), Students of the Intercollegiate Faculty of Biotechnology UG & MUG
XIX	Gdańsk 2013	1. Basics of modern molecular evolution 2. Teaching soft skills – how to write a good grant	FEBS (Federation of European Biochemical Societies) Education Committee	Prof. dr hab. Igor Konieczny (IFB UG&MUG), Prof. Angel Herraez (FEBS), Prof. Gül Güner-Akdogan (FEBS), Prof. dr hab.

No	Summer School	Thematic Modules	Sponsors	Organizers
			Ministry of Science and Higher Education Polish Biochemical Society Foundation for Polish Science	Jarosław Marszałek (IFB UG&MUG), Elżbieta Serżysko (IFB UG&MUG), dr Anna Gwizdek-Wiśniewska (IFB UG&MUG), Joanna Jaszczołt (FRUG), Katarzyna Sroślak-Janasiewicz (FRUG), Aleksandra Krypa (FNP)
XX	Stegna 2014	Model organisms Public understanding of biotechnology	European Social Fund (Human Capital Programme): "The University of Tomorrow: internationalization of the educational process at the University of Gdansk via cooperation with the University of Houston-Downtown"	Prof. dr hab. Igor Konieczny (IFB UG&MUG), prof. GUMed, dr hab. Michał Obuchowski (IFB UG&MUG), Elżbieta Moroz (IFB UG&MUG), Angelika Michalak (IFB UG&MUG)
XXI	Kadyny 2015	Biotech innovations & International research cooperation	Polish Scientific Publishers PWN Enbio Technology	Prof. dr hab. Igor Konieczny (IFB UG&MUG), prof. GUMed, dr hab. Michał Obuchowski (IFB UG&MUG), Elżbieta Moroz (IFB UG&MUG), Angelika Michalak (IFB UG&MUG)
XXII	Wielimowo Osada Danków 2016	Biotechnologists love every bit of life	Molecular Biotechnology for Healthy Life Mobi4Health	prof. GUMed, dr hab. Michał Obuchowski, prof. dr hab. Jarosław Marszałek, dr Wioletta Żmudzińska, Angelika Michalak, Agnieszka Borowik, Maja Pega (IFB UG&MUG)

Program of XXIII Biotechnology Summer School

Tuesday, 4th July 2017			
15:00		Departure from Gdańsk (Intercollegiate Faculty of Biotechnology of UG and MUG, Abrahama 58, Gdańsk)	
17:00	18:00	Arrival to a venue, accommodation in Adler Medical SPA in Stezyca, REGISTRATION	
18:30	19:30	Dinner, organizational meeting	
20:00	-	Integration – Field game (organized by Angelika Michalak and Marta Matuszewska from IFB UG&MUG)	

Wednesday, 5th July 2017			
08:00	08:45	Breakfast	
08:45	09:00	Welcome word	
09:00	10:00	**Julius Lukes** (Institute of Parasitology Biology Centre CAS, Laboratory of Molecular Biology of Protists, Czech Republic)	**Are human intestinal eukaryotes parasites or commensals?**
10:00	11:00	**Antonio J. Pierik** (University of Kaiserslautern, Germany)	**Introduction to iron-sulfur proteins: properties, structure and function**
11:00	11:30	Coffee Break	
11:30	12:30	**Steven Lindow** (University of California – Berkeley, USA)	**Control of Walnut blight disease caused by the bacterium *Xanthomonas arboricola* pv. *juglandis* by exploiting insights from the epidemiology of the pathogen**
12:30	13:30	**Adam Schikora** (Institute for Epidemiology and Pathogen Diagnostics, Julius Kühn-Institut (JKI), Federal Research Institute for Cultivated Plants, Germany)	**Priming for enhanced defense as a strategy to optimize crop resistance**
14:00	15:00	Lunch	
15:00	16:00	**Sophie Vaulont** (INSERM, Institut Cochin, France)	**Mammalian iron homeostasis: main players and mechanisms**
16:30	17:30	**Angelika Michalak** and **Marta Matuszewska** (IFB UG&MUG, Poland)	**Talking about science** – open session for all speakers and participants
17:30	18:30	Free time	
18:30	19:30	Dinner	
20:30	-	Fancy dress party (remember to take some fancy costume on molecular biology)	

Thursday, 6th July 2017			
08:00	09:00	Breakfast	
09:00	10:00	**Simone Ciofi** (CERM, Università degli Studi di Firenze, Italy)	**The unique contribution of NMR to elucidate cellular pathways**
10:00	11:00	**Steven Lindow** (University of California – Berkeley, USA)	**Biological control of Pierce's disease of grape caused by *Xylella fastidiosa* achieved by various strategies leading to pathogen confusion**
11:30	12:15	Lunch	
12:30	18:30	Regional trip	
19:00	20:00	Dinner	

Friday, 7th July 2017			
08:00	09:00	Breakfast	
09:00	10:00	**Roland Lill** (Institut für Zytobiologie am Fachbereich Medizin der Philipps -Universität Marburg, Germany)	**Biogenesis of iron-sulfur proteins in eukaryotes: Mitochondria, mitosomes, mechanisms, DNA maintenance, and maladies**
10:00	11:00	**Steven Lindow** (University of California – Berkeley, USA)	**Aggregation of phyllosphere inhabitants facilitate cell-cell signaling and community assembly**
11:00	11:30	Coffee Break	
11:30	12:30	**Iris Jedida** (Agricutural Research Organization (ARO) Volcani Center, Israel)	**Interkingdom signaling: elucidating a mechanism by which plant derived small molecules affect bacterial communication and virulence**
12:30	13:30	**Zohar Kerem** (Israel Center for Nutrigenomics and Functional Foods. The Institute of Biochemistry, Food Science and Nutrition, Israel)	**Using computational tools to study enzyme – substrate interactions**
14:00	15:00	Lunch	
15:00	16:00	**Steven Lindow** (University of California, Berkeley, USA)	**Biological control of fire blight disease caused by *Erwinia amylovora* by competitive bacteria**
16:00	17:00	**Zohar Kerem** (Israel Center for Nutrigenomics and Functional Foods. The Institute of Biochemistry, Food Science and Nutrition, Israel)	**Openness and excellence in the Mediterranean diet**
18:30	-	Dinner barbecue, giving Certificates	

