EDUCATION COMMITTEE REPORT 2014

1.01.2014-31.12.2014

Reported by:
Gül Güner Akdogan
Chair, FEBS Education Committee
March 1st, 2015

REPORT 2014- FEBS EDUCATION COMMITTEE
01.01.2014-31.12.2014

Report Plan:

1.Introduction

This report includes the activities of the Education Committee realized between 01.01.2014 and 31.12.2014.

2. Structure and Composition of the Committee

According to the latest version of FEBS Statutes, the Education Committee is composed of **"**a chair elected by Council, four ordinary members elected by Council and ex-officio members with voting rights, Secretary General of FEBS, Treasurer of FEBS, and Chair of Advanced Courses Committee".

There were no elections needed for any position on the Education Committee at 2014 FEBS Council.

The ordinary members who served on the Committee during in 2014 are:

Tomas Zima (Czech Republic) (Elected at Turin FEBS Council, 2011 and started as of 1st January 2012)

Angel Hérraez (Spain) (Elected at Turin FEBS Council, 2011 and started as of 1st January 2012)

Wolfgang Nellen (Elected at Sevilla FEBS Council, 2012 and started as of 1st January 2013)

(Wolfgang Nellen served partly in 2014 and had to leave the Committee (resigned) in November 2014, due to his retirement and departure to Indonesia).

Francisco Michelangeli (Elected at Sevilla FEBS Council and started as of 1st January 2013)

Chair: Gül-Güner Akdogan (Turkey) (Elected at Prague FEBS Council, 2009 and started as of 1st January 2010; reelected at Sevilla FEBS Council, 2012- started second term as of 1st January 2013).

Co-Opted:

Keith Elliott (UK) (Since January 1st, 2008)

Peter Ott (Switzerland) (Since May 14th, 2010). Peter Ott informed the Committee that he would no longer continue the FEBS Education platform, due to his retirement some time ago. Angel Hérraez, who is rotating out as of 1st January 2016, will be co-opted to take care of the FEBS Education web-site.

Ex-Officio Members: Israel Pecht (FEBS General Secretary), Alan Fersht (FEBS Treasurer), Winnie Eskild (Assistant to FEBS Treasurer) and Beáta Vértessy (Acting Chair, FEBS Advanced Courses Committee and became Chair through election at the FEBS Council in September 2014 in Paris)

Election at 2015 Berlin FEBS Council:

Tomáš Zima and Angel Hérraez will rotate out in 31 December 2015. Wolfgang Nellen resigned, due to his retirement and commitment in Indonesia.

There will be elections for three new members during Berlin FEBS Council.

Chair: Gül-Güner Akdogan (Turkey) (Elected at Prague FEBS Council, 2009 and started as of 1st January 2010; reelected at Sevilla FEBS Council, 2012- started second term as of 1st January 2013). Gül Güner's second term is ending on December 31st, 2015.

There will be election for Chair of FEBS Education Committee during Berlin FEBS Council.

3. Representation at FEBS EX-COM Meeting and FEBS WGI Visits

Gül Güner Akdogan, Chair of the Committee, represented the Committee during the WGI visit (organised by the Chair of the Working Group on Integration) to Sarajevo in September 2014 and to Latvia in November 2014. During these visits, the possibility of organising education Workshops in these countries was investigated; and it was agreed with the hosts in Sarajevo, to organise one, on September 3-4th, 2015. For Latvia, it is agreed to hold one in 2016,

4. Education Committee Meeting in 2014

According to the decision of FEBS Education Committee to hold only one meeting per year (to comply with the budget limitations), in 2014, FEBS Education Committee meeting took place, in two parts, during Paris Congress, on Tuesday, September 2nd, 09:00-12:30 and on Wednesday, September 3rd, 12:00-15:30 in FEBS Room.
The Agenda was follows:

Education Committee Meeting(s) during Paris Congress, 2014
FEBS Room

Education Committee Meeting Part 1:
Tuesday, September 2nd, 09:00-12:30, FEBS Room
Participants:

Ex-Officio Members:	**Committee Members:**
Israel Pecht	Gül Güner Akdogan
Winnie Eskild	Keith Elliott
Beata Vertessy	Angel Hérraez
	Frank Michelangelo

Invited:	**Apologies:**
Jean-Luc Souciet, Education Chair, SFBMB	Tomas Zima
Wolfgang Trommer, German Society for Biochemistry and Molecular Biology	Wolfgang Nellen
Mathias Sprinzl, Chair of WGI	

Part 1:

1. Welcome, Apologies
2. Minutes of the previous ED-COM Meeting (Prague)

3. Short reports from past activities:

St Petersburg (8th July, 2013), Gdansk (13-14th July, 2013), Tbilisi (8-9th October, 2013), Sofia (22nd November 2013), Istanbul (25th June, 2014)

The feedback from these workshops was discussed. It was suggested to explore if some of these workshops could be credited. A discussion ensued on the possibility of gearing these workshops either to young scientists or to faculty members; the general view was that it was advantageous to have the two groups together- to have more interaction and sharing of experiences.

4. FEBS Education Platform (Web-site)-New Perspectives

The possibility of integrating into the prospect KNODE expertise portal proposed by Wiley, in the light of the Workshop attended by GG and AH was discussed. We needed to see how it developed. AH would look into other possible solutions.

5. Promotion of Learning resources throughout Europe-What can be done?

A new effective web-site working like a platform would help.

6. Discussion on the prospect EU Project: "Core Knowledge, Skills, and Career Planning for a Molecular Life Scientist"

JLS pointed out that FEBS could be a catalyzer for such a project. KE pointed out that each university reaches its own programme and therefore it canot be obligatory; however, this project could enhance the "recognition" of the universities which comply. The ongoing pilot mini-workshops on "Core Knowledge, Skills, and Career Planning for a Molecular Life Scientist" during the FEBS Education Workshops were discussed and it was agreed to continue with these workshops.

7. Project: Ambassador's (from Constituent Societies) to FEBS Education Committee

GG explained that such a project would facilitate lining, networking and mobility between the Constituent Societies and thus enhance collaboration and interaction across Europe and would create a platform to design educational projects at the EU level. GG gave the information that Tomas Zima, the Rector of Charles University (Prague) was ready to host such a meeting.

8. Discussion on the evaluation criteria (and form) for the Poster Award

A poster evaluation sheet was created, involving the following criteria: Quality of pedagogic science (20 points); Appropriateness and description of methods (20 points), presentation of results (20 points);E(10 points); poster format (20 points); Oral defence (10 points); portential impact on education (10 points). The jury would consist of the ED-COM members.

9. Discussion on the organisation of the small group discussions of the Workshop on "What Skills and Core Knowledge Expected from a Molecular Life Scientist" Tuesday September 2nd, 18:00-19.30

The moderators for the small-group discussions were assigned. The organisation of this Workshop-latest tips- was discussed.

