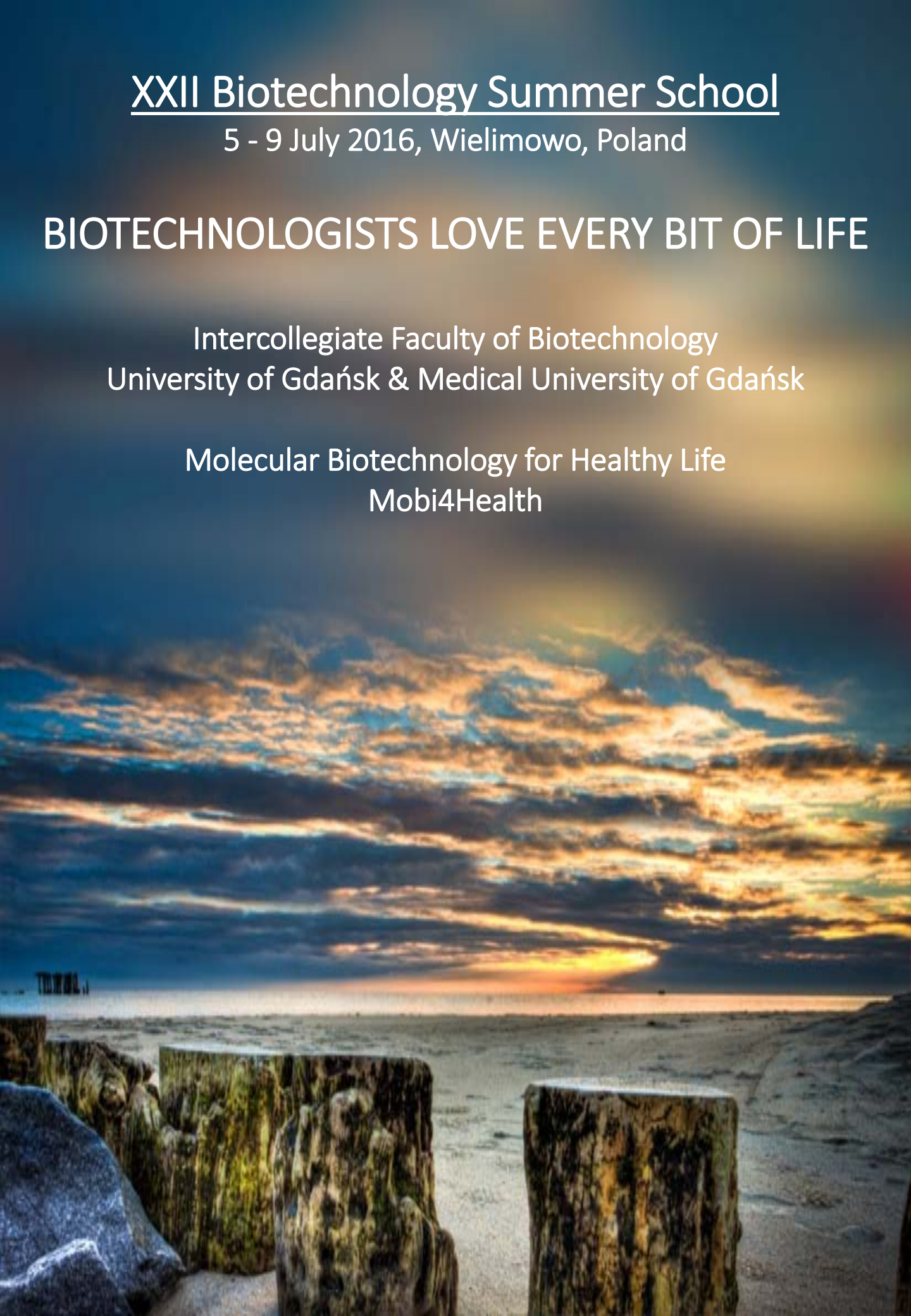
XXII Biotechnology Summer School

5 - 9 July 2016, Wielimowo, Poland

BIOTECHNOLOGISTS LOVE EVERY BIT OF LIFE

Intercollegiate Faculty of Biotechnology
University of Gdańsk & Medical University of Gdańsk

Molecular Biotechnology for Healthy Life
Mobi4Health



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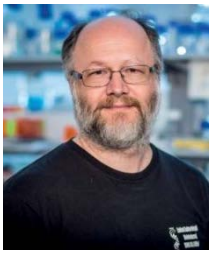
MOBI4Health

Organizing Committee

Workshop Scientific Coordinator



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Organizing Team

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About XXII Biotechnology Summer School

The topic of the XXII Biotechnology Summer School (BSS) is ***Biotechnologists love every bit of life***. The aim of the conference is to promote 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. Moreover, the participants will take part in the english language workshop-course. In this year we have prepared additional activities for our participants like: integration field game, trip-cruise "Take the Boat Through Grass" and traditional fancy dress party.

The targeted audience

XXII BSS is dedicated to PhD 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	SUPPORT	GUEST

Venue

XXII Biotechnology Summer School takes place July 5 – 9 2016 in Conference Palace „Osada Danków". The hotel is situated among the woods near the Elbląg Canal and Wielimowskie Lake, in the charming village of Wielimowo, in the municipality of Miłomłyn in Ostróda district.

