XXI BIOTECHNOLOGY SUMMER SCHOOL

30 June – 4 July 2015, Kadyny, POLAND

BIOTECH INNOVATIONS

&

INTERNATIONAL RESEARCH COOPERATION

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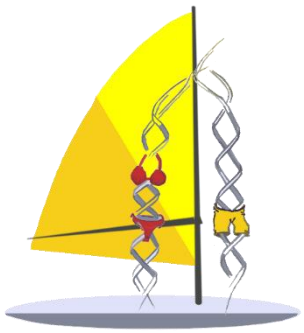
About XXI Biotechnology Summer School



The topic of the XXI Biotechnology Summer School (BSS) is ***Biotech Innovations and International Research Cooperation***. 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 workshop concerning scientific cooperation and workshops prepared by KAWA.SKA concerning microscopy. In this year we have prepared additional activities for our participants like: integration field game, team building workshop, regional trip through Kadyny village and traditional fancy dress party.

The targeted audience

XXI BSS is dedicated to students, PhD students and young scientists interested in experimental sciences, life sciences, especially in biotechnology.

During the conference we will use colors as follows:

ATTENDEE	SPEAKER	ORGANIZER	STUDENT'S TEAM	GUEST

Venue

The XXI Biotechnology Summer School takes place from 30 June to 4 July 2015 in **Kadyny Folwark Hotel&SPA**. The hotel is situated in the Elbląg Uplands in Poland on the edge of the National Park "Kadyny Woods", 19 km from Elbląg and about 75 kms from Gdansk. In the Kadyny Woods you will find not only the largest oak tree in Poland but also many varieties of birds trees and fauna as well as the rare Sika deer which was presented to Emperor Wilhelm II by the Japanese Emperor, over one hundred years ago. The woods make a fantastic setting for a walk and you may meet some wild boar, deer or pheasant on the way. The Vistula Bay and its beaches are just 800 metres from the hotel.

CADINEN

Sponsors

Sponsors of this year edition of BSS are:

Enbio Technology

Polish Scientific Publishers PWN

PWN

Organizing Committee

Workshop Scientific Coordinator

Prof. Michał Obuchowski (Intercollegiate Faculty of Biotechnology UG&MUG)

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*.

E-mail: michal.obuchowski@biotech.ug.edu.pl

Organizing Team

Elżbieta Moroz (Intercollegiate Faculty of Biotechnology UG&MUG)

Research Project Specialist involved in realization of strategic projects at IFB UG&MUG, social media activities, PR activities and Faculty's development. Also works as the front-end developer of IFB and BSS website.
Ela will lead team building workshop on the 2nd of July.

E-mail: elzbieta.moroz@biotech.ug.edu.pl Mobile: +48 509 328 507

Angelika Michalak (Intercollegiate Faculty of Biotechnology UG&MUG)

Founder of Cultural Biotechnology Project, Member of Student's Scientific Assotiation Bio-Med, student activist involved in integration of student's scientific community, popularization of science and preparing workshops: related to science communication and many other soft skills.
Angelika will lead the field games on the first day of the conference.

E-mail: angelique.michalak@gmail.com Mobile: +48 535 368 033

All questions on conference you can also send to e-mail: bss_contact@bss.ug.edu.pl

Support:

Members of Cultural Biotechnology Project

Project working under the patronage of Students' Scientific Association Bio-Med at Intercollegiate Faculty of Biotechnology UG&MUG. It unites students, PhD students and scientists from the field of life sciences.

Cultural Biotechnology

The project of active young scientist

The need for a break from everyday scientific work was the reason for creating this project. Developing different passions, talents and interests is the aim to be fulfilled by the members. To achieve that we take part in and create different cultural events such as meetings, lectures, festivals that are especially connected with popularisation of science.

The main purpose of the project is to develop so called 'soft skills' such as teamworking, techniques of presentation and autopresentation, self-management in time and many others.

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 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 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**.

Since 2012, IFB has been realizing FP7 Project ***Centre of Molecular Biotechnology for Healthy Life: Biotech solutions bringing health to living organisms and environment supported by mass spec-focused research platform*** (acronym: MOBI4Health).

The aim of the project is to increase the potential of the Intercollegiate Faculty of Biotechnology University of Gdańsk and Medical University of Gdańsk in terms of widening and modernization of its research technologies and expansion of the innovative dimension of its scientific achievements through establishing the Centre of Molecular Biotechnology for Healthy Life: MOBI4Health Centre. Almost 1.5 million EUR allowed the purchase of equipment enabling future cutting-edge multidisciplinary research focusing on making life healthier. The implementation of the action plan is going to strengthen IFB's human potential and allow to join leading European scientific institutions establishing standards in biotechnology. Budget of the project is 5.2 mln Euro.

In December 2012, the University of Gdansk signed an agreement for the construction of a new building for IFB. For the end of 2015 the opening of a new research and teaching complex has been planned.

It will be 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 will contribute to the integration of the university and facilitate the conducting of joint programmes and research work. The total cost of the project is approx. 15 million EUR and funding comes from the funds of the Operational Programme Infrastructure and Environment (EU Structural Funds). Start of classes in the new building is planned for October 2015.

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Linkedin
https://www.linkedin.com/company/intercollegiate-faculty-of-biotechnology

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

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.