10. Any other item

As Wolfgang Trommer was present during this time, representing the German Society, the possibilities of Education Workshop topics for the Berlin 2015 Congress was discussed. Issues suggested:

"Systems Biology", "Research in Undergraduate Education", "High School Teacher event" ; A workshop in which "the two trends of Education in Germany: Research (Humboldt) and teaching"

Undergraduate Education) and also to wait for the response from the German Society for the Humboldt issue, as a second activity. Inviting a junior society member for these workshops was suggested. He suggested that the Humboldt panel discussion would be timed on the Thursday afternoon, after the Congress (which was later found not to be practical by the Council- due to the Council Meeting on Thursday).

Education Committee Meeting Part 2

Wednesday, September 3rd, 12:00-15:00, FEBS Room

Participants to the ED-COM Meeting, Part 2:

Ex-Officio Members:	**Committee Members:**
Winnie Eskild Beata Vertessy	Gül Güner Akdogan Keith Elliott Angel Hérraez Frank Michelangelo Tomáš Zima
Invited: Jean-Luc Souciet, Education Chair, SFBMB	

Part 2:

1. 2015 Activities:
    - Educational session(s) during Berlin Congress (4-9th July, 2015)

(Already discussed in the first part).

- Cambridge Workshop (30-31st March, 2015)

FM updated the Committee on the programme and organisation of the Cambridge workhop. It was agreed that the contribution to the workshop in terms of lecturers/trainers should involve more input from Europe. New names were suggested: Jan Glatz (Maastricht), Angel Herraez (Spain), Robert Harris (Sweden)... FM would try to accommodate these names into the programme.

- Other activities?

2. 2016 Activities
    - Educational session(s) during Kusadasi (Turkey) FEBS Congress (3-8th September, 2016)

It was suggested to have a plenary speaker on education at the 2016 Kusadasi Congress: Bruce Alberts was suggested (his talk in Sevilla had a big impact). For a workshop topic, it was decided to ask the Turkish Society of Biochemistry for suggestions.

3. Continuation of the discussion on the EU Project (GG, FM)

The main issue was to find a coordinator for this project. FM agreed to explore the possibility of coordinating such a project from Birmingham University. The members of the Committee were willing to participate in some way.

4. Future Collaborations: with the FSBMB and other bodies

JLS, who coordinated the educational events from the SFBBM, was willing to enhance collaboration with FEBS. He suggested working more efficiently with the related Societies (Belgium, Germany, Spain) in sharing resources and information.

5. Preliminary feedback from first Paris Education Workshop

The feedback from the first workshop on "What Skills and Key Knowledge to Expect from a Molecular Life Scientist?" was excellent. It was attended by about 120 participants. In addition, delegates from some of the Constituent Societies, Lithuanian, Serbian, German, Spanish, Croatian, Slovenian, and Belgium were present.

6. Latest Details for the WS on New Technologies (JLS, AH)

JLS updated the Committee on this workshop. The Clickers from Turning Technologies had been received.

7. Joint Project with FEBS Advanced Courses Committee

BV and GG informed the committee on a pilot project designed to enhance the "scientific skills" of young scientists, with the implementation of a session during the FEBS Advanced Courses. Some of the topics/names suggested: "How to Write a Scientific Article" (Mathias Sprinzl, Felix Goni) "Process es involved in Scientific Publishing" (Mary Purton), "How to Write a Scientific Project" (Vicente Rubio, Miguel de la Rosa), "How to Write a CV (Keith Elliott). It was decided to elaborate on this issue and bring it to the next meeting of the Committee.

8. Next Meeting of the ED-COM: Date and Place

The next meeting of the Committee would take place in Cambridge (March 29th, 2015), before the workshop.

5. Educational Events in 2014

The activities of the Education Committee in 2014 encompassed the educational events during Paris FEBS-EMBO Congress, a Joint- Symposium on "PhD Training in Clinical Chemistry, Clinical Biochemistry, and Laboratory Medicine" in Istanbul, co-organised by IFCC and ORPHEUS; Szeged Workshop on "Education in Molecular Life Sciences", hosted by the Hungarian Society of Biochemistry and Molecular Biology, and other Workshop on "Education in Molecular Life Sciences", hosted by the Serbian Chemical Society.

5.1 Educational Activities during Paris FEBS-EMBO Congress:

During the Paris Congress, two workshops on education were realized, one by FEBS Education Committee, and the other by collaboration between FEBS Education Committee and the French Society for Biochemistry and Molecular Biology (SFBMB). In addition, a

poster session on education was organised. As traditionally, CV advising clinics were run by Dr. Keith Elliott.

Workshop 1: Tuesday, September 2nd, 2014, 18:00-20:00

"What Skills and Key Knowledge to Expect from a Molecular Life Scientist?

Organised by FEBS Education Committee

Co-Chairs: Gül Güner, Frank Michelangeli

18.00-18.05 Introduction

18.05-18:25 Prof. Frank Michelangeli (Birmingham, UK)
"What Skills to Expect from a Molecular Life Scientist?"

18.25-18.45 Prof. Jean Luc Souciet (Strasbourg, France)
"What to teach in biochemistry? Results and prospects of a brief survey in French universities"

18.45-19.30 Small Groups Discussions

Moderated by members of FEBS Education Committee

19.30-20.00 Presentations and Panel Discussion

Report by Frank Michelangeli, Member of FEBS Education Committee:

"This session was chaired by Gül Güner Akdoğan and Frank Michelangeli of the FEBS Education Committee. The first talk, by Frank (Birmingham University, UK), highlighted the findings from several recent reports on education and graduate-level employability skills by major multinational employers and pharmaceutical industries. These findings appear to highlight that these employers are concerned by lack of a number of skills that they would require of their graduate employees. The areas of concern included lack of practical abilities as well as detailed subject-specific knowledge, and more importantly transferable skills, such as numeracy, communication skills, team working and problem-solving skills. To address this lack of skills and knowledge, Frank described how in the UK a number of learned societies with input from these employers were involved in defining key criteria that should be incorporated within degree programmes through accreditation processes.

The second talk, by Jean-Luc Souciet (Université de Strasbourg, France) presented the results from a recent survey undertaken across several French universities to look at what is taught in biochemistry degrees. The survey identified many of the skills and subject-specific knowledge mentioned earlier, but also highlighted that ethical issues relating to bioscience such as food safety and animal welfare should also be embedded within biochemistry degree programmes. The talks were followed by a 'small' group discussion session where more than 100 participants contributed to discussions regarding what constituted competent practical skills, transferable skills and essential molecular bioscience knowledge. In addition, some participants contributed ideas regarding how careers, employability skills and bioethics could be incorporated into molecular bioscience undergraduate degree programmes. The main points raised from these discussions is published on the FEBS Education Platform".