CENTRUM PAŁACOWO-KONFERENCYJNE
Osada Danków
Osada GRA Danków
www.dankow.pl

Hotel „Osada Danków”, Wielimowo

It is a pleasure to invite you to work and relax
in a natural habitat of the Wielimowskie lake,
surrounded by beautiful Masurian forests.
Enjoy the abundance of fauna and flora!

Program of XII Biotechnology Summer School

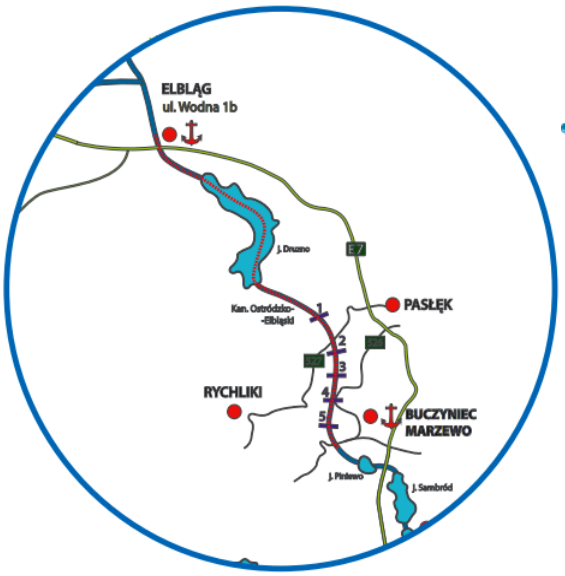
Tuesday, 5th July 2016				
14:00		Departure from Gdańsk (Gdańsk Oliwa Train Station, Plac Dworcowy 1)		
16:00	18:30	Arrival to a venue, registration and accommodation		
18:30	19:30	Dinner		
20:00	—	**Field game***		
* Organized by members of the Cultural Biotechnology Project				
Wednesday, 6th July 2016				
08:00	08:45	Breakfast		
08:45	09:00	Welcome word		
09:00	10:00	**David L. Lewis** (Arrowhead Pharmaceuticals, USA)	Lecture: **Early Drug Discovery**	
10:00	11:00	**Marco Moracci** (Institute of Biosciences and Bioresources - National Research Council, Italy)	Lecture: **Discovery of carbohydrate active enzymes from (hyper)thermophiles: how to exploit natural diversity in biotechnology**	
11:00	11:30	Coffee Break		
11:30	12:30	**Lars Renner** (Leibniz Institute of Polymer Research Dresden, Germany)	Lecture: **Microfabrication meets microbiology – Morphology manipulation of bacterial cells**	
12:30	13:30	**Izabela Święcicka** (University of Białystok, Poland)	Lecture: **Bacillus thuringiensis – an effective and safe biopesticide**	
13:30	14:30	Lunch		
14:30	15:30	**Kathryn Wheeler** (Literacy Network, Madison, USA)	Workshop – group 1: **Problem areas in English for Polish speakers**	Discussion: **Let's talk about science #1*** **Angelika Michalak** Cultural Biotechnology Project (IFB UG&MUG, Poland)
15:30	16:00			
16:00	17:00	**Kathryn Wheeler** (Literacy Network, Madison, USA)	Workshop – group 2: **Problem areas in English for Polish speakers**	
18:30	19:30	Dinner		
20:00	—			
* Informal conversations about science with guest speakers				

Thursday, 7th July 2016				
08:00	09:00	Breakfast		
09:00	10:00	**David L. Lewis** (Arrowhead Pharmaceuticals, USA)	Lecture: **Intellectual Property in Drug Development**	
10:00	11:00	**África González Fernández** (University of Vigo. Biomedical Research Center, Spain)	Lecture: **Nanomedicine: Immune System as Target**	
11:00	11:30	Coffee Break		
11:30	12:30	**Rachna Sadana** (University of Houston-Downtown, USA)	Lecture: **Cytotoxic coscinamide analogues inhibit tubulin polymerization and cause cell cycle arrest in G2/M phase leading to apoptosis**	
12:30	13:15	Lunch		
13:15	17:30	**Boat trip** *„Take the boat through grass"*		
18:30	19:30	Dinner		
20:00	22:00	**Robert Lasek** Cultural Biotechnology Project (University of Warsaw, Poland)	Discussion: **Let's talk about science - popularization of science***	
* Informal conversations about science with guest speakers				

Friday, 8th July 2016				
08:00	09:00	Breakfast		
09:00	10:00	**David L. Lewis** (Arrowhead Pharmaceuticals, USA)	Lecture: **What it's like to work in biotechnology: the evolution of one company from a scientist's perspective**	
10:00	11:00	**Paweł Żołnierczyk** (iTech Innovations Ltd)	Lecture: **Ballance between blue-sky and applied research within the research group**	
11:00	11:30	Coffee Break		
11:30	12:30	**Imrich Barak** (Institute of Molecular Biology, Slovak Academy of Sciences, Slovakia)	Lecture: ***Bacillus subtilis*** **as a tool in basic science and applied research**	
12:30	13:30	**Jakub Banaszek, Łukasz Kawelski** (LABSOFT - Krzysztof Herman, Poland)	Lecture: **The use of atomic force microscopy for imaging and evaluation of the mechanical properties of biological structures.**	
13:30	14:30	Lunch		
14:30	15:30	**Kathryn Wheeler** (Literacy Network, Madison, USA)	Workshop - group 3: **Problem areas in English for Polish speakers**	Discussion: **Let's talk about science #2*** **Marta Matuszewska** Cultural Biotechnology Project (IFB UG&MUG, Poland)
15:30	16:30			
18:30	22:00	**Dinner barbecue**		
* Informal conversations about science with guest speakers				