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	BioMoBil Centre Of Excellence, 5th Thematic Programme Eu	Prof. Jacek Bigda (Dean of IFB), Prof. Ewa Łojkowska, the group of biotechnology students,

No	Summer School	Thematic Modules	Sponsors	Organizers
		3. Molecular diagnosis and treatment of human and plant pathogens 4. Legal and administrative aspects of research project (in polish)		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 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 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 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)

Program of XXI Biotechnology Summer School

Tuesday, 30th June 2015		
14:00		Departure from Gdańsk (Gdańsk Główny Train Station, Podwale Grodzkie 2 Street)
16:00	18:00	Arrival to a venue, accommodation in Kadyny Folwark Hotel&SPA
18:30	19:30	Dinner, organizational meeting
20:00	-	Integration field game*

* *Organized by students from the project "Cultural Biotechnology" (please take flashlight)*

Wednesday, 1st July 2015			
08:00	08:45	Breakfast	
08:45	09:00	Welcome word	
09:00	10:00	Lecture **"Rules and Tools for Efficient Enzyme Evolution, Recruitment and Discovery"**	**Florian Hollfelder** (University of Cambridge, United Kingdom)
10:00	11:00	Lecture **"Growth of microorganisms in microfluidic devices"**	**Filip Dutka** (Institute of Physical Chemistry, Polish Academy of Sciences, Poland)
11:00	11:30	Coffee Break	
11:30	12:30	Lecture **"Lab-on-a-Chip devices for long-term cell culture and anticancer drug activity evaluation"**	**Zbigniew Brzózka** (Warsaw University of Technology, Poland)
12:30	13:00	Presentation **"Steam sterilization versus innovative DET technology - revolution in liquid media sterilization"**	**Arkadiusz Dorna** (Enbio Technology Sp. z o.o., Poland)
14:00	15:00	Lunch	
15:00	18:30	Free time / **Students interviewing with the guest speakers – talking about science**	
18:30	19:30	Dinner	
20:30	-	Fancy dress party	

Thursday, 2nd July 2015			
08:00	09:00	Breakfast	
09:00	10:00	Lecture **"Understanding and manipulating pluripotent stem cells: toward applications in basic biology, biotechnology and medicine"**	**Pierre Savatier** (INSERM U846- Stem-Cell and Brain Research Institute, France)
10:00	11:00	Lecture **"Synthetic Biology: New ways and tools to engineer biological systems"**	**Rafael Giraldo** (Centro de Investigaciones Biologicas, Spain)
11:00	11:30	Coffee Break	
11:30	14:00	Workshop and discussion panel **"Principles of intercultural cooperation for research teams"**	**Adam Jagiełło-Rusiłowski** (University of Gdańsk, Poland)
14:00	15:00	Lunch	
15:30	18:30	Regional trip	
18:30	19:30	Dinner	
20:00	22:00	Team building – let's play a game	

Friday, 3rd July 2015			
08:00	09:00	Breakfast	
09:00	10:00	Lecture **"The art of antibacterial warfare – deception through interference with quorum sensing–mediated communication"**	**Paul Williams** (University of Nottingham, United Kingdom)
10:00	11:00	Lecture **"Microbiology and Biotechnological Applications of Spore Formers"**	**Ezio Ricca** (University of Naples, Italy)
11:00	11:30	Coffee Break	
11:30	12:00	Lecture "**Microsurgery techniques in biology**"	**Takashi Kuwana** (KAWA.SKA Sp. z o.o.)
12:00	12:30	Lecture "**Advanced Laser Microdissection Systems**"	**Grzegorz Gacek** (KAWA.SKA Sp. z o.o.)
12:30	13:15	Lecture **"The future of DNA diagnostics"**	**Charles Cantor** (Sequenom Inc., San Diego, California, USA)
13:15	13:45	Lecture **"To see invisible. Imaging techniques in fluorescence microscopy"**	**Jarosław Korczyński** (KAWA.SKA Sp. z o.o.)
14:00	15:00	Lunch	
15:00	16:30	Interactive lecture **"Science communication"**	**Joanna Bagniewska** (University of Reading, United Kingdom)
16:30	18:30	Free time / **Students interviewing with the guest speakers – talking about science**	
18:30	-	Dinner barbecue, giving Certificate	

SCIENTIFIC WORKSHOPS: GOOD RESEARCH SHOULD BE CREATED BY GOOD TECHNIQUES – KAWA.SKA (Friday, 3rd July 2015)*			
09:30	11:00	Workshop **"Stereoscope microscopy techniques" – gr. A**	**Grzegorz Gacek** (KAWA.SKA Sp. z o.o.)
11:30	13:00	Workshop **"To see invisible. Imaging techniques In fluorescence microscopy" – gr. B**	**Jarosław Korczyński** (KAWA.SKA Sp. z o.o.)
15:00	16:30	Workshop **"Stereoscope microscopy techniques" – gr. C**	**Grzegorz Gacek** (KAWA.SKA Sp. z o.o.)
16:30	18:00	Workshop **"To see invisible. Imaging techniques In fluorescence microscopy" – gr. D**	**Jarosław Korczyński** (KAWA.SKA Sp. z o.o.)

* *Workshops prepared by KAWA.SKA conducted parallel. The number of places is limited. Registration list will be available at the Venue.*

Saturday, 4th July 2015		
08:00	09:00	Breakfast
09:00	10:00	Checking out
10:00		Departure

Information on Speakers and Talks

Joanna Bagniewska (University of Reading, United Kingdom)

Dr Joanna Bagniewska is a zoologist specializing in behavioral ecology and invasive species research. She obtained her MSc and doctorate from Oxford University's Zoology Department. Thus far she conducted research in five countries and visited over 40, having studied foxes and jackals in South Africa, wombats and wallabies in Australia, mole-rats in the USA and mink and bees in the UK. Currently she works as a teaching fellow for the School of Biological Sciences at the University of Reading.

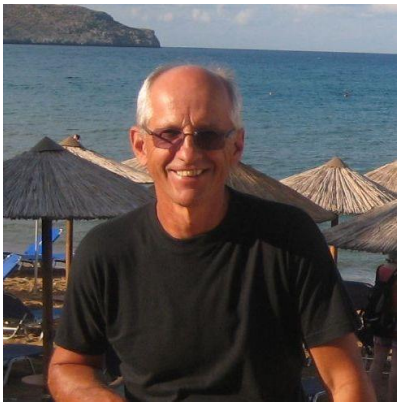
Joanna is passionate about science communication and is constantly engaged in a number of outreach activities. In 2014 she won FameLab Poland, a science communication competition for researchers, and went on to receive the Alumni Award in the international finals of the event. For the last two years she has co-organised the popular science conference "Science. Polish Perspectives"; more recently she has taken part in endeavours such as the theatrical Science Slam, science stand-up comedy for Bright Club Oxford and Museums Show Off, and the school-oriented I'm a Scientist – Get me out of here! She also described her research during a talk at TEDxWarsaw. Joanna regularly writes for Gazeta Wyborcza and Focus, and runs a blog on INNPoland.pl. In her free time (or what is left of it!) she acts as the principal ambassador for Oxford in The Kings Foundation, a mentoring scheme for university applicants.

www.joannabagniewska.com

Workshop: **SCIENCE COMMUNICATION**
Time: Friday, 3rd July 2015, 15:00 – 16:30

Our two core duties as scientists are discovering knowledge, and disseminating knowledge. We find ourselves doing the latter in a variety of circumstances – at conferences, open lectures, or as part of reaching out to the general public – yet we don't always feel entirely comfortable with it. This session is designed to provide an introduction to science communication in various contexts. How to structure a talk? How to pitch to the right audience? How to cope with stress and stage fright? How to talk to the media? This workshop combines lecturing with practical activities and Q&A sessions to make giving talks a much more relaxed, enjoyable and effective experience.