Summary of discussions in small groups

The session was attended by about 100 participants. They split into 4 groups to discuss specific topics related to this session, as listed below. Some of the main points that were raised during the specific discussions are collected in this report.

Group 1: What are the key practical skills that molecular life science students should learn?

The group came up with an extensive list of techniques, procedures and good practice:

- Making buffers, solutions and being able to understand concentrations.
- Using a pH meter and adjust pH of buffers.
- Knowing how to dilute solutions.
- Training in good laboratory practice (especially lab safety)
- Keeping a detailed lab book.
- Designing an experiment to test hypothesis and consideration of control and replicates.
- Being able to perform and analyse the results from SDS PAGE.
- Being able to perform and analyse the results from DNA agarose gels.
- Concepts of protein purification, i.e. size exclusion and ion exchange chromatography.
- Uv-vis spectrometry and use of calibration curves.
- Enzyme assays and following rates of reactions.
- Basic microbiology techniques also expose to other model organism systems ie yeast or flies, etc.
- Undertaking PCR reactions and analyzing products.
- Searching scientific literature data bases.

Group 2: What are the key transferable skills that molecular life science students should learn?

- Mathematical competency. Being able to use and manipulate simple equations.
- Being able to plot and interpret data in the form of graphs and tables.
- Statistics and its uses. Being able to ulitilise statistical software, i.e. Excel, SPSS, Minitab, etc.
- Communication skills, oral presentations and in writing.
- Scientific writing, how to write a scientific report or paper.
- Problem solving skills – i.e. critical analysis, experimental design and setup.
- Team working skills.
- Independency and time management.
- Leadership and managerial skills.

Group 3: Careers and improving employability prospects

- Have an extensive period of workplace experience as part of the degree. This could take the form of a “sandwich year” where the students spend one academic year working in an industrial setting such as for a pharmaceutical company.
- Coaching and mentoring.
- Helping with CV writing.
- Helping to develop interview skills.
- Employ or utilize specific careers officers within the university to help students with applications.

- Organise careers fairs for the students and invite past graduates to talk about their careers following graduation.

Group 4: Subject-specific knowledge

- Proteins
- DNA / RNA / Genetics
- Enzymes
- Metabolism
- Regulation
- Cell biology
- Molecular biology
- Bio-energetics
- Membranes
- Cell signaling
- Biotechnology
- Microbiology
- Molecular pharmacology

Workshop 2: Wednesday, September 3rd, 2014
"New technologies to teach molecular life science"

Organised by FEBS Education Committee and SFBMB
Co-Chairs: Jean-Luc Souciet and Angel Herraez

18:00-18.05 Introduction
18.05-18.35 Quentin Vicens (Nice, France)
"Peer Instruction: General view and Application to Specificity of Molecular Life Sciences"
18.35-19.05 Michael. E. Caspersen (Aarhus, Denmark)
"The role of Peer Instruction in Educational Development"
(Getting more scientists to revamp teaching)
19.05- 19.35 Neil Morris (Leeds)
"Using technology to engage with students"
19.35-20.00 General discussion
Supported by the company "Turning Technologies": This company will provided free technology rental that included all receivers and Response Cards for presenters and participants.

Report by Jean-Luc Souciet
Université de Strasbourg and SFBBM Education Committee

"The FEBS–EMBO 2014 Conference was a perfect opportunity to promote and to compare innovative ideas and teaching experiences for the best training of our undergraduate

students. This workshop was organized to present in real time an interactive teaching strategy: 'peer instructions using clickers' (as defined by Eric Mazur and Turning Technologies). Each workshop participant received a clicker (courtesy of Turning Technologies) – a small handheld voting device – to simulate the experience of a student attending a lecture using this teaching strategy. The first speaker, Quentin Vicens (Université de Strasbourg, France), presented the general strategy: (1) a biological problem is set; (2) the right answer, with four possible choices, is requested using clickers; (3) the results of the survey (but not the right answer) is shown, initiating discussions between opposite proposals; and (4) step 2 is now repeated, with the correct answer. This elegant demonstration was very well received.

The second speaker, Michael Caspersen (University of Aarhus, Denmark), reported quantitatively how efficient this method is to improve student results and the main gains: the concepts developed during the lecture are understood; the curiosity of students is stimulated; and with this feedback the teacher is immediately informed about what is understood or not.

The third speaker, Neil Morris (Leeds University, UK), presented the projects and results related to Blended and Digital Learning conducted at Leeds University, encompassing the use of tablet computers and e-Books, and the integration of video lectures, podcasts and mobile technology. It was a fruitful workshop that raised numerous comments and advice from the participants, including many young graduates".

Poster session on "Education, Training, and Career Planning in Molecular Life Sciences".

Reported by Gul Guner, FEBS Education Committee

Sixteen posters were displayed in this category and the best poster on education was selected by the jury formed of the members of FEBS Education Committee. The criteria used in assessment were: quality of pedagogic science, methods, results, evaluation of the data, quality of the poster set-up, oral defence of the work, and potential impact.

The name of the laureate of the education Poster Prize was:
MON-520
"Multidisciplinary biochemistry laboratory education; student centered real learning process"
A. Sepici DINCEL, Y. OZKAN, M. SELVİ, F. ERKOC
Gazi University, Ankara, Turkey

The winners were offered a plaquette from FEBS Education on Committee. In addition, the organisers of Berlin FEBS Congress offered the waiving of the registration fee for one of the authors of the winner poster.

FEBS Education Committee plans to follow this initiative, which attracted great interest from the participants.

- **CV Advising Activity:**

Finally, in the traditional collaborative activity between the FEBS Education Committee and the Young Scientists' Forum (YSF), Keith Elliott provided CV advice to around 50 YSF participants, which will help the young scientists in their bright future careers.

5.2. Symposium on PhD Training in Clinical Chemistry, Clinical Biochemistry, and Laboratory Medicine (During Worldlab, Istanbul, June 25th, 2014)

This symposium was attended by around 120 participants from all over the world and a lively discussion ensued.