Saturday, 8th July 2017		
08:00	09:00	Breakfast
09:00	10:00	Checking out
10:00		Departure

Information on Speakers and Talks

Simone Ciofi (CERM, Università degli Studi di Firenze, Italy)

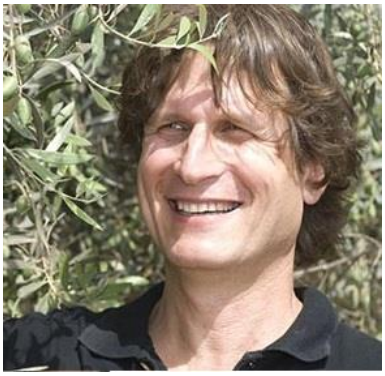
Simone Ciofi Baffoni has been dedicated since his PhD studies to biomolecular NMR spectroscopy, to NMR solution structure determination of proteins and protein complexes, and to exploit NMR observables to define uniquely the position of a metal ion/cofactor in a protein structure. Since 2002, he has been involved in the first Europe-wide Structural Genomics four-year project (Structural Proteomics in EU - SPINE funded by the European Commission in the Framework 5 Research and Technological Development Programme) to implement automated processes for structural biology. He actively contributes to develop a pipeline procedure for protein structure determination by solution NMR, concentrating on protein structures of important human metalloproteins involved in human diseases and disorders. He was then involved in the second phase of the SPINE protein structure initiative, the four-year project SPINE2-Complexes. The project was funded through FP6 Framework Research and Technological Development Programme and was targeted to the development and application of methods for the efficient determination of atomic resolution structures of protein-protein and protein-ligand complexes relevant to human health. Thanks to this eight years' work and training experience in contact with European top-level scientists in structural biology and participating to numerous training activities within SPINE and SPINE-Complexes projects, Simone Ciofi Baffoni has acquired top-level knowledge and cutting-edge skills in structural biology and protein-protein interaction by solution NMR spectroscopy. Thanks to this acquired competences, Simone Ciofi Baffoni is now actively involved in Instruct, a pan-European research infrastructure in structural biology, making high-end technologies and methods available to european users. Research activities of Simone Ciofi Baffoni are mainly focused on i) the cellular mechanisms controlling the intracellular concentration and distribution of copper ions and the related human diseases, ii) the oxidative protein folding mechanisms required for the import and assembly of mitochondrial intermembrane space proteins, and iii) now principally on the cellular mechanisms responsible of the Fe/S protein biogenesis in humans and the related human diseases. These studies involved the investigation

of metal(cofactor)-protein interactions, protein-protein interactions, and structural characterization of protein-protein adducts, through the application of an integrated structural biology approach which exploits a vast number of biophysical and biochemical techniques. Simone Ciofi Baffoni contributed to the discovery of interactions that are driven by metal ions, a phenomenon that can be important in tuning various cellular processes. Simone Ciofi Baffoni has significantly impacted at the international level to the discipline "Metals in Biology". This emerges from i) his works published on Nature (Nature. 2010 Jun 3;465(7298):645-8; Nature. 2016 Aug 11;536(7615):205-9), representing fundamental contributions on cellular copper trafficking and Fe/S protein maturation; ii) from his interactions and joint publications with the very important scientists in the field of metal ions in biological processes, such as Prof. Dennis Winge (University of Utah, USA), Prof. Thomas O' Halloran (Northwestern University, USA), Prof. Nigel J. Robinson (University of Duhram, UK), Prof. Kostas Tokatlidis (University of Glasgow, UK), Prof. Roland Lill (University of Marburg, Germany) etc.; iii) from his involvement in the organization of three editions of the "International Copper Meeting: Copper in Biology" (2012, 2014 and 2016), the most renowned conference in "the copper in biology" field; iv) from his participation as speaker to international meetings and conferences on metals in biology, such as Gordon Research Conference "Cell Biology of Metals - Metal Metabolism And Disease", 2009; International Copper Meeting: Copper in Biology, 2010 and 2012; 12th European Biological Inorganic Chemistry Conference, 2014; FeSBioNet Meeting, 2016; v) actively participates as Management Committee member to the EU COST project on "The Biogenesis of Iron-sulfur Proteins: from Cellular Biology to Molecular Aspects" founded by European Community from 2016; and vi) for receiving the "Arturo Leone Young Investigator Award", which is a prestigious, international award given to young researchers which fundamentally contribute with their research to "copper in biology" field. Simone Ciofi Baffoni has coauthored about 67 publications in peer-reviewed journals of international renown with a fundamental contribution to all of them (alphabetical order is used in almost all publications). The quality of his publications is very high as can be seen from several research contributions published on Nature, Nat. Chem. Biol., Nat. Struct. Mol. Biol., PNAS, JACS, and Elife. His h-index is 31 (ISI).

Talk: **THE UNIQUE CONTRIBUTION OF NMR TO ELUCIDATE CELLULAR PATHWAYS**
Time: Thursday, 6th July 2017, 09:00 – 10:00

Cellular pathways in living systems are largely defined by protein-protein interactions. To get a comprehensive picture of the pathways is necessary to describe protein-protein interactions at an atomic resolution, to characterize thermodynamics and kinetics of them, and to define how their 3D structure changes during interactions. It is evident that solution NMR spectroscopy is the key technique for studying the molecular events underlying cellular function, since it can determine both the structure and dynamics of protein complexes/interactions under near physiological conditions, and since it is an ideal method for studying weak and transient interactions, which are intimately linked to biological function.1 In this context, it has been shown that a number of protein-protein interactions are mediated by the shared coordination of a cofactor such as a metal ion. For these systems, strategies have been developed integrating NMR with other techniques and spectroscopies to characterize the protein-cofactor interaction. Fe-S protein maturation pathways is a typical example of how solution NMR can contribute to unroll at the molecular level complex protein-protein interactions involving different type of Fe-S cofactors.2-4 An overview of the NMR contribution to protein-protein interactions and examples related to Fe/S protein interactome will be presented.