Saturday, 9th July 2016		
08:00	09:00	Breakfast
09:00	10:00	Checking out
10:00		Departure

Boat Trip „Take the boat through grass”



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www.zegluga.com.pl

The company of Żegluga Ostródzko-Elbląska Sp. z o.o. in the city of Ostróda merges tradition with innovation, the history and tradition of the dozens of years of sailing through the waters of Western Masuria and Pomerania, with the modernity of quality and the new form of innovative tourist services.

The cruise runs through the section of the Elbląg Canal with its system of 5 inclined planes, which is one of the most distinguished achievements of hydraulic engineering in the world, and through the ornithological nature reserve in the Druzno Lake. You will be also introduced to the story of the legendary settlement of Truso, which used to be situated in the Druzno Lake area.

Boat Trip „Take the boat through grass”

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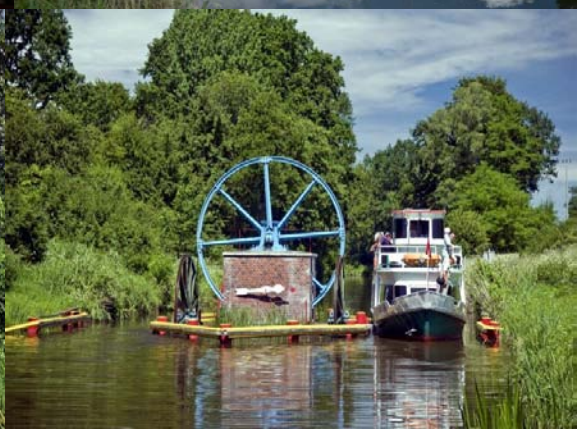


Brief History of Biotechnology Summer Schools

Biotechnology Summer Schools are organized annually since 1994 (Table 1). 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 (Table 1). 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

Table 1. 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 3. Molecular aspects of cancer biology	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
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 2. Biotechnological applications in agriculture 3. Biotechnological applications	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
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 and others	"Scan Balt" Campus Project Interreg III	Prof. Ewa Łojkowska, Prof. Andrzej Składanowski, BIO-MED,

Table 1. Historical facts about Biotechnology Summer Schools

No	Summer School	Thematic Modules	Sponsors	Organizers
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 2. Plants as a "green factory" for pharmaceutics, nutraceutics and colorants 3. Microbe - plant systems 4. New trends and hot topics in plant biotechnology	European Social Fund (INNOpomorze), Polish Academy of Science, Russian Academy of Science	Prof. Ewa Łojkowska (Dean of IFB), the group of biotechnology students
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 IFB 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 Ministry of Science and Higher Education Polish Biochemical Society Foundation for Polish Science	Prof. dr hab. Igor Konieczny (IFB UG&MUG), Prof. Angel Herraez (FEBS), Prof. Gül Güner-Akdogan (FEBS), Prof. dr hab. 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)

Memories of the XXI BBS in Kadyny

„The Last Supper” performed by Participants of XXI BSS

Evening fire tricks

The view of Vistula Lagoon

About Intercollegiate Faculty of Biotechnology University of Gdańsk & Medical University of Gdańsk

The Intercollegiate Faculty of Biotechnology of the University of Gdańsk and Medical University of Gdańsk (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), a European network of research centers within the MOBI4Health project 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 forthe 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.

In December 2012, the University of Gdansk signed an agreement for the construction of a new immediate vicinity of the Departments of Chemistry and Biology. This location is greater integration and to stimulate interdisciplinary research and education. The total cost of the project is 60 million PLN and is funded by the Operational Programme Infrastructure and Environment of the EU building for IFB. The ceremonial opening of the building took place in 2016.

State-of-the-Art Research Infrastructure at IFB

Laboratory of Biomolecular Analysis

This laboratory allows insight into molecular structure and interactions within biological systems. It is equipped with spectro- and fluorometers, e.g. JASCO FP-8500, stopped-flow, microcalorimeter, microplates reader, plasmon resonance analyser Biacore 2000.

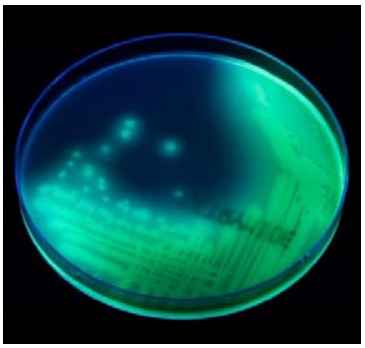
Laboratory of Mass Spectrometry

The laboratory comprises four distinct spectrometers providing various applications, for instance in genomics, transcriptomics, proteomics, lipidomics (MassARRAY® Analyzer 4, MALDI-TOF/TOF™ 5800 with MALDI Imaging, QTRAP® 6500 LC/MS/MS, TripleTOF® 5600). Experienced mass spectrometry specialists facilitate research work in the MS Laboratory. This unit has been established within the FP7 project MOBI4Health.