FEBS Education Committee, IFCC Education Committee, and ORPHEUS

Symposium Programme:

Chairs: M. Ferrari (Italy), G. Güner-Akdogan (Turkey), T. Zima (Czech Republic)

14:30-14:40	Introduction
14:40-15:10	"Recent Trends in PhD Training - A Global View" G. Güner-Akdogan (Turkey)
15:10- 15:40	"PhD Training in Laboratory Medicine – Connection to Medical Specialization" T. Zima (Czech Republic)
15:40-16:10	"Overview on How Postgraduate Training in Laboratory Medicine is Accomplished in Europe" M. Ferrari (Italy)
16:10-16:40	Coffee break AACC's ComACC Program: Post Graduate Education in Laboratory Medicine in the United States
16:40-17:00	S. Wong (USA) Panel Discussion with Speakers and Participants-Conclusions

5.3 Education Workshops in 2014

5.3.1. Workshop on Education in Molecular Life Sciences (Debrecen, Hungary) 24-25th August, 2014

The Hungarian Society of Biochemistry and Molecular Biology has proposed include the workshop within the framework of the next year annual conference of the Hungarian Biochemical Society, to be held in Debrecen, between August 24 and 28. It was decided to hold it as an "annex" to the Congress, to provide more focused time on education. It will be a one-and a half-day workshop. The main topics were: curriculum planning, designing laboratory practicals, problem-based learning, and research in undergraduate education. The coordinator for this Workshop from Hungary was Prof László Dux, and both Profs. Vértessy and Fésüs were in charge of the Hungarian Congress 2014 of Biochemistry. The workshop trainers are from FEBS Education Committee as well as from Hungary.

The programme of the workshop is as follows:
Venue: University of Debrecen
Hosted by Hungarian Biochemical Society
Coordinator from HBS:
Prof. László Dux (University of Szeged)
Prof. Beáta Vértessy (Budapest University of Technology)

From FEBS Education Committee:
Prof. Gül Güner Akdogan (Chair) (Izmir, Turkey)

Workshop Trainers:
Prof Matthias Sprinzl (Bayreuth, Germany)
Prof Gül Güner Akdogan (Izmir, Turkey)
Dr Anikó Görbe (Szeged, Hungary)
Dr Margit Keresztes (Szeged, Hungary)
Dr Tamás Csont (Szeged, Hungary)

With Kind Support of
Prof. Mathias Sprinzl, Chair, FEBS WGI (Bayreuth, Germany)
Prof. László Fésüs, Chair, FEBS Publications Committee (Debrecen, Hungary)
Prof. Beáta Vértessy, Chair, FEBS Advanced Courses Committee (Budapest, Hungary)

Programme

DAY 1	**Sunday, August 24th,2014**	
09:00-09:15	Introduction to the Workshop	László Dux
09:15-10:30	Problem-Based-Learning (PBL)-Talks on Manchester, Izmir and Szeged Experiences	Gül Güner/Anikó Görbe
10:30-10:45	Introduction to PBL Small-Group Sessions	Gül Güner
10:45-11:00	Coffee and Break Into Two Groups	
11:00-11:45	First PBL Session	Güner/Anikó Görbe
11:45-12.30	Second PBL Session	Güner/Margit Keresztes
12:30-13:00	General Discussion on PBL	Güner/Dux
13:00-14:00	Lunch	

14:00-14:30	Designing Laboratory Practicals: Introduction and General Concepts	Mathias Sprinzl
14:30-15:00	Wet Labs	Anikó Görbe
15:00-15:30	"Skills and Key Knowledge Expected from a Molecular Life Sciences Graduate- FEBS Education Comm. Project"	Gül Güner Akdogan
15:30-15:45	Coffee and Break into Groups	
15:45-16:30	Small Group Discussions	*(Discussion on what skills and key knowledge)* *4-5 groups depending on the number* Güner/Sprinzl/Dux/Vértessy/Fésüs
16:30-17:00	Report from Groups	(*A report will be given from each group)*

DAY 2	**Monday, August 25th,2014**	
09:00-09:45	"How to Write a Scientific Article"	Mathias Sprinzl
09:45-10:00	Discussion	
10:00-10:25	Involvement of undergraduate students in research activities: experiences in the Department of Biochemistry, University of Szeged	Tamás Csont (Univ Szeged, Szeged)
10:25-10:30	Discussion	
10:30-10:45	TBA	Mihály Kovács (Univ Eötvös Loránd, Budapest)
10:45-10:50	Discussion	
10:50-11:10	Coffee break	

11.10-11:35	"Special Study Modules: An Innovative Laboratory Research Practice for Medical Students"	Gül Güner Akdoğan (Dokuz Eylul University, Izmir)
11:35-11:40	Discussion	
11.40-11:55	"Research in undergraduate education in Univ Debrecen"	Ferenc Erdődi (Univ Debrecen, Debrecen)
11:55-12:00	Discussion	
12:00-12:15	"Research in undergraduate education in Univ Pecs"	Ferenc Gallyas (Univ Pécs, Pécs)
12:15-12:20	Discussion	
12:20-12:40	General Discussion and Close	

POSTER SESSION

(with discussions from senior scientists)

Attendance:
This workshop was very well attended, with around 60 participants at all career stages and with representatives from different Hungarian universities. The sessions were highly interactive, with lively small-group discussions.

5.3.2 Workshop on Molecular Life Sciences Education (Belgrade, Serbia)

This workshop was conceived during the WGI visit to Belgrade, which took place in October 2013.

FEBS Workshop on Molecular Life Science Education

September 18-19th, 2014

Belgrade, Serbia

Hosted by Serbian Biochemistry Society (SBS) (President: Professor Dr Mihajlo Spasić)

Coordinator from SBS: Prof. Marija Gavrovic-Jankulovic

Venue: Faculty of Chemistry University of Belgrade, Studentski trg 12-16

From FEBS Education Committee:

Prof. Keith Elliott (Manchester, UK) Prof. Gül Güner Akdogan (Chair) (Izmir, Turkey)

With Kind Support of Prof. Mathias Sprinzl, Chair, FEBS WGI (Bayreuth, Germany)

The Workshop was well-attended, with sixty participants from all over Serbia with a ratio of about 1/3rd professors and 2/3rds post-graduate students and post-docs.

Programme

DAY 1	**Thursday, September 18th**	
08:30-09:00	Registration	
09:00-09:30	Opening of Workshop	
09:30-10:00	General Discussion: " Issues on Molecular Life Sciences Education in Serbia"	Moderator: Prof. Mihajlo Spasic
10:00-10:30	"Skills and Key Knowledge Expected from a Molecular Life Sciences Graduate-FEBS Education Comm. Project"	Keith Elliott
10:30-10:45	Coffee and Break into Groups	
10:45-11:45	Small Group Discussions	Sprinzl/Elliott/Güner/Gavrovic-Jankulovic
11:45-12:45	Report from Groups	

12:45-14:00	Lunch	
14:00-14:45	"How to Write a Project Proposal"	Gül Güner-Akdogan
14:45-15:00	Discussion	
15:00-15:30	"Funds and Programmes"	Keith Elliott
15:30-16:00	Coffee Break	
16:00-16:45	"How to Read and Write a Scientific Article"	Mathias Sprinzl
16:45-17:00	Discussion	