Zbigniew Brzózka (Warsaw University of Technology, Poland)



Prof. Zbigniew Brzózka obtained his Ph.D. in analytical chemistry at the Warsaw University of Technology, studying mechanisms of transition metal cations by carboxylic acids. He was a postdoctoral fellow at ETH Zurich in the middle 80's, working on new membrane selective electrodes in Prof. W. Simon's group supported by the Swiss National Science Fundation and by Orion Research, Inc. Then he came back to Department of Analytical Chemistry of Warsaw University of Technology and finished his Dr.Sc. in chemical sciences.

Within 1991 – 1993, he was working in postdoc position in Prof. D.N. Reinhoudt's group (University of Twente), supported by the Royal Dutch Science Foundations (NWO, STW), by Priva and Sentron, Inc. He was involved in a number of projects on molecular recognition based on supramolecular chemistry and its application to chemical sensors (chemically modified field-effect transistors, membrane ion-selective electrodes, fibre-optic sensors) suitable for monitoring in clinical diagnostic and environmental protection. One of the most interesting topic was anion recognition (in nature, the selective complexation of anions takes place by hydrogen bonds) and his research was focused on a novel type of neutral anion receptors consisting of a combination of a Lewis acidic center and fragments involving hydrogen bonds.

Since 1998, he is tenured professor of bioanalytics in Faculty of Chemistry, Institute of Biotechnology, Department of Microbioanalytics and now heads the "Miniaturized analytical systems" team. His current research interests focus on miniaturized analytical systems (Lab-on-a-Chip) for monitoring of bioanalytes. Emphasis is now also being laid on the applications of polymer microfabrication technologies to microchemical analysis, i.e. the integrated microchips with optical and electrochemical detection principles dedicated to early diagnostics of genetic diseases as a novel approach to reliably diagnose patients, and protect them from mistaken diagnoses and disorder progress. Another field of interest of the partners will be the development of polymeric chips for human cell culture in unique, in vivo-mimicking microenvironment where studies of cellular growth and responses to external factors are conducted for drug screening and toxicology applications.

Zbigniew Brzózka has received Professor Subvention of The Foundation for Polish Science (2003-2006) and Wiktor Kemula Medal (Honour Award of Polish Society of Chemistry) (in 2010). Since September 2008, he is Dean of Faculty of Chemistry, Warsaw University of Technology.

Talk: **LAB-ON-A-CHIP DEVICES FOR LONG-TERM CELL CULTURE AND ANTICANCER DRUG ACTIVITY EVALUATION**
Time: Wednesday, 1st July 2015, 11:30 – 12:30

The presentation will concern development of microfluidic cell culture systems which were applied for monolayer cell culture, three-dimensional cell culture, cell based cytotoxicity assays and photodynamic therapy procedures. Polydimethylsiloxane (PDMS) and sodium glass were used for fabrication of the microdevices based on novel method of three-dimensional microfabrication in PDMS. The designed geometry of the microdevices includes cell culture microchambers or microwells and a concentration gradient generator (CGG). The CGG enables to obtain different concentrations of tested drugs in a single step, which is a significant simplification of cytotoxicity assay procedure. In the designed microsystems three various cell lines (normal and carcinoma) were cultured and analyzed. Microsystem for three-dimensional cell culture enabled long-term spheroid cultivation (over 4 weeks) in the *in vivo*-like microfluidic environment. Application of this type of microfluidic devices is expected to have a significant influence on biological and engineering studies. It can be a user-friendly device applicable in biological laboratory.

Charles Cantor (Sequenom Inc., San Diego, California, USA)

Dr. Charles Cantor is a founder, and retired Chief Scientific Officer at SEQUENOM, Inc., which is a genetics discovery company with tools, information and strategies for determining the medical impact of genes and genetic variations. Dr. Cantor consults for a number of biotech companies including SEQUENOM, Agena and Retrotope. He is also the founder of SelectX Pharmaceuticals, a drug discovery company, Retrotope, an anti-aging company, and DiThera, a biotherapeutic company.

Dr. Cantor is professor emeritus of Biomedical Engineering and of Pharmacology and was the director of the Center for Advanced Biotechnology at Boston University. He is currently adjunct professor of Bioengineering at UC San Diego, adjunct professor of Molecular Biology at the Scripps Institute for Research, distinguished adjunct professor of Physiology and Biophysics at UC Irvine and adjunct professor at the Moscow institute of Physics and Technology. Prior to this, Dr. Cantor held positions in Chemistry and then in Genetics and Development at Columbia University and in Molecular Biology at the University of California at Berkeley. Cantor was educated in chemistry at Columbia College (AB) and at the University of California Berkeley (PhD).

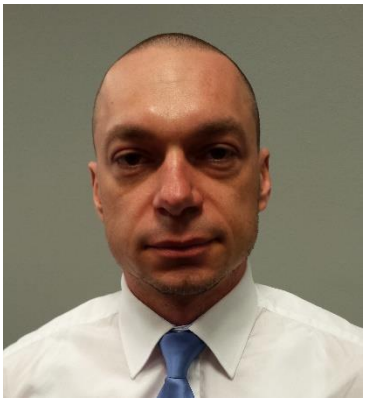
Dr. Cantor has been granted more than 60 US patents and, with Paul Schimmel, wrote a three-volume textbook on biophysical chemistry. He also coauthored the first textbook on Genomics titled 'The Science and Technology of the Human Genome Project'. In addition, he has published more than 450 peerreviewed articles, and is a member of the U.S. National Academy of Sciences.