Laboratory of Genetic Analysis

The equipment comprises new genetic analysis devices (real-time thermocycler Light Cycler 480, real time cell analyser xCELLigence DP, homogeniser Magna Lyser, aparatus for the automatic isolation of nucleic acids Magna Pure 2.0, apparatus for nucleic acids capillary electrophoresis Tape Station 2200 and automatic pipetting station epMotion 5070).

State-of-the-Art Research Infrastructure at IFB



Laboratory of Imaging and Data Analysis

IFB has three confocal microscopes (Nikon PCM-2000, Leica DMI6000 CS SP8 and microscope Leica HCS LSI) as well as several fluorescent ones. The confocal microscope Leica TCS SP8 is equipped with white light laser, which perfectly matches the excitation wavelength ranging between 470 and 670nm of any fluorophore. Up to eight excitation lines can be used simultaneously. This microscope is equipped with five spectral detectors (350-800nm) working independently. Leica TCS LSI macro confocal is the first super zoom confocal that offers high resolution plus a large 16x16mm field of view for *in vivo* imaging. Both Leicae microscopes are equipped with a special incubation chamber for Live cell imaging. Nikon PCM 2000 fluorescent confocal microscope equipped with 3 lasers and ultra-sensitive color camera Hamamatsu.

Laboratory of *In Vitro* Plant Breeding

The infrastructure consists of several growth chambers that serve as a controlled environment for the growth of *in vitro* cultured plants. The growth chambers contain various *in vitro* cultured endangered plants (e.g. *Droseracae* and *Orchidaceae* species), hairy root cultures, plants containing bioactive compounds and GM plants. These cultures areused for breeding and reintroduction purposes, transformations as well as for obtaining biologically active secondary metabolites.

Isotope Laboratory Type III

The laboratory comprises full equipment indispensable for conducting research with radioisotopes such as: ^{3}H, ^{14}C, ^{32}P, ^{33}P and ^{35}S. The scintillation counter is available in the laboratory.

Intercollegiate Faculty of Biotechnology of UG&MUG

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Youtube
https://www.youtube.com/user/IFBUGandMUG


SEQUENOM

The MOBI4HEALTH Project

The project MOBI4HEALTH (Centre of Molecular Biotechnology for Healthy Life biotech solutions bringing health to living organisms and environment supported by mass spec-focused research platform) is supporting the Intercollegiate Faculty of Biotechnology of the University of Gdańsk and the Medical University of Gdańsk (IFB UG&MUG) in boosting its research and innovation potential has been launched on June 1, 2013. Implementation is planned for the following 42 months. This project is funded by the European Commission under the FP7 REGPOT call within the Specific Programme “Capacities”.

MOBI4Health project will increase the potential of IFB UG&MUG in terms of widening and modernization of its research techniques and to expand the innovative dimension of its scientific achievements through establishing the Centre of Molecular Biotechnology for Healthy Life: MOBI4Health Centre.

Almost EUR 1.5 million will be dedicated to the purchase of equipment enabling future cutting-edge multidisciplinary research focusing on making the life healthier. This and the other aims realized within the action plan will strengthen IFB’s human potential and will allow to join to leading European scientific institutions establishing standards in biotechnology.

The Cultural Biotechnology Project

Cultural Biotechnology
The project of active young scientists

Cultural Biotechnology was founded in 2014 on the Intercollegiate Faculty of Biotechnology of University of Gdańsk and Medical University of Gdańsk. The project gathers students, young scientists, and enthusiasts of biological sciences and biotechnology, who treat science as something more than just books and time spent on complex experiments in the laboratory.

The project arose from a need to break away from the daily scientific work and to find a chance to exchange experience and integrate with young scientists. The primary objective of the project is the development of soft skills useful in scientific work by using experience of Cultural Biotechnology members. These include team management, teamwork, presentation and self-presentation techniques, time management, science popularization and many other skills that the project members develop through workshops and trainings. The project also assumes taking actions on promoting science through popularizing actions, festivals, articles, lectures, films and meetings with scientists.
Project members also organize scientific workshops, trips, meetings and help in organization of scientific conference. Most of the Cultural Biotechnology events are open to participants from outside the project.

One example of such event is the 'Let's talk about science' series of open meetings where invited scientists speak about their job in a simple, interesting way. The meetings are held in an informal atmosphere as a discussion panel, where everyone is free to ask questions and express their opinion.