Zohar Kerem (Israel Center for Nutrigenomics and Functional Foods. The Institute of Biochemistry, Food Science and Nutrition, Israel)



Kerem's research team is leading and involved in projects that include designing novel food products, discovery of new biologically active natural compounds and promoting their use as food supplements, as novel antimicrobials for food and agriculture and as active ingredients in cosmetics. Their expertise cover extraction, isolation and structure elucidation using up-to-date NMR and mass spectrometry, profiling and quantitation, and using computational tools to elucidate enzyme-substrate and enzyme-inhibitor interactions, looking specifically on CYP 3A. The team has a long experience in studies of the cultivation of olive for olive oil production, e.g. using alternative water sources for irrigation, and study of secondary metabolites. Kerem has participated in several EU projects, published over 80 manuscripts in peer reviewed journals, and has tutored over 40 graduate students. In addition to his duties as a team leader and a professor at HUJI, Kerem is a member of the national committee for nutrition security, head of the expert committees for trade standards of olive oil and of edible oilsat the 'Standards Institution of Israel'. Kerem is Israel's delegate to the Chemists' Expert Group of the International Olive Council and a member of USP Pharmacopeia experts' panel on olive oil authentication. Kerem has vast experience as consultant to food producers and start-up companies.

Talk 1: **USING COMPUTATIONAL TOOLS TO STUDY ENZYME - SUBSTRATE INTERACTIONS**

Time: Friday, 7th July 2017, 12:30 – 13:30

Cytochrome P450 (CYP) enzymes are heme-protein monooxygenases that play a critical role in the metabolism of drugs and of dietary bioactives. The CYP3A subfamily is particularly relevant in this respect, due to their abundance in human intestine and liver, and the vast structural diversity of their substrates. Dietary compounds, of which polyphenolics are the most studied, have been shown to be modified by CYP3A4 and alter its activity and expression. It is also well documented that continuous exposure to these compounds may lead, in a feedback fashion, to increased expression of CYP3A4, adding a nutrigenomic aspect to the mode of

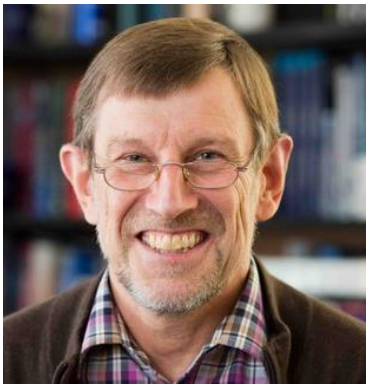
action of dietary phytochemicals. Means are required to evaluate and study the clinical importance of the interaction of bioactives and CYP3A. Here, the use of computational tools to predict the potency of phytochemicals to inhibit CYP3A4 will be demonstrated and discussed. Natural products and synthetically modified compounds, and new bio-assays to support and fine-tune the prediction shall also be demonstrated. Together, these tools allow further development of the simulation as predictive tools in evaluating the potential of polyphenols to interact with CYP3A4.

Talk 2: **OPENNESS AND EXCELLENCE IN THE MEDITERRANEAN DIET**

Time: Friday, 7th July 2017, 16:00 – 17:00

The term “Mediterranean diet” (MD) has been tremendously exploited, and still holds its value. Everybody knows something about it, and many have a personal know-how, may it be academics; chefs, authors of cooking books and bloggers who propose fast-, healthy-, tasty-, easy- Mediterranean recipes; public relations and eventually all of us. To understand how it is not worn already, we first need to go back to the old Mediterranean world, namely Greece, where the word diet meant a way of living, and more precisely, as advised by a physician, which would include a "food" diet and other daily habits. Indeed MD is not about nutrition recommendations per-se, but also e.g. daily exercise, as demonstrated in the MD pyramid. The MD that we cherish today is not here since ancient time. Observing MD closely, one finds cucumber that immigrated from India, tomato that immigrated from South-America and pasta that joined from the far-east. All are immigrants that were absorbed to the loss of their exotic origin. And how were they selected? Simplifying it shows a two-step mechanism: Initially, every new idea, food or habit was welcomed and minds were open to observe and learn; Then, when the new-comer, proved to promote either health or happiness, it was perfected and adopted to become an integrative ingredient of the diet. With this in mind, it is not surprising that only two ingredients of the diet are native to the Mediterranean basin: olive oil and nuts. Many claim that fat in our modern diet is the most important in either inducing or combating modern world disease. Their works support the role of these highly appreciated plant-oil sources in giving the MD its virtue. It is suggested here, that the openness and excellence foundations of the mediterranean diet, make a dynamic collection of ideas and concepts, of foods and recipes, all leading to its being superior and lasting.