DAY 2	**Friday, September 19th, 2014**	
09:00-09:30	Designing Laboratory Practicals: Introduction and General Concepts	Keith Elliott
09:30-10:00	Applications: "An Innovative Laboratory Research Practice in a Medical School"	Gül Güner-Akdogan
10:00-10:30	Coffee and Break into Three Groups	
10:30-12:00	Small Group Sessions with rotation-(Each session -30 minutes)	
In Silico Practicals *(Gül Güner-Akdogan)*	Dry Practicals *(Keith Elliott)*	Wet Practicals *(Mathias Sprinzl)*
12:00-12.30	General Discussion on Practicals	Güner/Elliott/Sprinzl
12:30-14:00	Lunch	
14:00-14.45	"Molecular Life Sciences Education for the Needs of Industry"	Mathias Sprinzl
14:45-15:00	Discussion	
15:00-15:30	"How to Make the Best of Yourself: How to Write a CV"	Keith Elliott
15:30-16:00	Coffee Break	
16:00-17:00	General Discussion and Close	

Discussion Group Reports:

The reports below have been composed by the Reporters selected in each discussion group.

Group Report 1

Moderator: Gül Güner

- ***Is it worthwhile to apply for an EU project "What Skills and Core Knowledge Expected from a Molecular Life Scientist"?***

We believe it is.

Molecular life sciences graduates (both bachelor and master) would benefit from the European level project related to the subject. The main outcome of such project would be a set of standards in the field of molecular life science education that would promote mobility of molecular life science graduates. Such standards would, of course, be introduced and accepted on voluntary basis.

What basic skills should graduate have at the end of 1st and 2nd cycles?

We concluded that, so called, transferable skills are as important as practical skills. Team work, time management and communication skills (oral, written, electronic communication) should be introduced at bachelor level. We emphasized the importance of the promotion of molecular life science in the community (e.g. Festival of science) and in the population of undergraduate students (e.g. Student congresses). Bachelors should also adopt practical skills such as basic principles and techniques required for laboratory work. They should be introduced to the principals of dealing with biological samples and corrosive, toxic and

flammable chemicals, as well as their disposal, laboratory safety hazards and measures. They should also be informed about the work in specific (e.g. sterile) conditions and with techniques that are used to maintain those.

Bachelors should also adopt basic laboratory techniques and methods such as pipeting, solution preparing, pH measuring, weight measuring, spectrophotometry, light microscopy, chromatography etc.

Skills regarding writing scientific paper and statistics should be introduced at master level, and skills such as project writing and fund management are in our opinion appropriate for PhD level. Practical skills that in our opinion should be adopted at master level are specific laboratory techniques such as PCR, blotting, electrophoresis, flow cytometry, HPLC, LC MS. However, in our opinion they should be introduced in general (core modul) and further specialization should be in the field of the methods required for the thesis.

What core knowledge should they have?

In our opinion, interdisciplinary approach is the key in teaching and understanding molecular life science. Bachelor should adopt general knowledge about the normal structure and function of the living cell (biomolecules, enzymes, cell organization, organelles, metabolism, cell signalisation and communication, ECM, nuclear processes, cell cycle and apoptosis), tissues, organs, systems and organism as a whole and about disturbances in the structure and function that represent molecular basis of disease itself. We found the theoretical knowledge crucial for understanding cellular processes and molecular life science.

What are the problems in delivering these?

We found the structure of curricula and interpretation of Bologna process to be the problem. Burocracy and the structure of the administration in the field of education that prevent collaboration and interdisciplinarity, as well as the lack of funding are the crutial obstacle in the development of molecular life science in Serbia.

Group Report 2:

Moderator: Mathias Sprinzl

Life science education in Serbia that we discussed is organized in three levels (4+1+3) at Faculty of Chemistry (Biochemistry) and Faculty of Biology (Molecular biology) University of Belgrade. We decided to accept the model 4+1 for graduate studies due to employers' attitude not to hire Bachelors with 180 ETCS. Having in mind that more than 50% of both Bachelors and Masters pursue scientific career in Serbia or abroad, we concluded that basic Life science curriculum and obtained skills should be strongly science oriented. The beginning of curriculum should include all natural sciences, before focusing on life sciences. The core knowledge with special attention on accepting scientific critical thinking, rather them reproduction of facts, should enable young colleagues to solve problems and to be successful in any area they chose during MS studies. The knowledge and specific skills that a molecular life science student must have are presented elsewhere, but simple reproduction is useless without deeper understanding, ability to collect, analyze and report data. However, the main problem in achieving this goal lies in the lack of critical thinking of

students-to-be. Fact based learning is widespread in both elementary and high schools, so to fulfill the goal we need to encourage teachers (at all levels) to insist on problem solving approach. We hope that the Society can provide a frame for such an activity.

Group Report 3

Moderator: Keith Elliott

1.Basic skills

BSc

Students should be acquainted with:

1. Basic skills such as: making solvents, dilutions, proper pipetting, pH measurements, chromatography techniques, electrophoresis, spectrophotometry
2. Handling biological materials:
   Macromolecule solutions (e.g. protein)/cell cultures/animals
3. Good laboratory practice (GLP)
4. Communications skills
5. Presentation skills
    a. Abstracts
    b. Poster presentations
    c. Oral presentations
6. Management in Science
7. Skills of self-reflection – what do they want to after obtaining BSc – career in academia or non-academia sector

MSc

Students will develop specific skills (practical) depending on MSc projects they will choose. During Master studies students should be introduced to Writing projects.

1. Core knowledge

Students are coming to University with different backgrounds, so core knowledge among them differs. Although, they pass exam (which is consisted from basic of Math, Biology and Chemistry) to enroll University, often they are not able to show that when courses at University starts, which brings us to problems in education starting even from primary school. This is global problem and requires serious reorganization of total education system.

In the meanwhile, we have to encourage our student to use their capacities and develop critical thinking.

In order to adjust differences among student (their previous knowledge) we agreed that basics in Mathematics, Physics, Chemistry and Cell Biology should be mandatory at first year of studies. Regarding Basic in Biochemistry, focus should be on Integration. They should be able to use their knowledge operatively to cross Biology and Chemistry easily, in order to understand fundamental principles easily.

- 4 types of macromolecules
- Structure – function relationship
- We used proteins as example:
    - Group of proteins – They should be able to recognize group of proteins, how they work e.g enzymes – structure, structure-function relationship (example: pH optimum, T optimum, inhibitors) Great example of showing how chemistry influence biology and vice versa
    - Genetics
    - Integration – metabolism! All this molecules work together, even our investigation approaches are usually focused on particular ones.