It is a rare opportunity to make a direct contact with the experienced scientists outside the universities and labs.
We are open to create new events and cooperative projects.
If you are interested in participation in the Cultural Biotechnology project, please contact us at the one of the following addresses:

kulturalnabiotechnologia@gmail.com
www.facebook.com/kulturalnabiotechnologia
www.kulturalnabiotechnologia.wordpress.com

The Cultural Biotechnology Project

Main events and activities of Cultural Biotechnology

- Biotech noir film: https://www.youtube.com/watch?v=BSipbJ-JCv0
- Let's talk about science
- Popularization of science
- Scientific presentations workshop
- OAK (Obóz Atrakcyjnych Konwentykli)
- Support team on Biotechnology
- Summer School
- Integration trips

Members of Cultural Biotechnology

Intercollegiate Faculty of Biotechnology UG& MUG

Angelika Michalak
Marta Matuszewska
Anna Smolarska
Kinga Wcisła
Daria Świgoń
Justyna Rygelska
Michał May
Grzegorz Suwała
Igor Grochowina
Joanna Sołdek
Kamila Wielgut
Aleksandra Matrejek
Klaudia Chmielewska
Katarzyna Serbakowska
Marcin Lubocki
Bartłomiej Tomiczek

Jagiellonian University

Kamil Trzebuniak
Piotr Zgłobicki

University of Warsaw

Robert Lasek

Medical University of Warsaw

Maciej Książyk

Information on Speakers and Talks

Imrich Barak

Institute of Molecular Biology, Slovak Academy of Sciences, Bratislava, Slovakia

The head of Department of Microbial Genetics at IMB SAS. He obtained his Ph.D. in molecular biology at Institute of Molecular Biology in 1991. Within 1991-1993, he was working under supervision of Prof. Phil Youngman as a postdoctoral fellow at Department of Genetics, University of Georgia, Athens, US. This stay was a start of his decades long work in the field of bacterial sporulation and cell division. After his return back to Bratislava he started a new research group and since 1996 he is a Head of Department of Microbial Genetics. During early stage of his career he was a visiting scientist in many different laboratories as: University of Georgia, US (1994-1996); York University, UK (1999, 2001); and visiting scientist of Royal Society at Oxford University UK (2002). Later he was a visiting professor at University of Cagliari, Italy (2011) and at EPFL Lausanne, Switzerland (2013). He also served one term (2008-2012) as a Director of Institute of Molecular Biology, SAS. He was principal investigator of three The Wellcome Trust grants from UK, four grants from Framework Programme from EU, one from European Science Foundation, one from Fonds National Suisse and other from Slovak agencies. Since 2013 he is a member of Steering Committee of European Bacell organization 2014 and he is a member of SFX Management Board at European XFEL (X-ray Free Electron Laser) in Hamburg, Germany and from 2015 he is a member of XBI Management Board at European XFEL. He was a principal organizer of Bacell meeting in 2014 and he was a principal organizer of seven European Spores Conferences.

Lecture: *Bacillus subtilis* as a tool in basic science and applied research

Bacillus subtilis is an internationally-recognised model microorganism, whose physiology, biochemistry and genetics has been studied for decades. Our research is oriented toward studying the proteins involved in basic processes in *B. subtilis* as cell division, sporulation and programmed cell death. The lecture will cover broad range of results explaining the mechanism of the basic cell processes in *B. subtilis* and its potential in biotechnological exploitation. It will concentrate on basic science questions as i) How the cell knows with high precision to find its center? ii) How the cell knows when to start to sporulate? iii) How the asymmetry in gene expression is programmed? iv) Why the unicellular organism is programmed for self destruction? How the resistant spore coat is assembled and can it be used for novel nano-biotechnology?

One of the probably most controversial questions regarding cell division of rod-shaped bacteria concerns the mechanism that ensures correct placement of the division septum – mid-cell during vegetative growth or asymmetric during sporulation. Bacterial cell division begins with polymerization of FtsZ protein and formation of Z-ring, which marks the future site of the septum. Z-ring serves as a scaffold for division proteins, and thus its proper placement is crucial for subsequent steps in cell division. In rod-shaped bacteria this is achieved by localizing.

Jakub Banaszek

Labsoft – Krzysztof Herman

Jakub is a physicist, specialized in nanotechnology. Graduated in 2010 at Poznań University of Technology (Faculty of Technical Physics). Sales Manager, responsible for Scanning Probe Microscopy, industrial 3D optical microscopy, surface stylus profilers (since 2008).

Łukasz Kawelski

Labsoft – Krzysztof Herman

Łukasz is a physicist, specialized in medical physics. Graduated in 2007 at University of Szczecin (Faculty of Mathematics and Physics). Application and service engineer, responsible for Scanning Probe Microscopy, industrial 3D optical microscopy, surface stylus profilers (since 2008).

Lecture: *The use of atomic force microscopy for imaging and evaluation of the mechanical properties of biological structures*

Scanning Probe Microscopy (commonly known as Atomic Force Microscopy) for over 30 years of development has become one of the key material science research technique next to white light and electron microscopy. In recent years, this technique is more frequently utilized in biological structures (like tissues, cells or biomolecules) study at the same time demonstrating many competitive advantages over other imaging techniques. Novel imaging modes permitting precise control of interaction forces between the probe and sample surface allow to *in situ* imaging of sensitive structures with applied force even below 50 pN, so that is possible to study surface structure and mechanical properties while retaining regular morphology and physiological state of biological materials. In addition, low interaction forces, allow to obtain higher resolution images, making it possible to observe small biomolecular particles, such as proteins, double-helix DNA with ability to visualize minor and major grooves. The aim of presentation is to make the latest biological samples Scanning Probes Microscopes imagining techniques more familiar for biologists.