Roland Lill (Institut für Zytobiologie am Fachbereich Medizin der Philipps-Universität Marburg, Germany)



Roland Lill studied Chemistry at the Universities of Ulm and München, Germany. After getting his diploma in 1981, he received his PhD in Biochemistry in 1986 at the University of München. His postdoctoral work from 1987-89 at UC Los Angeles, was supported by Deutsche Forschungsgemeinschaft (DFG). After his habilitation in 1995 at the University of München he became a Professor of Cell Biology at Philipps-Universität Marburg, Germany in 1996, and since 2000 he is the Director of the Institut für Zytobiologie. He is a founding member of the Center of Synthetic Microbiology (SynMikro). Lill's research is centered around the biogenesis of iron-sulfur (FeS) proteins in mitochondria, cytosol, and nucleus of eukaryotes. FeS clusters are essential cofactors of proteins involved in fundamental processes such as respiration, DNA synthesis and repair, tRNA modification, and translation. Genetic, cell biological, biochemical, proteomic and structural approaches in budding yeast and human cell culture allowed the Lill group to identify and molecularly characterize many components of the cellular machinery supporting Fe/S protein biogenesis. Moreover, Lill is interested in processes intimately connected to FeS protein biogenesis such as cellular iron metabolism, nuclear DNA metabolism and the maintenance of genome integrity. Because mutations in components of FeS protein biogenesis lead to various human diseases, Lill tries to understand the molecular basis of these 'FeS diseases'. Finally, the work is of interest for biotechnology for optimal use of Fe/S proteins in Synthetic Biology. Roland Lill is an author of more than 200 publications in international peer-reviewed journals and has trained numerous PhD and postdoctoral fellows. He was a Fellow of Max-Planck Society (2009-14) and the spokesman of the collaborative research center CRC 593 "Mechanisms of cellular compartmentation and its disease relevance" of DFG (2003-14). In 2003 he received the G.W.-Leibniz Prize of DFG, in 2010 the Feldberg Prize, and in 2014 the Luigi-Sacconi Medal and the Albrecht Kossel Prize. Lill is elected member of the German Academy of Sciences Leopoldina and of EMBO. He currently serves as an elected member of the senate of DFG and is a senator of the German Academy of Sciences Leopoldina. He works in the

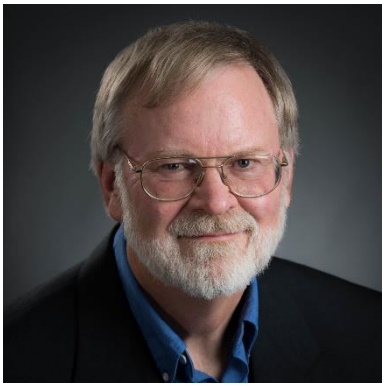
Editorial Advisory Boards or as a guest Editor of several. He organized numerous international scientific meetings on intracellular trafficking, mitochondrial function, and metal biology.

Talk: **BIOGENESIS OF IRON-SULFUR PROTEINS IN EUKARYOTES: MITOCHONDRIA, MITOSOMES, MECHANISMS, DNA MAINTENANCE, AND MALADIES**

Time: Friday, 7th July 2017, 09:00 – 10:00

Iron-sulfur (Fe/S) clusters are evolutionary ancient, inorganic cofactors of proteins with essential functions in catalysis, electron transfer and regulation. Synthesis of Fe/S clusters and their assembly into apoproteins in a living cell is a complex process involving more than 30 proteins in mitochondria and cytosol of eukaryotes (1-4). Biogenesis of mitochondrial Fe/S proteins is accomplished by the iron-sulfur cluster (ISC) assembly machinery which was inherited from bacteria during evolution. Cytosolic and nuclear Fe/S protein assembly also depends on the function of this machinery, yet additionally requires the mitochondrial export apparatus and the cytosolic iron-sulfur protein assembly (CIA) machinery. While we have a good picture of the general outline of Fe/S protein biogenesis (Figure), the detailed molecular mechanisms underlying the individual reaction steps are only now being unraveled by biochemical, biophysical, bioinorganic and ultra-structural methods. The presentation will summarize new aspects concerning the basic mechanisms of cellular Fe/S protein maturation in yeast and human cells. I will also explain how functional impairment of the ISC components results in various “Fe/S diseases” with complex hematological, metabolic or neurodegenerative phenotypes [5]. The fate of dysfunctional mitochondria due to Fe/S protein (biogenesis) defects is unexplored so far and will be discussed.

Steven E. Lindow (University of California, Berkeley, USA)



Steven Lindow is a Professor of Plant Pathology at the Department of Plant and Microbial Biology and the Executive Associate Dean at the College of Natural Resources at the University of California-Berkeley, Berkeley, USA. A member of the Editorial Boards of Proceedings of the National Academy of Sciences (PNAS), Biological Control, Microbial Ecology, Environmental Microbiology, Annual Review of Phytopathology, Molecular Plant Microbe Interactions, Cellular Microbiology and Phytoparasitica.

His research interests are focused on the molecular microbial ecology of plant-associated bacteria leaving on plant surfaces and on the endophytic growth of bacteria within plants. Prof. Lindow is the author and co-author of more than 340 scientific publications and more than 90 book chapters, he is also a laureate of numerous international and national awards in the field if microbiology and molecular phytopathology.

Talk 1: **CONTROL OF WALNUT BLIGHT DISEASE CAUSED BY THE BACTERIUM *XANTHOMONAS ARBORICOLA* PV. *JUGLANDIS* BY EXPLOITING INSIGHTS FROM THE EPIDEMIOLOGY OF THE PATHOGEN**

Time: Wednesday, 5th July 2017, 11:30 – 12:30

Walnut blight disease caused by *Xanthomonas arboricola* pv. *juglandis* (Xaj) is one of the most serious diseases of walnuts in all parts of the world where it is grown. Infections of nuts occurs shortly after their formation each spring. Considerable evidence indicates that infection is due to inoculum that is present in dormant buds. The population size of the pathogen on individual dormant and developing buds and shoots of walnut trees varied by over 106-fold at any sample time and within a given tree. The Xaj population size in shoots was often no larger than that in the buds from which the shoots were derived but mean population sizes in shoots were strongly correlated with prior pathogen population sizes in buds. Likewise, Xaj populations on developing nuts were strongly related to that on the shoots on which they were borne. The incidence of walnut blight disease of nuts in June was

strongly correlated with the logarithm of the population size of Xaj in dormant buds in March. Inoculum efficiency, the slope of this linear relationship, varied between years but was strongly related to the number of rain events following bud break in each year. Inoculum of Xaj present on dormant buds is thus the primary determinant of infection of nuts forming on shoots derived from those buds and the risk of walnut blight disease can be predicted from both the numbers of Xaj in buds and the incidence of early spring rain. Bactericide treatments made early in the growing season to reduce the distribution of inoculum from dormant buds to growing shoots are most efficacious for disease control.