His major scientific accomplishments include the development of pulsed field electrophoresis, immuno PCR, affinity capture electrophoresis, the earliest uses of FRET to characterize distances in protein complexes and nucleic acids, the standard methods for assaying and purifying microtubule protein, various applications of nucleic acid mass spectrometry, and methods for noninvasive prenatal diagnostics. He is also considered to be one of the founders of the new field of synthetic biology.

Talk: **THE FUTURE OF DNA DIAGNOSTICS**
Time: Friday, 3rd July 2015, 12:30 – 13:15

Conventional PCR, mass spectrometry and highly parallel DNA sequencing are complementary synergistic tools for the analysis of patient samples. The choice of technique friends in the scale of the problem and demands of accuracy turnaround time and cost. Germ line measurements are relatively easy but need be made only once in the lifetime of an individual. They are very informative for rare highly penetrant markers but not that useful in most complex diseases. Epigenetic variations, somatic mutations and metagenomic profiles are more interesting diagnostic targets since they usually must be measured continually. I will present examples mostly from DNA mass spectrometry in cancer infectious disease and complex genetic situations.

Arkadiusz Dorna (Enbio Technology Sp. z o.o., Poland)



Sales Manager of Enbio Technology Sp. z o.o. Gdańsk, Poznań University of Technology graduate, over 12 years of experience in sales and technical support for laboratory equipment

Enbio Technology sp. z o. o. is company specialized in liquid media sterilization. Company has its roots in Vitroservice, core activity of which was plant production by In-vitro method for customers from Holland and Germany. As the Supplier we had to meet the most rigorous global quality standards and ensure a continuity of our deliveries even in the hot seasons. This kind of operating conditions required form us a continuous improvement of processes used in the company and resulted in the invention and manufacture of the worldwide unique microwave devices designed for sterilization of liquids. Thanks to innovative DET technology we made liquid media sterilization so fast and easy as making cup of coffee.

Talk: **STEAM STERILIZATION VERSUS INNOVATIVE DET TECHNOLOGY - REVOLUTION IN LIQUID MEDIA STERILIZATION**
Time: Wednesday, 1st July 2015, 12:30 – 13:00

Filip Dutka (Institute of Physical Chemistry, Polish Academy of Sciences, Poland)

My scientific field of interest is soft condensed matter and application of microfluidics in the fields of microbiology and medicine.

During my master and doctoral studies at the Faculty of Physics, University of Warsaw (Poland) I was looking into mathematical description of the liquid-gas fluid interfaces on nanoscale and phenomena such as wetting and morphological phase transitions. I continued research on nanodroplet shapes on my Post Doc in the Max-Planc-Institute if Intelligent Systems in Stuttgart (Germany). Using methods of statistical physics I explained Gibbs' criterion on nanoscale.

Coming back to Poland range of my scientific research expanded by the experimental methods in the discipline of microfluidics. In the Microfluidics and Complex Fluids Research Group, Institute of Physical Chemistry, Polish Academy of Sciences (Poland) we design and fabricate microfluidic devices in which droplets can form separate microbioreactors. In our Homing Plus project granted by the Foundation for Polish Science we constructed device in which full automated culturing of microorganisms and their online growth dynamics monitoring is possible.

Talk: **GROWTH OF MICROORGANISMS IN MICROFLUIDIC DEVICES**
Time: Wednesday, 1st July 2015, 10:00 – 11:00

Microfluidics is quite new interdisciplinary branch of science at frontier of physics, chemistry and biotechnology. In polymer or glass chips with channels of micrometer diameters one can conduct experiments with tiny amounts of liquids.

In our Microfluidics and Complex Fluids Research Group (http://ichf.pong.pl/) we construct microfluidic devices and conduct full automated experiments also in the field of microbiology, among which are platforms for rapid screening of antibiotic toxicity [1] and microdroplet chemostats for investigations of bacterial growth and their adaptation to changing antibiotic concentrations [2].

During my talk I will present and describe in particular microfluidic system that supports batch culturing of microorganisms in an array of individually controlled micro bioreactors. We use for the first time microfluidic droplet traps, which beside trapping droplets, enable perfect mixing inside droplets, good aeration conditions and online in time monitoring of growth dynamics. The device forms a platform for parallel quantitative experiments on bacterial populations. The speed of microbial growth can be accelerated, which is very important issue in clinical diagnostic laboratories. With using our method we can accelerate such tests as antibiogram from few days to few hours. We obtained very high bacterial concentration $1.76 \times 10^9\ cfu/ml$, already after $2h$ of growth which cannot be achieved by standard microbiological methods. This very fast growth may be of relevance in clinical setting in identification of microbial strains and in rapid searches for most effective treatment in cases of sepsis.

[1] Churski, K., Kaminski, T.S., Jakiela, S., Kamysz, W., Baranska-Rybak, W., Weibel, D.B., Garstecki, P., 2012. *Rapid screening of antibiotic toxicity in an automated microdroplet system.* Lab on a Chip **12**, 1629;

[2] Jakiela, S., Kaminski, T.S., Cybulski, O., Weibel, D.B., Garstecki, P., 2013. *Bacterial Growth and Adaptation in Microdroplet Chemostats.* Angew. Chem.-Int. Edit. **52**, 8908–8911.

Grzegorz Gacek (KAWA.SKA Sp. z o.o., Poland)

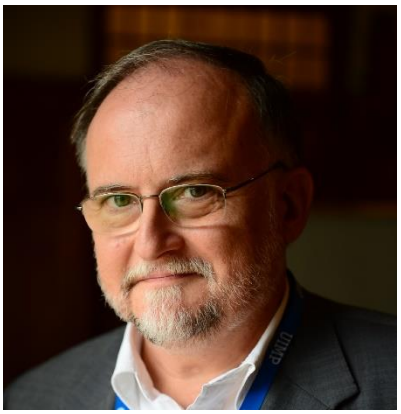
Biologist, widefield microscopy, TIRF microscopy, laser microdissection and stereomicroscopy specialist. Application specialist in KAWA.SKA Sp. z o.o. the distributor of Leica Microsystems in Poland.