África González Fernández

Biomedical Research Center (CINBIO), University of Vigo, Spain

The director of the Biomedical Research Center (CINBIO) and Professor of Immunology at the University of Vigo, Spain. She is President of the Spanish society of Immunology, and coordinator of BIOCAPS, an Institutional project funded by the FP7 program for the IBI (Instituto Biomédico de Orense, Pontevedra y Vigo). She is graduated in Medicine and Surgery, PhD in Alcalá de Henares (Madrid, Spain) and specialist in Immunology in Clínica Puerta de Hierro, Madrid. She worked in the Laboratory of Molecular Biology of the Medical Research Council (Cambridge, UK) under the supervision of Dr. César Milstein (Nobel Prize winner for the monoclonal antibody technique). Since 1996, she leads the Immunology group and works in the fields of immune response to vaccines, generation of monoclonal antibodies and Nanomedicine (toxicity and immunogenicity to nanomaterials). She has published more than 100 manuscripts (in highly known journals such as Nature, Cell, ACS-Nano, PNAS..) and has several patents, including one biosensor to detect tumoral cells. She is one of the scientific promoters of the spin-off company NanoImmunoTech.

Lecture: *Nanomedicine: immune system as target*

The use of very tiny elements in Medicine such as nanomaterials is increasing in the last years because of their potential wide range of applications (*in vitro* and *in vivo* diagnosis and therapy). Due to their size, they can interact with the body systems inducing undesirable or desirable effects. The immune system has the role, between other functions, of defending the body from pathogens and foreign materials. Nanoparticles, as foreign elements, can be recognized by the immune system, with important consequences. The study of the interaction between the components of the immune system and nanomaterials is, therefore, an area of great interest. Moreover, nanomaterials can be used in biomedicine to target different cells to modulate their function towards a desired response, for example in preventive and therapeutic vaccines. The talk will focus on how the interactions between nanomaterials and the immune system could affect to its normal function.

David L. Lewis

Arrowhead Pharmaceuticals,
USA

The Chief Scientific Officer at Arrowhead Pharmaceuticals, a development stage biotechnology company specializing in RNA-based therapeutics. Dr. Lewis was a pioneer in the use of RNAi in animals and was the first to show that siRNAs could be used to inhibit gene expression in multiple tissues of adult mammals. He is a co-inventor of Dynamic PolyConjugate™ (DPC™) technology for targeted delivery of siRNA, which is currently used in two clinical programs. Prior to his role at Arrowhead, Dr. Lewis was Site Head and Director of RNA Therapeutics at Roche's research and development facility in Madison, WI. Dr. Lewis received his BS degree in Biochemistry and Molecular Biology from the University of Wisconsin and his PhD in Biochemistry from Michigan State University. His post-doctoral studies were performed at the Howard Hughes Medical Institute at the University of Wisconsin. Dr. Lewis has authored more than 25 scientific papers and book chapters, and is co-inventor on over 50 patents and patent applications. He is also an Adjunct Professor at the University of Wisconsin and a Lecturer in the Masters of Biotechnology program.

Lecture nr 1: *Early drug discovery*

This lecture will cover early drug discovery and move from consideration of the therapeutic area of focus, to target identification and validation, lead optimization and preclinical safety evaluation. I will also provide a real-life example of this process.

Lecture nr 2: *Intellectual Property in Drug Development*

In this lecture, I will cover intellectual property – patents, trade secrets, copyrights and trademarks. The lecture will focus in detail on patents, which are essential to the success and even to the safety of new drugs. What constitutes an invention, the process of turning an invention into a patent application, and subsequent prosecution of the patent filing will be covered.

Lecture nr 3: *What It's Like to Work in Biotechnology: The Evolution of One Company from a Scientist's Perspective*

In this lecture, I will give an illustration of what life is like working in the drug development business as a scientist. I will give the story of my experience working in my own company from its founding as a private biotechnology company, to its acquisition and subsequent divestment by a major pharmaceutical company, and finally to its rebirth as a publicly-traded biotechnology company.

Marco Moracci

Institute of Biosciences and Bioresources
of the National Research Council, Italy

Senior Researcher and Group Leader at the Institute of Biosciences and Bioresources (IBBR-CNR), Naples, Italy. As student at the University of Naples, and then at the Institute of Protein Biochemistry and Enzymology of the CNR in Naples, he worked on his Thesis on a malic enzyme and a β-glycosidase from the thermoacidophilic Archaeon *Sulfolobussolfataricus*under the supervision of Prof. M. Rossi. After that, Marco spent two years of post-doctoral fellow in the laboratory of Prof. J. Pulitzer at the International Institute of Genetic and Biophysics - CNR in Naples working on the yeast *Saccharomyces cerevisiae* as a host for the expression of recombinant genes. From 1991, Marco became interested in protein and enzyme folding and stabilization and, in the Department of Chemistry of the University of Cambridge (UK) under the supervision of Prof. A.R. Fersht, studied the hydrophobic core of the chymotrypsin inhibitor CI2, preparing mutants by site-directed mutagenesis and analysing them by equilibrium and kinetics of denaturation. Then, back to Italy, from 2001 he settled his own research group, now at the IBBR-CNR in Naples, and for eight years he taught Enzymology at the University of Naples "Federico II". In these years, his research interests focused on the study of the structure/function relationship of carbohydrate active enzymes (cazymes) and on the mechanicistic aspects of the enzymatic hydrolysis and synthesis of glycosides, which are addressed with a variety of approaches including molecular enzymology, biophysics, mutagenesis, and metagenomics. The model systems are the cazymes from (hyper)thermophilic microorganisms, mainly Archaea, which are considered the extant organisms closest to the early forms of life on Earth. Therefore, Marco's scientific interests include also the study of gene expression in Archaea and of the molecular base of protein stability to the extreme conditions to understand and trace the origin and evolution of life on Earth.