Talk 2: **BIOLOGICAL CONTROL OF PIERCE'S DISEASE OF GRAPE CAUSED BY *XYLELLA FASTIDIOSA* ACHIEVED BY VARIOUS STRATEGIES LEADING TO PATHOGEN CONFUSION**

Time: Thursday, 6th July 2017, 10:00 – 11:00

Xylella fastidiosa, vectored by xylem-feeding insects, moves between xylem vessels after inoculation, inciting water stress symptoms in grape. Because of the incompatibility of traits enabling virulence to plants and insect transmission the pathogen modulates gene expression by accumulating a quorum sensing molecule that partitions its population between those non-adhesive cells that colonize plants, and adhesive cells that colonize insects. The production of extracellular enzymes and active motility is suppressed while the production of surface adhesins increases with as cell density, thereby increasing the local concentration of DSF, a family of unsaturated fatty acids that mediate quorum sensing. Disease control can be achieved by artificially increasing DSF levels in the plant, leading to high adhesiveness of the pathogen, thereby limiting its ability to move and grow in the plant after inoculation. Transgenic grape plants expressing rpfF, encoding the DSF synthase in *X. fastidiosa* exhibit high resistance to Pierce's disease both in greenhouse and field studies. *Burkholderia phytofirmans* PsJN can multiply and move extensively within grape and produc es a small molecule in culture that induces high levels of adhesiveness and thus hyper-biofilm formation in *X. fastidiosa*. The growth and movement of *X. fastidiosa* in grape and symptom development is dramatically reduced in plants inoculated with *B. phytofirmans* either before or after that of the pathogen.

Talk 3: **AGGREGATION OF PHYLLOSPHERE INHABITANTS FACILITATE CELL-CELL SIGNALING AND COMMUNITY ASSEMBLY**

Time: Friday, 7th July 2017, 10:00 – 11:00

Aerial plant surfaces often support large population sizes (>106 cells/cm2) of a variety of bacterial colonists. The large majority of these colonists occur in relatively large cellular assemblages, apparently driven by localized abundance of limiting carbon resources and more conducive environmental conditions at such sites. The production of so-called quorum sensing signal molecules such as acyl homoserine lactones and various unsaturated fatty acids is common in these communities, and the frequent absence of free water that would dissipate such signals maximizes the opportunities for interspecific interactions among community members. Since many plant pathogenic bacteria modulate expression of virulence factors and control behaviors needed for epiphytic colonization via such signal molecules, the incidence of plant disease can be strongly influenced by the composition of the microbial communities on that plant part. Plants also can detect bacterial signal molecules and often respond by inducing host defenses. Bacterial growth and survival is strongly favored in cellular aggregates, which also are sites of preferential recruitment of immigrant inoculum. Emigration of bacteria from plants is quite efficient and thus the abundance and composition of microbes in air near plants is strongly influenced by the amount and type of vegetation nearby. Phyllosphere microbial communities thus are assembled from a metacommunity contributed and shared by nearby plants in a process that likely involves microhabitat modification at sites of microbial aggregation by initial plant colonists. Leaf surface microbial communities therefore are quite context-dependent and can be managed either by direct inoculation or by changing the agroecological context in which crops are grown.

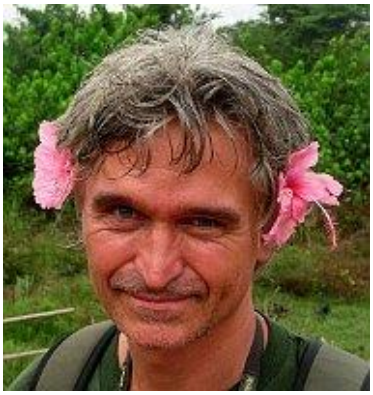
Talk 4: **BIOLOGICAL CONTROL OF FIRE BLIGHT DISEASE CAUSED BY *ERWINIA AMYLOVORA* BY COMPETITIVE BACTERIA**

Time: Friday, 7th July 2017, 15:00 – 16:00

XylFire blight disease of rosaceous plants including pears and apples occurs in most places in the world where these crops are grown and is a devastating disease. Control with various bactericides including copper compounds and antibiotics are

both costly and environmentally damaging. The pathogen colonizes flowers that are the site of infection . Biological control can be achieved by colonization of flowers with various antagonistic microorganisms such as *Pseudomonas fluorescens* strain A506 prior to their colonization by the pathogen. The colonization of individual flowers in mature orchards by this biological control agent applied at various times during Bloom was measured to determine the receptivity of flowers to colonization and the extent of in treachery movement over time. This bacterium colonized flowers that were inoculated within about five days of opening quite well. However, eventual population sizes of the biological control agent decreased with further increases in flower age at inoculation. Populations of the biological control agent on flowers that opened after inoculation increased rapidly with time after flower opening on all flowers and opened within about seven days after inoculation. Large population sizes of the biological control agent on treated trees were associated with significant reductions populations of *Erwinia amylovora* and reduced incidence of fire blight disease. Introduction of the biological control agent into dormant buds of pear and apple using penetrating organo- silicon surfactants is an attractive strategy to achieve biological control with limited frequencies of application of the biological control agent. In addition, flowers and fruit colonized by biological control agents such as *Pseudomonas fluorescens* also exhibit reduced severity of fruit russeting caused by IAA-producing bacteria and incidence of freezing injury caused by ice nucleation active bacteria.