Talk: **ADVANCED LASER MICRODISSECTION SYSTEMS**
Time: Friday, 3rd July 2015, 12:00 – 12:30

Laser Microdissection, also known as LMD or LCM (Laser Capture Microdissection), is a contact- and contamination-free method for isolating specific single cells or entire areas of tissue from a wide variety of tissue samples. The dissectate is available for further molecular biological methods such as PCR, real-time PCR, proteomics and other analytical techniques. Laser microdissection is now used in a large number of research fields, e.g. neurology, cancer research, plant analysis, forensics or climate research. The method is meanwhile also applied for manipulation of cell cultures or for microengraving of coverslips. The lecture will concern on the review of LMD market as general. The presentation will also cover characteristics of the laser microdissection system LMD6500/7000 from Leica Microsystems.

Workshop: **STEREOSCOPE MICROSCOPY TECHNIQUES**
Time: Friday, 3rd July 2015, 09:30 – 11:00 (gr. A) and 15:00 – 16:30 (gr. C)

Rafael Giraldo (Centro de Investigaciones Biológicas – CSIC, Madrid, Spain)



Rafael got a Ph. D. Biol. Sci. in 1991 (*Complutense U.*, Madrid) on the genetics and biochemistry of plasmid DNA replication initiation, under the supervision of R. Díaz-Orejas (CIB-CSIC). Then, he spent a postdoctoral (1992-94) in the group of D. Rhodes at the MRC Laboratory of Molecular Biology (Cambridge, UK), where he studied the role of the yeast Rap1 protein in packing telomeric dsDNA, which led to the crystal structure of the first telomeric nucleoprotein complex. Rafael also found that Rap1 promoted the assembly of parallel DNA quadruplexes by the G-rich strand of yeast telomeres, an early example of a protein chaperoning a DNA structure. Back to CIB-CSIC, first as a postdoctoral (1995-1999) and since then as staff scientist, his main focus was on how sequence-specific DNA binding elicits conformational changes in the winged-helix (WH) domains of plasmid-encoded bacterial replication (Rep) proteins. Besides this, he studied the assembly of yeast ORC initiator. In 2007, Rafael found the way to tailor WH domains to become DNA-modulated amyloidogenic devices, having recently developed synthetic prion-like modules recapitulating essential features of mammalian amyloid proteinopathies (e.g.: toxicity, modulation by chaperones of conformational strains), albeit confined to a bio-safe bacterial host. Since 2010, he is a CSIC Research Professor and a member of *Academia Europaea*. In 2015, he has been elected as Vice-President of the Spanish Society for Microbiology (SEM).
More info: http://www.cib.csic.es/en/grupo.php?idgrupo=61
http://www.researchgate.net/profile/Rafael_Giraldo

Talk: **SYNTHETIC BIOLOGY: NEWS WAYS AND TOOLS TO ENGINEER BIOLOGICAL SYSTEMS**
Time: Thursday, 2nd July 2015, 10:00 – 11:00

Synthetic Biology (SynBio) is the most recent and dynamic among the disciplines integrating Biology. With strong bases on Maths, Physics and Chemistry, SynBio aims to enable the engineering of biological systems, a goal proposed by Molecular Biology and Biotechnology long ago but, up to very recently, an unreachable one due to the intrinsic complexity of living organisms. To a global scale, it is much expected that SynBio will contribute solutions to the challenges that, in diverse areas (e.g.: health, food and energy supplies, environment, bio/nano-materials) and all along this century, will be critical for advanced societies. Paradoxically, such expectations are in sharp contrast with the meagre coverage that SynBio still has in most academic curricula across the European Union. This talk is intended to provide a fresh overview, a sort of route map, on SynBio for young scientist avid to explore new venues in Biotechnology.

Florian Hollfelder (University of Cambridge, United Kingdom)

Florian Hollfelder was educated at the Technical University of Berlin (Diplom-Chemiker) and Cambridge University (MPhil). After a formative stay at Stanford (with Dan Herschlag) on free-energy relationships in enzymes, he joined Tony Kirby's group at the Chemistry Department of Cambridge University working on enzyme models and physical-organic chemistry. During his PhD he also collaborated with Dan Tawfik (on the mechanism and evaluation of model enzymes such as catalytic antibodies). His postdoctoral work at Harvard Medical School (with Chris T. Walsh) was concerned with the biosynthesis and action of the natural antibiotic microcin B17. In 2001 he returned to Cambridge to start his own research group in the Biochemistry Department. The group's research centers around quantitative and mechanistic questions at the chemistry/biology interface, involving low- and high-throughput approaches. Florian is Director of Studies and Graduate Mentor at Trinity Hall. He was coordinator of several EU-funded trans-national collaborative initiatives, e.g. the EU New and Emerging Science and Technology project MiFem on biological experiments in microdroplet reactors, and Marie-Curie networks on directed evolution of functional proteins (ENDIRPRO, ENEFP), on protein-protein interactions (ProSA) and on biological phosphates (PhosChemRec).

Talk: **RULES AND TOOLS FOR EFFICIENT ENZYME EVOLUTION, RECRUITMENT AND DISCOVERY**
Time: Wednesday, 1st July 2015, 09:00 – 10:00

C. Miton, B.van Loo, P.-Y. Colin, B. Kintses, M. Fischlechner, Y. Schaerli,

A. Zinchenko, C. Bayer, S. Jonas, D. Morgavi, D. Janssen, M. Hyvonen, F. Hollfelder*

Department of Biochemistry, University of Cambridge, Cambridge CB2 1GA, UK. (fh111@cam.ac.uk)

'Promiscuous' enzymes possess additional activities in addition to their native ones, challenging the textbook adage "*one enzyme – one activity*". The observation of strong promiscuous activities in the alkaline phosphatase (AP) superfamily - where one active site can catalyse up to six chemically distinct hydrolytic reactions with promiscuous second order rate accelerations between 10^9 and 10^{17} - suggests that even broadly promiscuous catalysis can be rather efficient. We demonstrate by directed evolution and phylogenetic analysis that crosswise promiscuity relationships in the AP superfamily indicates that an enzyme is 'pregnant' with another activity, i.e. has the potential to be mutated or evolved into a new catalyst. These catalysts are multifunctional generalists that have won additional activities, at low (or no) trade-off cost to the other existing activities. The systematic comparative analysis promiscuous relationships in enzyme superfamilies on the level of structure, sequence similarity, specificity and reactivity suggests factors that govern evolutionary adaptation.