Lecture: *Discovery of carbohydrate active enzymes from (hyper)thermophiles: how to exploit natural diversity in biotechnology*

The study of carbohydrate active enzymes, namely glycoside hydrolases, glycosyltransferases, carbohydrate esterases, etc., which are widespread in nature and of increasing applicative interest, greatly increased our knowledge on this class of biocatalysts in the glycobiology field and improved their exploitation in biotechnology and biomedicine. The recent (meta)genomic sequencing explosion provided an enormous amount of hypothetical cazyme genes, but also made evident the current impairment of enzymatic characterization, which is essential to unequivocally assign to the products of these genes an enzymatic activity and, possibly, a physiological function. Among the natural sources of cazymes, hyperthermophiles, microorganisms thriving at temperatures >80°C are an attractive source because the enzymes extracted therein show impressive stability not only to high temperatures, but also to extremes of pH and high concentrations of ions and organics, which are often experienced in industrial applications. An overview on cazymes structure and function features, and specific examples of their classification and discovery will be presented, with particular focus on the exploitation of the natural diversity of hyperthermophilic microorganisms as source of novel and interesting hyperstable glycoside hydrolases.

Lars Renner

Leibniz Institute of Polymer Research Dresden, Germany

Lars is an engineer with a degree in bioprocess engineering from the Technical University of Dresden. During his PhD thesis, he developed artificial membrane systems on polymer platforms to accommodate transmembrane proteins for in vitro studies. He moved on to the University of Wisconsin-Madison as a DFG Post-doctoral Fellow to work at the biochemistry department with Douglas Weibel. We developed methods to manipulate bacterial cell shape and study the spatial and temporal localization of biomolecules in bacteria. Lars is now a group leader at the Leibniz Institute for Polymer Research Dresden. His current research interests concern bacteria shape-function relationships and bacterial growth using microchamber technology to manipulate bacterial morphology. He continues to work on artificial membrane systems to study protein-lipid interactions. Although he never worked as an engineer, he keeps engineering principles dear.

Lecture: ***Microfabrication meets microbiology – Morphology manipulation of bacterial cells***

Why bacteria have evolved, established and maintained specific shapes is one central question in bacterial cell biology. Bacteria are remarkably successful in achieving a precise shape and tightly coordinating cellular processes such as DNA replication, protein production and cellular division, yet the underlying biophysical cues and the evolutionary advantage for one shape over another are largely unknown. I will take about the organizational hierarchies of how rod-shaped bacteria coordinate the localization of biomolecules, with a focus on specific proteins and lipids. Further, I will show how rod-shaped bacteria maintain their shape when subjected to mechanical deformation. In particular, we explore how mechanical force changes bacterial rod-shaped morphology and consequently affects the bacterial shape after the mechanical force is released. I will discuss how microtechnology tools can be explored to design and create microchambers for the manipulation of cellular shape.

Rachna Sadana

University of Houston-Downtown,
USA

Rachna is an Assistant Professor of Biology and Biochemistry in the Department of Natural Sciences, University of Houston-Downtown. She received her Ph.D. in Biochemistry, at Kurukshetra University, India She teaches a variety of lower and upper level biology courses. Her research focuses mainly on investigating analogues of natural compounds for their anti-cancer properties. and regulatory mechanisms of adenylyl cyclase (a family of enzymes that catalyzes the formation of 3',5'-cyclic AMP, the second messenger).

Lecture: *Balla Cytotoxic coscinamide analogues inhibit tubulin polymerization and cause cell cycle arrest in G2/M phase leading to apoptosis*

Cancer is a collection of diseases hallmarked by uncontrolled cell division. Cancer treatment involves varying combinations of surgery, radiation, chemotherapy and hormone therapy. Chemotherapy employs the use of drugs that kill the rapidly dividing cells (characteristic of cancer cells). Various chemotherapeutic drugs such as paclitaxel and vinblastine interrupt cell division by binding to tubulin (a protein responsible for spindle formation, a critical step in cell division). For more than 50 years, tubulin binding drugs have been used to treat cancer, Scientists are still in search of novel anti-cancer compounds targeting tubulin for two reasons; (1) patients develop resistance to existing drugs and (2) tubulin is one of the most validated targets for cancer treatment. A series of eighteen synthetic coscinamide analogues were evaluated for their cytotoxic effects on 5 different cancer cell lines. Our initial screen using MTT cell proliferation assay identified four compounds that caused cell death with IC_{50} less than 0.5 µM. Preliminary mechanism of action studies indicated that these compounds cause cell cycle arrest in G2/M phase, induce a caspase-dependent apoptotic response and exert their anticancer activity through inhibition of tubulin polymerization.