Julius Lukeš (Institute of Parasitology Biology Centre CAS, Czech Republic)



I studied at Charles University, Prague, did my PhD at the Czechoslovak Academy of Sciences in 1991, went for several post-doc stays (University of Amsterdam, University of California, Los Angeles and Riverside). In 1999 I started a laboratory at the Institute of Parasitology, Biology Centre, Czech Academy of Sciences in České Budějovice, investigating molecular biology of trypanosomes and related flagellates. We are also interested in various aspects of evolution of protists, their diversity and functions and composition of their mitochondria. I am senior Fellow of the Canadian Institute for Advanced Research, Fellow of the American and European Academies for Microbiology etc.

Talk: **ARE HUMAN INTESTINAL EUKARYOTES PARASITES OR COMMENSALS?**
Time: Wednesday, 5th July 2017, 09:00 – 10:00

We know for a long time that each human body hosts a multitude of microbes, which actually outnumber human cells. Within the last decade a huge amount of data has been amassed mostly thanks to next generation sequencing that provides compelling evidence for a major impact of the consortia of viruses (viriome), bacteria (microbiome) and eukaryotes (eukaryome) on our health. In my talk I will give an overview of the impact of microbiome, the by far best studied consortium, on human health and will also discuss various interesting aspects of this overlooked "organ". Finally, I argue that eukaryotes found in human intestine, until now usually considered as parasites, are in fact in many cases commensals with beneficial effects.

Antonio J. Pierik (University of Kaiserslautern, Germany)

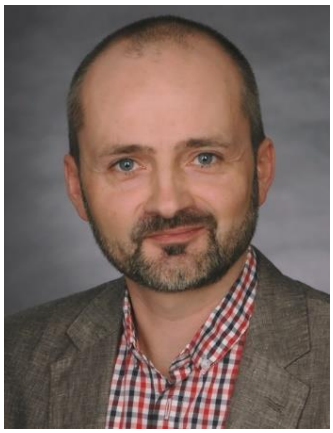
Antonio is Professor of Biochemistry at the Department of Chemistry (University of Kaiserslautern, Germany). After his study of chemistry at the University of Utrecht (the Netherlands) he did his PhD with Prof. Wilfred R. Hagen and Prof. Cees Veeger at the Agricultural University, Wageningen (the Netherlands), during which he first encountered metalloproteins, including iron-sulfur proteins. Thereafter he held post- pdoctoral positions in laboratories studying the complex metalloenzymes nitrogenase (Prof. Bob Eady, Nitrogen Fixation Laboratory, Brighton, U.K.) and hydrogenase (Dr. Siem P.J. Albracht, University of Amsterdam). In 1998 he moved to Germany to join the Microbial Biochemistry group of Prof. Wolfgang Buckel at the Department of Biology, Philipps University Marburg. Cumulative publications and his work on the elucidation of the complete pathway of nicotinate fermentation by Eubacterium barkeri led to his habilitation in Microbiology. He joined Prof. Roland Lill (Institute of Cytobiology, Faculty of Medicine, Philipps University, Marburg) as group leader in 2006, taking care of the core facility for protein spectroscopy. Together with his wife, Dr. Daili J.A. Netz, and other group members the emerging new field of eukaryotic iron-sulfur proteins and the cytosolic iron-sulfur protein assembly (CIA) machinery was explored. He then moved to University of Kaiserslautern (Germany) in 2013 to become Professor of Biochemistry. Through his expertise in (bio)synthesis of isotope-labelled substrates, enzymology, electron paramagnetic resonance (EPR), Fourier transform infrared (FTIR), nuclear magnetic resonance (NMR) and Mössbauer spectroscopies he has contributed to our knowledge on a variety of systems. Examples are discovery of superclusters, microbial metabolic pathways, identification of carbon monoxide/cyanide as intrinsic ligands in hydrogenases, detection of glycyl and ketyl intermediates, the mechanism of vitamin B12-dependent enzymes, identification of novel metalloproteins and maturation factors. In his group hitherto unknown Fe/S proteins, including those with coordination by non-cysteine amino acid residues, are discovered. Equally, his group contributes to a better understanding of the function of a range of biotechnologically important Fe/S dehydratase enzymes at the molecular level. Last but not least, novel methods for a more efficient insertion

of clusters by the cellular maturation machinery in vivo are developed in collaboration with the DFG consortium Fe/S for Life.

Talk: **INTRODUCTION TO IRON-SULFUR PROTEINS: PROPERTIES, STRUCTURE AND FUNCTION**
Time: Wednesday, 5th July 2017, 10:00 – 11:00

Metal ions are present in about a third of all proteins and half of all enzymes. In many cases the metal ions represent the most critical part for the biological function of the biomolecule. One of the most ancient and exciting classes of metallo-proteins is formed by those containing iron (Fe2+/Fe3+) and acid-labile sulfide (S2-) ions organized in inorganic clusters. Examples are the [2Fe-2S], [3Fe-4S] or [4Fe-4S] clusters, which are bound by heteroatoms of amino acid sidechains (usually cysteine). The properties, structure and function of proteins containing these and other Fe/S centres will be the focus of the lecture. Examples on important classes of Fe/S proteins, bioinformatic identification, heterologous expression and application of spectroscopic methods, such as electron paramagnetic resonance (EPR) and Mössbauer spectroscopy, will be given.

Adam Schikora (Institute for Epidemiology and Pathogen Diagnostics, Julius Kühn-Institut (JKI), Federal Research Institute for Cultivated Plants, Germany)



Adam is group leader at the Julius-Kühn Institute in Braunschweig. His group investigates the collaborative action between a host plant and associated bacteria. The focus reaches from the stimulation of plant immune system by bacterial quorum sensing molecules on one hand, and on the other, the question how bacteria (e.g. the human pathogen Salmonella) manipulate plant defense mechanisms. Adam studied biology at the Universities of Warsaw (Poland) and Göttingen (Germany) and got his PhD in mineral plant nutrition.