To efficiently explore the interconversion of promiscuous enzyme, we use picoliter water-in–oil emulsion droplets produced in microfluidic devices as high-throughput screening reactors. We present new workflows that allow screening of >10^6 clones and allows successful selections from single protein and metagenomic libraries, where lower throughput approaches have failed.

- Fischlechner, M.; Schaerli, Y.; Mohamed, M. F.; Patil, S.; Abell, C.; Hollfelder, F., Evolution of enzyme catalysts caged in biomimetic gel-shell beads. *Nat Chem* **2014,** *6* (9), 791-6
- Zinchenko, A.; Devenish, S. R.; Kintses, B.; Colin, P. Y.; Fischlechner, M.; Hollfelder, F., One in a Million: Flow Cytometric Sorting of Single Cell-Lysate Assays in Monodisperse Picolitre Double Emulsion Droplets for Directed Evolution. *Anal Chem* **2014,** *86* (5), 2526-33.
- Kintses, B.; Picoliter Cell Lysate Assays in Microfluidic Droplet Compartments for Directed Enzyme Evolution. *Chem. & Biol.* **2012**, 19(8):1001-9.
- Mohamed, M. F.; Hollfelder, F., Efficient, crosswise catalytic promiscuity among enzymes that catalyze phosphoryl transfer. *Biochim Biophys Acta* **2013,** *1834* (1), 417-24.
- van Loo, B.; Jonas, S.; Babtie, A. C.; Benjdia, A.; Berteau, O.; Hyvönen, M.; Hollfelder, F., An efficient, multiply promiscuous hydrolase in the alkaline phosphatase superfamily. *Proc. Natl Acad. Sci USA* **2010,** *107* (7), 2740-5.

Adam Jagiełło Rusiłowski (University of Gdańsk, Poland)

Adam Jagiello-Rusilowski – is an educator and social entrepreneur. He holds MA in English Literature and PhD in Educational Psychology from University of Gdansk. He studied Drama in Education at University of Northern Iowa, Community Leadership at Picker Centre, Columbia University and Social Economics at INSEAD Business School (Fontainableau). He ran 3 youth NGOs, was Ford and Ashoka's fellow, worked as an expert for Soros Foundations in Eastern Europe, European Cultural Foundation in Amsterdam and UNWRA in Gaza Strip. His original idea of self-sustainable system of training young actors as youth workers using drama to promote social and civic competences among the socially excluded (working class) children was scaled through various programs in South Eastern Europe, Russia, Peru, Uzbekistan and Palestine (Gaza Strip).

Currently he works as Dean of Development and International Programs at Faculty of Social Sciences, University of Gdansk. As a researcher he is interested in Lisbon Key Competences in Education in particular looking at activities promoting pro-social and entrepreneurial (innovation) attitudes in young Europeans and Arabs.

Workshop: **PRINCIPLES OF INTERCULTURAL COOPERATION FOR RESEARCH TEAMS**
Time: Thursday, 2nd July 2015, 11:30 – 14:00

The workshop will guide the participants through key elements of intercultural competency in the context of research and development projects run by academic teams. A simulation game will be offered to experience the potential challenges of communicating and creative problem solving in multicultural professional groups. A list of principles to watch will be created and consulted with the experienced researchers for validity.

Jarosław Korczyński (KAWA.SKA Sp. z o.o., Poland)

Since childhood I was interested in biology and generally nature. I followed my interests during my education process and finally graduated biology with honors at Jagiellonian University in Cracow, Poland. There, for the first time, I have become acquainted with the fascinating world of microscopy experiments. Continuing my fascination with biology I began PhD studies at the Nencki Institute of Experimental Biology in Warsaw, Poland, where I investigated signaling pathways which regulate actin cytoskeleton dynamics in glioma C6 cells and astrocytes, using both biochemical and confocal microscopy techniques. There I met with a different type of fluorescent experiments like 3D visualization, FRET and FRAP techniques, STED microscopy, Calcium measurement and live cell imaging. Now, since July of this year, I'm working as an application specialist in KAWA.SKA Company – distributor of microscopy equipment in Poland.

POSITIONS

2014 - now Application specialist in microscopy, KAWA.SKA Company – distributor of scientific equipment.

2006 - 2014 Biologist in Laboratory of Confocal Microscopy, Nencki Institute of Experimental Biology, Warsaw.

2005 – 2006 Microbiologist in Epidemiology Station, Radom.

EDUCATION

2009-2014 PhD studies in Department of Biochemistry, main topic: „Regulation of signaling pathways controlling reorganization of actin cytoskeleton in glioma C6 cells", Supervisor: prof. dr hab. Wanda Kłopocka. Nencki Institute of Experimental Biology, Warsaw.

2002-2004 Jagiellonian University Center for Educational Studies.

2000-2005 Jagiellonian University in Cracow, Department of Biology, specialization: zoology; completed with honours. Thesis prepared in the Department of Comparative Anatomy of Vertebrates: „The comparison of anatomy of the olfactory organs between two piranhas species: carnivorous, Serrasalmus nattereri and herbivorous, Metynnis argenteus (Pisces, Characiformes)", supervisor: dr hab. Krystyna Żuwała.

Talk: **TO SEE INVISIBLE. IMAGING TECHNIQUES IN FLUORESCENCE MICROSCOPY**
Time: Friday, 3rd July 2015, 13:15 – 13:45

Fluorescence microscopes are invaluable tools for a wide range of research in the field of biological and medical sciences. They serve not only as tools to study the morphology of the observed sample but also as tools to perform biochemical studies of the environment around fluorophore particles. During my lecture listeners will be familiarized with basic techniques used in fluorescence microscopy (FRET, FRAP, photoactivation) as well as get acquainted with the newest development in the field of confocal microscopy. Continuous improvement of confocal microscopes allows to achieve: better resolution of generated images (resolution below 50 nm in the XY axis), greater sensitivity of light detectors (even detection of single photons) and increasingly rapid visualization of samples (scanning speed up to tens images per second). With these enhancements, laser scanning confocal microscopy has gained tremendous popularity in the research community.