2. Problems

We discussed about current problems regarding career future of Biochemists (From Faculties of Natural Sciences) since they are not able to join medical laboratories (even they finish PhD at Medical faculty or Faculty of Pharmacy - purpose of doing those PhDs?). This is a rare opportunity for biochemist to work in Serbia, due to lack of industry etc. This discussion emphasized problem of University structure, isolation of Faculties and future of Biochemistry as individual discipline in Serbia. Consequently, young people nowadays decide not to study Molecular life sciences (for comparison number of students enrolled at Faculty of Belgrade-Biochemistry is around 40-50) due to their uncertain career prospective. We believe that this issue is worthwhile to be solved and the contribution of FEBS as well as FEBS constituent societies may be of crucial importance.

Feedback from the Participants:

From the written feedback taken, 90 % of the participants rated the workshop as “excellent” and 10%, as “very good”.

Some of the comments and suggestions:

- “Very inspiring and useful. Thanks”
- “The talks were very useful to me as a PhD student”
- “I got a lot of information regarding methods in teaching that will be very helpful in work with students. Thank-you”
- “Hope that your next workshop will be successful as this one! Thank-you!”
- “Thank-you all, you were very good! I cannot agree more about the way how a biochemist should be educated.”
- “I learned so much from you; thank-you for your time. It is very important for PhD students to visit this workshop because it is very helpful and inspiring.”
- “The Workshop covered a broad range of topics regarding education in life sciences, although it was mixed for those who teach and who are students. I would like to suggest a Workshop for PhD students and post-docs where it would be more words about mobility and opportunity for career development.”
- “More on how to get students interested in biochemistry and less on how to organise practicals, would be my suggestion”.

6. FEBS Education Activities in 2015

- **Cambridge Education Workshop** is planned to take place on March 30-31st, 2015, in collaboration with the Biochemical Society. The first of these workshops was organised in December 2012 and was highly successful, with participation from all over Europe. It was then agreed to hold these workshops once in every two years.
- **Education Events during Berlin FEBS:** An education session will be held during Berlin FEBS, entitled: "Research in Undergraduate Education" along with a poster session on "Education, Training, and Career Planning in Molecular Life Sciences".
- **Sarajevo Workshop:** Another Workshop on Molecular Life Sciences Education will be organised in Sarajevo, Bosnia and Herzegovina, on 3-4th September, 2015, hosted by Radivoj Jadric from Sarajevo University.
- **Oslo Workshop:** IUBMB-FEBS Workshop on Molecular Life Sciences Education will take place in Oslo, on September 18-19th, hosted by Winnie Eskild, the President of the NSBMB.
- **Athens Workshop in Memory of Costas Drainas**: A Workshop on Molecular Life Sciences Education in Memory of Costas Drainas (member of FEBS Education Committee, who sadly passed away in July 2011) will be held in Athens in October 2015, hosted by Dimitris Kletsas, President of the HSBMB.

7. FEBS 50th ANNIVERSARY

7.1. 50 YEARS OF FEBS AWARD FROM THE FEBS EDUCATION COMMITTEE:

This award has been planned as an activity under the framework of the 50th year celebrations of FEBS. The guidelines for this education award were formulated previously and adapted to the present perspective (Please see below).

SHORT-TERM TRAINING AWARD FOR MOLECULAR LIFE SCIENCES EDUCATION IN EUROPE

FEBS EDUCATION COMMITTEE

GENERAL GUIDELINES

Award Perspectives

This award aims to provide the awardee with educational opportunities (in a country from one of FEBS Constituent Societies) tailored toward specific home country needs. The awardee visiting the host-country institution studies aspects of undergraduate or post-graduate education that have the potential to promote and expand education programmes / courses/modules in biochemistry, molecular biology, and other bimolecular sciences in his/her home country institution and department.

Aim and Objectives

The award aims to promote molecular life sciences education in Europe to the highest quality at both the undergraduate and post-graduate levels.

The objectives include:

- Assisting European educational institutions in improving and advancing the process of undergraduate or post-graduate education in the molecular life sciences
- Facilitating placement of education training fellows in institutions (faculty, graduate school, research centre providing teaching…) able to provide excellent instructional experiences in areas of recognized home country need
- Advancing the international exchange of information and skills in biochemistry, molecular biology and the molecular life sciences *at large,* and the same, in the context of broader areas, such as biochemistry and molecular biology education in medical training.
- Contributing to the promotion of international understanding and exchange within Europe and with associate countries.

Award Description:

A Short-term Training fellowship will be awarded on merit, with preference for candidates from countries in need, in case of eligible applications. Mentoring will be provided by preceptors in institutions involved with undergraduate or post-graduate teaching within a Constituent Society country. Eligible areas of study include: innovative techniques in education (e-learning, distant learning…), educational methods (problem-based learning , project-based learning…) curriculum planning, designing laboratory practicals, evaluation systems, supervision/mentoring, quality and accreditation.. This study may be conducted in disciplines of molecular biosciences, as well as in educational disciplines, provided that they offer some association with a molecular-bioscience discipline. Although the major emphasis of this programme is to learn educational processes, the trainee may concurrently pursue some collaborative research interest with the host-institution research faculty. The time allocated to training in teaching should be at least 80 %.

The short-term training award is not provided for any of the following: basic or clinical research, degree-granting educational programmes, programmes that require tuition payments, grants for short-term courses or conference attendance, specialty training in residency programmes, training solely in laboratory/clinical procedures, or educational programs in schools of public health.

Eligibility of Applicants

Applicants for this programme must be faculty in biochemistry, molecular biology and other molecular life sciences from countries of FEBS Constituent or Associate Societies, possessing the following eligibility criteria:

- Reside and work in their home countries at the time of application, acceptance and initiation of the education training award.
- Provide evidence of membership of the Constituent Society (thus of FEBS)
- Have a PhD or equivalent degree
- Hold an academic teaching appointment in a school of science, engineering, or medicine, etc or postgraduate education institute/school.
- Have at least three years of teaching experience in the home country following completion of their PhD (or equivalent) studies
- Demonstrate competence in written and oral English (or in the language of the host country)

- Have a position at the home country institution to which they will return upon completion of the programme.

Duration and Time of the Training Programme

The training programme will range up to two months and will be accomplished during the academic year 2014-2015.

Review Criteria

FEBS Education Committee reviews eligible applications and makes the decision for award. In reviewing applications, consideration is given to the following:

- Appropriateness and specificity of the educational programme proposed by the applicant and the endorsing home country institution.
- The home country institution's plans for and commitment to utilizing the benefits of the fellowship to meet identified needs.
- Assessment of the overall value of the fellowship experience to the individual, institution, home country, and the European Area.
- Evidence that the applicant will be in a position to implement the proposed educational improvements upon return to the home country institution.

Award Announcement

Applicants will be notified of the final result of the review of applications no later than three months after the submission.