During the post-doctoral trainings (in France and Austria) he focused on signaling pathways and the cellular responses to diverse stress stimuli, including the response to human pathogenic bacteria. In 2009, Adam became leader of the Plant-Bacteria Interaction Group at the Institute of Phytopathology at JL University Giessen (Germany). In 2015 the group moved to Julius-Kühn Institute in Braunschweig.

Talk: **PRIMING FOR ENHANCED DEFENSE AS A STRATEGY TO OPTIMIZE CROP RESISTANCE**
Time: Wednesday, 5th July 2017, 12:30 – 13:30

The “primed state” allows plants a faster and stronger response to stress situations. In agriculture, this phenomenon is used for plant protection. Today, we know a number of small molecules inducing this primed state. Additionally, also microbiome can have priming-inducing properties. There is good evidence for cultivar-specific variation of the capacity to induce the priming state. However, approaches to use the plant-associated microbiome to induce priming or to improve priming capacity for plant breeding are still missing.

To use priming-inducing compounds or organisms (biologicals) in order to enhance the natural resistance of crop plants against pathogens seems a very good method to increase the production and lower the impact of agricultural practices on the environment. Various approaches have been already undertaken to acquire detailed information on the priming in plants. To achieve such goals, we study the physiology of priming in barley and the capacity of soil microbiome to induce priming. In addition, we will screen the genetically diversity of plants for their capacity to induce priming. Using these novel approaches, we expect to identify accessions with particularly high capacity to induce priming as a reaction to microbial communities in the field, and to identify those components of microbial communities, which contribute to the priming phenomenon.

Iris Yedidia (Agricultural Research Organization Volcani Center, Israel)

Head of the Ornamental Plants and Agricultural Biotechnology Dep. at the Agricultural Research Organization (ARO), Volcani center, Israel. Since 2004, a scientist and a team leader focusing on applying biotechnological tools to improve flower bulbs resistance to pathogens and studying the involvement of natural products in plant resistance to bacterial pathogens. Her PhD was obtained at the Hebrew University of Jerusalem, in Agricultural Microbiology. During her post-doc under the supervision of Prof. Eitan Bibi, at the dep. of Biological Chemistry, the Weizmann Institute of Science, she worked on multidrug resistance mechanisms in Enterobacteria. Seeing education as a major goal for scientists, she was involved in integrating young high school students in research of constructed wetlands, and conservation of natural wetland habitats. In addition to her scientific publications she recently edited the first guide book for flower bulbs in Hebrew. Her Research Interest is Biotechnology based approach to improve resistance to pathogens and color traits in selections of flower bulbs and Involvement of plant derived small molecules in the interaction of soft rot bacteria and plants.

Talk: **INTERKINGDOM SIGNALING: ELUCIDATING A MECHANISM BY WHICH PLANT DERIVED SMALL MOLECULES AFFECT BACTERIAL COMMUNICATION AND VIRULENCE**

Time: Friday, 7th July 2017, 11:30 – 12:30

Of the diverse array of low molecular-mass natural products existing in nature, plants make over 100,000 small molecules, of which more than 8,000 are phenolic compounds. Some of these compounds have a role in the plant interactions with pathogenic microbes or with beneficial or symbiotic microorganisms. The importance of plant-bacteria chemical signalling is increasingly recognized as an example of interkingdom communication, that is pivotal to the understanding and devising of new ways to increase plant defence and control bacterial virulence. Here, we provide an example for the strategy by which plant small molecules interfere with bacterial virulence, via inhibition of the quorum sensing (QS)

machinery. The antimicrobial potential of different active phenolics to inhibit soft rot pectobacteria, was studied in search for a possible mode of action. Interestingly, biofilm formation and exoenzymes activity were significantly impaired, at compounds concentrations that did not affect bacterial cell growth. Since, these major virulence determinants (biofilm and exoenzymes) are controlled by quorum-sensing (QS), we focused on the effect of specific molecules on the QS system of pectobacteria. The study revealed an effect of the tested compounds on the expression level of central QS system and QS controlled genes, using quantitative real time-PCR. Two reporter strains (CV026 and pSB401) demonstrated a prominent reduction in the level of QS signal molecules N-acyl-homoserine lactone (AHL) accumulation, following exposure to the compounds. Moreover, infection capability was strongly impaired on three different hosts, potato, cabbage and calla-lily; but almost completely recovered upon external application of AHL (exogenous-AHL). To support potential interaction of the plant phenolic compounds with QS targets, drug discovery tools were used (SCHRODINGER®) to reconstruct a computational model of the QS central proteins in *Pectobacterium* ExpI/ExpR and predict the potential of specific compounds to bind to the active site of these targets.

Sophie Vaulont (INSERM, Institut Cochin, France)

Director of Research at INSERM and she is working at the Cochin Institute in Paris, France. She is director of the department "Endocrinology, Metabolism and Diabetes" and is co-leading a team entitled "Iron, Oxygen and Energy Sensing in Pathophysiology". She is Member of the laboratory of excellence GREX "The red cell: from genesis to death" and of the DHU AUTHORS "Autoimmune and hormonal diseases".

Her interests lie for more than 14 years in body iron homeostasis. Her group has (1) identified the role of the iron regulatory hormone, hepcidin, (2) contributed to the identification of the signals involved in the regulation of the hormone in various pathophysiological conditions such as anemia, hypoxia, and inflammation and (3) helped to decipher its activity toward the iron exporter ferroportin. They showed that mice made deficient for hepcidin are iron loaded and, conversely, that transgenic mice overexpressing the hormone presented with severe anemia. They made the first proof of concept that hemochromatosis, a common genetic iron overload disease, could be treated by hepcidin hormonal substitution. S Vaulont received the Marcel Simon Award of the International Bioiron Society in 2005 for the discovery of hepcidin.