Takashi Kuwana (KAWA.SKA Sp. z o.o., Poland)

Ph.D. (1981) Graduate School of Medical Science, Kumamoto University, Japan

1981 to 1987 Assistant Lecturer, Dept. of Anatomy, Kumamoto University Medical School, Japan

1987 to 1991 Lecturer, Dept. of Anatomy, Kumamoto University Medical School

1989 to 1990 International Exchange Researcher between Japan and Poland

1991 to 2003 Head, Pathology Section, National Institute for Minamata Disease, Japan

1998 to 2004 Professor, Faculty of Life Science, Kumamoto Univ., Japan

2003 to 2009 Chief, Biological Resource Laboratory, Laboratory for Intellectual Fundamentals for Environmental Studies (LIFES), National Institute for Environmental Studies (NIES), Japan

2009 to 2011 Director, LIFES, NIES, Japan

2011 to 2014 General Director, International Institute of Avian Conservation Science, Management of Nature Conservation, Department of the President's Affairs, United Arab Emirates

2011 to present Professor, Institute of Advanced Technology, Kinki University, Japan

2015 to present Scientific Consultant, KAWA.SKA Sp. z o.o., Poland

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Talk: **MICROSURGERY TECHNIQUES IN BIOLOGY**
Time: Friday, 3rd July 2015, 11:30 – 12:00

Primordial germ cells (PGCs) are a good tool for the conservation of endangered avian species and for the transgenic birds using germline chimeras. These cells are the stem cells (germline stem cells) of future functional gametes (sperm or ova) and can be easily stocked in the liquid nitrogen comparing to fertilized eggs or mature oocytes because of no yolk granules in the cytoplasm. Also, we can manipulate PGCs easier than that of other animal species because PGCs only in birds and few reptiles circulate via an embryonic blood vascular system temporarily before their settlement into future gonads. That is a reason why we can obtain those cells without any chemical and physical treatment. In the present conference, I would like to show how to manipulate the cells and what are their future usages.

Ezio Ricca (University of Naples Federico II, Italy)

Ezio Ricca is a professor of Microbiology of the Federico II University of Naples (Italy). As a student of the University of Naples, he worked for his Thesis at the International Institute of Genetic and Biophysics (IIGB) of Naples under the supervision of Prof. M. De Felice on the molecular characterization of *Escherichia coli* mutants altered in the biosynthesis of branched-chains amino acids. After that Ezio spent more than two years as a post-doctoral fellow in the laboratory of Prof. J.M. Calvo at the Department of Biochemistry and Cell Biology of the Cornell University, Ithaca, NY (US). At Cornell Ezio worked on the transcriptional regulation of the *ilvIH* operon of *Escherichia coli* and *Salmonella typhimurium* identifying and characterizing Lrp, a global regulator of metabolism in enterobacteria. From 1990 Ezio became interested in gram-positive spore forming bacteria and spent two years in the laboratory of Prof. R. Losick at the Department of Cellular and Developmental Biology of the Harvard University, Cambridge, MA (US). At Harvard Ezio worked on the activation of sigmaK, a sporulation-specific sigma factor of the RNA polymerase, on the characterization of the sporulation gene *spoVM* and on the identification of CotG, an abundant component of the spore surface. Since Ezio return to Italy at the Federico II University of Naples, his research interests have been focused on the study of the bacterial spore surface and on the use of spores as a biotechnological tool. In particular, Ezio developed the use of the spore as a mucosal delivery system and as a probiotic agent. More recently, Ezio became also interested in the study of the interactions between commensal bacteria and intestinal cells and in the effects of bacteria and bacterial molecules on the composition of the gut microbiota. Since 2003 Ezio Ricca is in the Editorial board of FEMS Microbiol Lett, and is in the Organizing Committee of the "European Spores Conference" (Bratislava, Slovakia, 2004 and 2006; Napoli, Italy, 2008; Cortona, Italy, 2010; Egham, UK, 2012 and 2014).

Talk: **MICROBIOLOGY AND BIOTECHNOLOGICAL APPLICATIONS OF SPORE FORMERS**
Time: Friday, 3rd July 2015, 10:00 – 11:00

Spore formers are organisms able to form an endospore (spore), a quiescent cell with a peculiar structure that allows survival at conditions that are lethal for standard cells. Spore production (sporulation) is induced by a variety of environmental conditions that limit cell growth and/or block DNA replication. More than 1,000 bacterial species are able to form spores. These species are grouped within the phylum *Firmicutes* (low GC Gram-positive bacteria) and commonly fall under two genera: the strict anaerobic *Clostridia* and the aerobic/facultative anaerobic *Bacilli.* In most species of these two genera the sporulation process occurs through a series of generally similar morphological changes that has been studied in detail mainly in *Bacillus subtilis*, the model system for spore formers.
The sporulation process begins when a vegetative cell, no longer able to grow, divides asymmetrically originating two cells of different size. The big (mother cell) and the small (forespore) cell will have the same genome but follow different programmes of gene expression and have different morphology and fate.
In the last few years it has become clear that entering into the sporulation cycle is not the only possibility for the vegetative cell in unphysiological environmental conditions. This cell is now considered as an undifferentiated cell that can respond to the environment in many different ways. It can become motile and move in a different habitat, produce surfactants or degradative enzymes and obtain nutrients by otherwise unused sources, become competent and acquire external DNA, become matrix or spore producers. A network of master regulators are active in the undifferentiated cell and with their action determine the programme that the cell will follow. As a consequence, a cell culture is extremely heterogeneous and formed by cells that follow different differentiation pathways.
Spore formers are not only good models to study various, fascinating routes of microbial differentiation but are also powerful biotechnological tools: *B. subtilis* cells have long been used to produce endogenous and heterologous enzymes while spores of several species are used worldwide in probiotic and functional food preparations. More recent is the use of spores as a platform to display heterologous molecules.
An overview of the differentiation routes followed by *Bacillus* cells and of the various biotechnological appplications of *Bacillus* cell and spores will be presented.