Conditions of Appointment

The Training Award recipient must accomplish his/her educational programme during the academic year 2014-2015.

He/she is required to devote full time to the educational programme for which the fellowship was awarded. Any substantial change in the educational programme or a change in the host institution requires prior FEBS Education Committee approval.

The Trainee is required to submit a final report upon completion of the programme, approved and signed by the Host Institution.

Financial Award

The Education Training Award is intended to cover subsistence and travel costs for the Fellow only; expenses incurred by dependents are not provided for. The daily subsistence allowance amounts to €70 per day. Travel costs will provide for a second-class two-way rail fare or a two-way economy flight between the place of residence and the host institution. The trainee is responsible for providing proof of health insurance during the visit period.

Application Procedure

Applications should be made **by May 30th, 2014**. Results will be communicated at the latest in three months.

The following documents should be accompanying the application form:

1. CV of the candidate
2. Programme of training visit
3. Nomination-support letter from the host institution, completed by an official of the home country institution.
4. Reference letter: must be completed by the applicant's head of department or equivalent

The applicant should submit the application to the Chairperson of the FEBS Education Committee both by e. mail and by post (and receipt will be acknowledged immediately):

Prof. Gül Güner Akdogan
Dokuz Eylül University School of Medicine
Department of Biochemistry (Dekanlik Binasi 2. Kat)
Inciralti-35340
Izmir-Turkey
Phone: + 90 533 749 17 96 / + 90 232 412 44 03

Budget allocated from FEBS (50th anniversary budget):

5 000 Euros (60 days X 70 euros + travel)

Applications and Evaluation

There were four eligible applications:

Ines Heiland (Norway)

Eva Margittai (Hungary)

Aram Gyulkhandanyan (Armenia)

Dessislava Marinkova (Bulgaria)

The evaluation was done by six members of the Education Committee according to the following criteria:

- Quality and specificity of the proposed programme of visit- (overall programme, duration, etc)
- The quality of the hosting institution and the mentor
- Candidate's CV and potential benefit from the experience
- Evidence that the applicant will be in a position to implement improvements to the home contry institution after the return, according to the home instititution's declared commitment
- Assessment of the Overall value of the fellowship experience to the individual, institution, home country, and the European area

The winners are the following:

- **Ines Heiland** (Assoc. Prof. for Molecular Bioinformatics, Tromso University, Norway)

  Award: 5 weeks visit plus travel

  Hosting Institution: University of Vienna, Faculty of Life Science, Department of Microbiol Ecology

  Title of Proposed Education Programme: "Towards a better Integration of computational biology in biochemistry and molecular biology education: Digitalization of science and teaching".

- **Eva Margittai** (Assoc. Prof., Semmelweis University, Institute of Human Physiology and Clinical Experimental Research Budapest, Hungary)

Award: 4 weeks visit plus travel
Hosting Institution: University of Siena, Department of Molecular and Developmental Medicine, Italy
Title of Proposed Education Programme: “Studying of the tuition of biotechnology at Siena University”

7.2. Text sent by Chair of ED-COM, for the Book on the 50th Anniversary of FEBS

FEBS Education Committee

I. Short History

The FEBS Education Committee had its roots in FEBS “Working Group on Teaching Biochemistry”, which was founded in 2001 by Prof. Jean Wallach (Lyon, France) (See Prof. Wallach’s article). Between 2001 and 2006, it was active in promoting educational events at yearly FEBS Congresses, with, as members, Keith Elliott (Manchester, UK) , Peter Ott (Bern, Switzerland) , Gul Guner-Akdogan (Izmir, Turkey) , Jason Perret (Brussels, Belgium) , Jose Villalain (Alicante, Spain) (followed by Pilar Roca), Pedro Moradas-Ferreira (Porto, Portugal), and Ed. J. Wood (Leeds, UK). During the Council Meeting held in Istanbul in 2006, the “FEBS Working Group on Teaching Biochemistry” was converted to “FEBS Education Committee”, with Prof. Edward J. Wood (Leeds, UK) as the founding Chair. Prof. Costas Drainas (Ioannina, Greece) served on the Committee from 2009 till his unexpected sad loss in 2011. Prof. Jason Perret (Brussels, Belgium)(2008-2011), Prof. Miguel Castanho (Lisbon, Portugal) (2008-2011) (Please see Prof. Castanho’s note), and Prof. Karmela Barisic (Zagreb, Croatia) (2009-2012) (Please see Prof. Barisic’ note), served on the Committee, each for one term, according to FEBS regulations for committee membership. Prof. Gül Güner-Akdogan (Izmir, Turkey) (Member from 2007-) took over, following the sad loss of the Chair of the Committee, Prof. Edward J. Wood on December 14th, 2008 (FEBS News, July 2009- A Tribute to Ed Wood). Dr. Keith Elliott was co-opted on the Committee since the beginning (Please see Dr. Elliott’s note). Prof. Peter Ott was also co-opted on the Committee and served as the web-site manager. Prof. Gül Güner Akdogan was elected as Chair of the Committee during the 2009 FEBS Council in Prague and then reelected for a second term during 2012 Sevilla FEBS Council. Presently, Angel Herraez (Alcala de Henarez, Spain) (2012-2015), Tomas Zima (Prague, Czech Republic) (2012-2015), Wolfgang Nellen (Kassel, Germany) (2013-2016), and Frank Michelangelo (Birmingham, UK) (2013-2016) are serving on the Committee.

II. Mission and Aims

FEBS Education Committee has the mission of promoting education of the highest quality in Biochemistry and Molecular Biology in Europe at both the undergraduate and postgraduate levels.

In order to realize this important mission:

1. We encourage the development of innovative teaching methods

2. We disseminate advice on educational resources

3. We arrange at least one education event at each FEBS Congress

4. We arrange other educational events such as workshops on educational issues in FEBS member countries on request.

III. Overview of the Main Activites of FEBS Education Committee

The main activites of FEBS Education Committee comprise the "Workshops on Education in Molecular Life Sciences" organised during the FEBS or IUBMB/FEBS Congresses or in different FEBS countries upon request from the Constituent Society. In addition, FEBS Education Committee collaborates with bodies within and outside of FEBS: the Working Group on Integration, the Science and Society Committee, the IUBMB Education Committee, Working Group on the Careers of Young Scientists, the Constituent Societies of FEBS, IFCC, and ORPHEUS.

IV. Workshops on Education in FEBS countries

1. How these workshops were conceived:

The letter of late Prof. Ed Wood, the founding chair of the Committee, to the Constituent Societies of FEBS) best describes the starting point of these workshops.