Her current objectives are to better understand the spatiotemporal regulation and activity of the hormone, in physiology and pathologies. She has published more than 120 scientific manuscripts, patents (use of hepcidin for the diagnosis and therapy of disorders of iron homeostasis) and has participated to numerous national and international meetings.

Talk: **MAMMALIAN IRON HOMEOSTASIS: MAIN PLAYERS AND MECHANISMS**
Time: Friday, 7th July 2017, 15:00 – 16:00

Iron is an essential biometal employs by almost all cells as a cofactor for fundamental biochemical activities, such as oxygen transport, energy metabolism and DNA synthesis.

The molecular circuits that achieve iron balance, both at the cellular and systemic levels, begin to be well characterized[1]. At the cellular level, iron homeostasis is orchestrated by the Iron Regulatory Proteins (IRP1 and 2). The mechanism involves the binding of the IRPs to RNA stem-loop structures, called Iron-Responsive Elements (IREs), in untranslated regions of target mRNAs encoding proteins involved in iron uptake (Divalent Metal Transporter 1, DMT1 and transferrin receptor 1, TfR1), storage (ferritin) and export (ferroportin), thereby controlling mRNA stability or translation[2]. Systemic body iron homeostasis is complex and depends on the regulated absorption of dietary iron by mature enterocytes of the duodenum and iron recycling by macrophages, which supply most of the serum iron through recovery of the metal from senescent erythrocytes. These two fundamental processes are regulated by the iron-dependent hormone hepcidin, a 25-aminoacid peptide produced mainly by the liver, that allows iron adaptation according to the body iron needs[3]. The circulating peptide acts to limit gastrointestinal iron absorption and serum iron by binding to ferroportin, a transmembrane iron exporter, thereby inducing its internalization and subsequent degradation, leading to decreased export of cellular iron. Complete hepcidin deficiency in mice leads to progressive iron accumulation with predominant iron overload in tissues and iron sparing of the macrophages[4]. Conversely, transgenic animals constitutively expressing the hepcidin gene display iron deficiency anemia[5]. In recent years, there has been important breakthrough in our knowledge of hepcidin regulation that has also implications for understanding the physiopathology of human iron disorders. Different aspects of hepcidin regulation will be considered in this presentation, including regulation by the iron status (the BMP6/HJV/SMAD pathway) and the infection/inflammatory pathway.

In human, dysregulation of hepcidin is involved in the pathogenesis of a spectrum of iron disorders. Most of the iron overload syndromes known to date (hereditary hemochromatosis and secondary iron overload such as α-thalassemia) imply a

reduction of hepcidin secretion. In contrast, excessive hepcidin expression causes hypoferremia and contributes to the anemia of inflammation (commonly observed in patients with chronic infections, malignancy, trauma, and inflammatory disorders) and genetic anemia called IRIDA (iron-refractory iron deficiency anemia). The emergence of hepcidin as the pathogenic factor in most systemic iron disorders should provide important opportunities for improving their diagnosis and treatment. If further investigations are awaited concerning the molecular regulation and interaction of hepcidin and ferroportin to expand our understanding of iron disorders, there is no doubt that targeting the hepcidin-ferroportin axis constitutes an interesting alternative therapeutic for human application.

References

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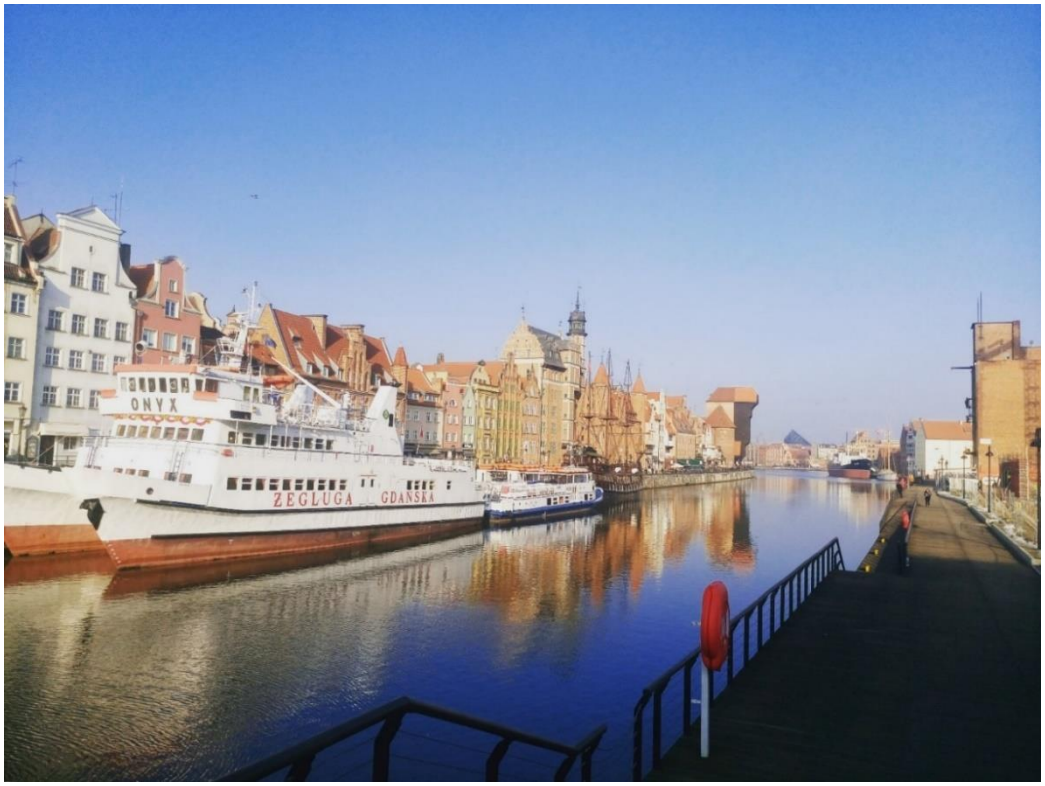

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