Pierre Savatier (INSERM U846 Stem Cell and Brain Research Institute, France)

Dr. Pierre Savatier obtained his PhD in biology at the University of Lyon, France, working on genome evolution in primates. He was a postdoctoral fellow at Oxford University in the late 80's, working on mouse early embryo development and pluripotent stem cells. Then he joined the Ecole Normale Supérieure in Lyon to start his own team, working on cell cycle regulation both in mouse embryonic stem cells and neural precursors of the developing cortex. In 2004, he joined the National Institute for Health and Medical Research (INSERM) in Lyon, and participated in the creation of the Stem Cell and Brain Research Institute (www.sbri.fr), where he now heads the team "Pluripotent stem cells in mammals". His current research interests include the regulation of pluripotency in the early embryo of rabbits, macaque monkey and human, and the generation of somatic and germline chimeras in rabbits and non-human primates with engineered embryonic and induced pluripotent stem cells. Pierre Savatier is a member of DEVweCAN, a cluster of Excellence dedicated to development and cancer research, and CORTEX a cluster of Excellence dedicated to the study of brain development and repair.

Talk: **UNDERSTANDING AND MANIPULATING PLURIPOTENT STEM CELLS: TOWARD APPLICATIONS IN BASIC BIOLOGY, BIOTECHNOLOGY AND MEDICINE**

Time: Thursday, 2nd July 2015, 09:00 – 10:00

Pluripotency is defined by the capacity for a cell to differentiate into all derivatives of ectoderm, mesoderm, and endoderm. Pluripotency includes a wide spectrum of *in vitro* growing cellular entities characterized by different molecular mechanisms, growth properties, and developmental capabilities. The mouse embryonic stem (ES) and the induced pluripotent stem (iPS) cells are the gold reference; they self-renew in the so-called naïve state of pluripotency, a state that mimics the pluripotent stem cells of the E4.5 day mouse blastocyst. Consequently, they can be used to generate somatic and germline chimeras after microinjection into host embryos. This procedure allows for the generation of knockout and knockin mice and for the creation of mouse models of human genetic diseases. The situation in other species is far more complex. In rabbits and primates, both ES and iPS cells only exist in the so-called primed state of pluripotency. This state is characterized by a higher propensity for spontaneous differentiation and genome instability. In human, this hampers the development of pluripotent stem cell technologies for clinical and biotechnology applications. Pluripotent stem cells in the primed state of pluripotency also fail to generate somatic and germline chimeras after microinjection into host embryos. This hinders the use of stem cells for in vivo studies and precludes the generation of rabbit and NHP models of human genetic diseases. Thus, there is a pressing need to generate pluripotent stem cells in rabbits and primates, harbouring the defining features of naïve state pluripotency. This has become a subject of intense research over the past 4 years. I will explain the issues at stakes. Then I will present our strategies and our latest results addressing these issues in rabbits, macaque monkeys, and humans.

Paul Williams (Centre for Biomolecular Sciences, University of Nottingham, United Kingdom)

Paul Williams is Professor of Molecular Microbiology in the School of Life Sciences, Faculty of Medicine and Health Sciences at the University of Nottingham U.K. He graduated in pharmacy in 1979 prior to undertaking a Ph.D in microbiology (1984). In 1996 he was appointed to the Directorship of the Institute of Infection, Immunity and Inflammation until 2008 when he became Head of the School of Molecular Medical Sciences, University of Nottingham. His research interests focus primarily on the regulation of gene expression in bacteria through cell-cell communication (quorum sensing) and the development of novel antibacterial agents and bacterial attachment resistant polymers. He has published around 300 research papers, reviews and book chapters and patents. For his quorum sensing research he was awarded the Royal Pharmaceutical Society of Great Britain Conference Science Medal (1992), Pfizer prize in Pharmaceutical Sciences (1994) and the Society for General Microbiology Colworth Prize Lecture in 2007. Prof. Williams has served on the editorial/advisory boards of Environmental Microbiology, Journal of Bacteriology Microbiology, FEMS Microbiology Letters, Biofilms, International Journal of Medical Microbiology and Molecular Microbiology. He has also been a member of the Biotechnology and Biological Sciences Research Council U.K. (Plants and Microbes Committee), the Medical Research Council (MRC) U.K. Advisory Board, the MRC College of Experts, the Infection Group of the Society for General Microbiology and was a specialist advisor for the UK RAE2008 research selectivity exercise. He is currently a member of the MRC Infection and Immunity board, a member of the EU Joint Programming Initiative in Antimicrobial Resistance and is a Welcome Trust Senior Investigator.

Talk: **THE ART OF ANTIBACTERIAL WARFARE – DECEPTION THROUGH INTERFERENCE WITH QUORUM SENSING–MEDIATED COMMUNICATION**

Time: Friday, 3rd July 2015, 09:00 – 10:00

There are two broad strategies for the control of bacterial infections, either (a) kill the organism or (b) attenuate virulence such the infecting organism fails to adapt to the host environment and can be cleared by host defences. Anti-virulence agents offer potential advantages including expanding the repertoire of bacterial targets, preserving the host microflora and exerting less selective pressure, which may result in decreased resistance. In many pathogens, virulence is co-ordinately controlled via sophisticated global regulatory systems such as quorum sensing (QS). This is usually defined as cell population density dependent gene regulation and is mediated via self-generated extracellular signal molecules. These activate or repress QS target genes once a critical threshold concentration of signal has been reached. The key components of any QS 'module' are the QS signal synthase, the signal receptor and the signal molecule. QS systems thus offer multiple targets for chemical intervention through the blockade of QS signal synthesis, QS signal molecule degradation or the inhibition of QS signal reception. Such targets in conjunction with high throughput screens offer multiple opportunities for the design of synthetic inhibitors and the discovery of natural products for the treatment of infections caused by multi-antibiotic resistant bacteria.