Izabela Święcicka

University of Białystok,
Poland

Izabela obtained her PhD in biology at the University of Białystok (UB) in 1999, working on the genome profiling of chosen bacteria from the Genus *Bacillus.* Then, she spent a postdoctoral (2003-04) in the group of prof. Jacques Mahillon (Universitécatholique de Louvain, Louvain-la-Neuve, Belgium), an enthusiasts of evolution and diversity of *Bacillus cereus sensulato*, a group consists of eight species, including *B. thuringiensis*, which has been used effectively over that past several decades as biopesticide. During the post doc study she observed that (i) in natural environments the processes of *B. thuringiensis* chromosome rearrangements are rare unlike processes in horizontal gene transfer, and (ii) the life cycles of *B. thuringiensis* and *B. cereus*, starting from endospore germination through proliferation of vegetative cells and sporulation, can occur in the alimentary tracts of many invertebrates. In 2006 Izabela became a Fulbright grantee in the Program Senior, which allowed her to conduct her project "Improvement of insecticidal efficacy of environmental *Bacillus thuringiensis* strains from north-east Poland," at University of California, Riverside, under supervising of Prof. Brian Federici. The project resulted in description of many genetic aspects of pathogenicity of Polish isolate *B. thuringiensis* IS5056. Izabela received habilitation on February 16, 2009. Two weeks later she was nominated to chair the Department of Microbiology, UB, and then in February 2010 she was nominated for an associate professor of UB. After habilitation she has continued her study of *Bacillus cereus sensulato*focusing mostly on (i) genetic aspects of *B. thuringiensis* entomopathogenecity, (ii) genetic structure of environmental *B. thuringiensis* isolates and other members of the *B. cereus* group, and (iii) pathogenicity of *B. cereus*.

Lecture: *Bacillus thuringiensis* - an effective and safe biopesticide

A big problem of agriculture is the lack of efficient protection of plants against insects. To counter the problem of agricultural pests, chemical insecticides have been used for the past 80 years. However, their use has resulted in adverseeffectsonthe environment due to residual buildup. Thus, there is a continuing need for biodegradable pesticides that are environmental friendly. In this regard, *Bacillus thuringiensis* have been used effectively over that past several decades. Strains of this bacillus synthetize (i) δ-endotoxins, also known as Cry toxins, selectively active against insect pests, and (ii) Vip toxins produced during these bacteria vegetative growth.

This talk is intended to provide an overview of entomopathogenic properties of *B. thuringiensis*, the insecticidal toxins produced by these bacteria, and the ability of an improvement of insecticidal efficacy of environmental *B. thuringiensis* strains.

Kathryn Wheeler

Literacy Network, Madison,
USA

Kate taught English Composition and Literature for many years as a Teaching Assistant at the University of Wisconsin-Madison and as a Visiting Instructor at Ripon College, both in the State of Wisconsin, USA. She has also taught English as a Second Language to a variety of English learners in university, professional and community settings, and is currently teaching ESL with the Literacy Network in Madison.

Lecture: *Problem Areas in English for Polish Speakers: Articles, Prepositions, the Present Perfect Tense, and More*

Kate has worked with her husband David Lewis and their friend, Professor Jaroslaw Marszalek, to determine the most common problems for Polish scientists writing and speaking in English. This workshop will use samples of scientific writings from biotech students to help you see the correct patterns in difficult areas such as English article use (**a, an, the**) and prepositions (**in, on, by**). We will also cover use of the English Present Perfect Tense (ex. **I have been working on this group of experiments for five years.**) and some common expressions in scientific papers.

We will practice using these elements of English in both written and conversational settings. We will also practice pronouncing some difficult English sounds which lack equivalents in Polish.

Paweł Żołnierczyk

iTech Innovations Ltd

Gdańsk University of Technology, PL (Physics), and The University of Salford, UK (Business) graduate. Experienced research commercialisation professionals with over 8years working experience in academic and international commercial environment. Track record in successful research commercialisation form academia to industry via completed license deals and spin off creation with cumulative value in the millions pounds. Managed spin-off companies creation. Former Managing Director of Onco-NX Ltd, oncology business sold in 2014. At the present holds COO position in the Incanthera Ltd business.

Talk: *Ballance between blue-sky and applied research within the research group*

One of the major changes in the society in the last century is shift from postindustrial economy to knowledge-based economy. Universities and wider research institutes are seen as an important an unexplored depositories of vital knowledge and innovation. This view changed the role of publicly funded research from 'blue sky' toward more applied research. As a consequence significant focused is made on the research commercialization process and closer collaboration between academia and business. In this process research group expected to act more with business acumen plays key and vital role.

In this seminar we will examine challenges to researchers on the borders between academia and business. Author's personal experience of research output commercialization will provide background to the discussion and advices regarding: "Balance between blue-sky and applied research within the research groups". Author's main postulate is that only highest scientific excellence is able to provide successful innovations. It is important to note that author will predominantly make focus on the life sciences and biotechnology fields of research.

Notebook

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We are pleased to invite you to IFB in Gdańsk!

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