Excerpt from Prof. Edward J. Wood:

The Education Committee of FEBS and Workshops on Education

"Successful education is not just about "giving" information to passive students and then assessing whether they can repeat the information in an examination. In recent years, in several countries, there have been "Assessments of the Quality of Education" in universities, often instigated by governments anxious to assure themselves that university teaching is receiving proper attention. This has resulted in lecturers and professors reviewing how they teach (and perhaps trying to do better in the light of psychological and educational studies about how people learn), and of universities examining the procedures by which teaching quality is assured.

Some years ago the Committee on Education of the International Union of Biochemistry and Molecular Biology (IUBMB) was in the habit of offering Workshops on Education on request from member Societies. These Workshops, organized by Professor Frank Vella, typically took place over three days, were held in many countries of the world, and the issues discussed were concerned with increasing the effectiveness of teaching and enhancing students' experience of teaching so as to improve their learning. There was no set formula for the activities and the issues discussed were very varied. The Workshop "team" usually consisted of three individuals from different countries who had some expertise in teaching. There was discussion of teaching to large classes, laboratory practical teaching, small-group teaching, computer-aided instruction, problem-based learning, postgraduate education, training for reading the scientific literature, and many other topics. Indeed, all the issues concerned with teaching, learning and assessment were up for discussion. Usually members of the visiting team gave one "scientific" lecture on their research topic, and often some local individuals

(for example at the post-doc level) were invited to speak about their research or prepare a brief critical summary of a current paper from the literature for presentation. The main activity however, was not "scientific" – it was concerned with the process of teaching, sometimes called 'pedagogy' , and how the activity could be made more effective.

The Education Committee of FEBS now proposes to try to offer similar Workshops and may do this in collaboration with IUBMB. Since the original IUBMB Workshops mentioned above, things have moved on considerably in the world of university education. Although at that time we had "distance education", we now speak of "E-learning" and "E-assessment" because we now have the Internet and email, making distance communication easier and more immediate. This has changed the way that we teach and the way in which students learn. Less may happen in formal classes, students may not be physically present on a campus, and may do their learning at their convenience at any time of the day or night depending on their other activities . Less and less do students use libraries because they have Google and Wikipedia, and one suspects that they are less skilled in critically appraising the information that they get hold of. In addition, many of us have been faced with increasingly larger classes of less well prepared or less committed undergraduates, making the task of teaching effectively more challenging as well as increasing the assessment load. There are also questions about assessment: what are the 'best' methods, linking assessment to teaching and learning? How do we make the best use of our time? And what about giving feedback – a process which is widely held to be extremely important in encouraging effective learning? So, there are many 'new' issues in pedagogy to be dealt with alongside the 'old' ones.

The FEBS Education Committee is still discussing how Workshops might be run and what the financial implications might be. In the IUBMB-sponsored Workshops, typically IUBMB provided the travel money for the visiting team, and accommodation was paid for locally, often in campus guest houses, sometimes in modest hotels. Sometimes it was possible to obtain additional funds to support the travel and accommodation of participants, sometimes not. Sometimes individuals from neighbouring countries could be invited and sometimes the Workshop Team visited several countries in a region. Usually Reports of the Workshops were published in Biochemical Education (and these can be read in back-numbers of that journal).

If you, through your local Biochemical Society, would be interested in discussing the possibility of a Workshop – perhaps with a view to reviewing the teaching methods used in your institution, then in the first instance please contact me: ***e.j.wood@leeds.ac.uk*** *and we can begin to consider the possibilities and feasibility of a visit."*

Ed Wood

(Chairman, FEBS Education Committee)

03. 2008

2. Overview of Workshops on Biochemistry and Molecular Biology Education (2008-)

General Information:

These Workshops are organised by FEBS Education Committee with collaboration of the FEBS Constituent and/or Associated Society of the country where the workshop is held. A typical workshop lasts one or two days and focuses on the current thinking and innovations in education that have been explored and found to be useful for enhancing learning. The specific topics to be covered are selected by the Constituent Society according to their needs, from the array of topics offered by the FEBS Education Committee:

- *Discussion on skills and knowledge expected from a molecular life science graduate*
- *Quality assurance in education*
- *Postgraduate education*
- *Distance or E-learning*
- *Curriculum planning*
- *Designing laboratory practical's*
- *Student centred learning*
- *Problem-based learning*
- *Ethics education*
- *Biochemistry education for the needs of industry*
- *Assessment and feedback*
- *Teaching molecular evolution*
- *Research experience in undergraduate education*
- *How to write a scientific paper*
- *Scientific communication to non-scientists*
- *How to Write a Research Proposal*
- *Funds and programmes*

3. Realization of FEBS Education Workshops (2008-):

The first Workshop was planned by Ed Wood to take place in Sofia, on 17-18th October 2008 , with Keith Elliott and Gül Güner Akdogan as co-trainers. Unfortunately, due to the illness of Ed Wood, Gül and Keith had to run the workshop without Ed, as he had planned it. Prof. Ganka Kossekova (Sofia Medical University) coordinated the workshop.

The first workshop being successful, many others followed:

- *Cluj-Napoca, Romania, September 2009*
- *Athens, Greece, May 14th, 2010*
- *Opatija, Croatia, 18-19th September, 2010*
- *Tallinn, Estonia, 13th May, 2011*
- *Bratislava, Slovakia, 12-13th September, 2011*
- *Ljubljana, Slovenia, November 3-4th, 2011*
- *Izmir, Turkey, March 29-30th, 2012*
- *Yerevan, Armenia, 8-9th October, 2012*
- *Cambridge, UK, 17-18th December, 2012 (In Memory of E.J. Wood)*
- *Gdansk, Poland, 13th July, 2013*
- *Tbilisi, Georgia, 8-9th October, 2013*
- *Sofia, Bulgaria, 22nd November, 2013*

The Workshop education team is identified and invited by FEBS Education Committee, either from the Committee members, or experts at large, depending on the topics to be covered.

The Workshop can stand alone or be associated with a Congress of the Constituent Society and/or any other scientific event.

4. Who Attends the Workshops?

Faculty, researchers, post-docs , and PhD students, administrators, (and high-school teachers where appropriate) from biochemistry, molecular biology, medicine, pharmacy, science education, and all disciplines of basic sciences attend the Workshop from the host country or other European countries.

5. Planning and Distribution of Responsibilities

The workshop is agreed between the Constituent Society and FEBS Education Committee at least one year before the event. The Constituent Society assigns a local Coordinator for the Workshop, typically, the person responsible for the educational activities of the Society. Although the workshops are intended to target the needs of the Constituent Society members and therefore attended largely by the members of the host Society, any FEBS members from different countries may attend these workshops in case of interest. From the Education Committee usually the Chair takes the responsibility. The venue, time and duration, as well as the topics of the workshop are suggested by the local hosts.

6. Responsibilities of the Constituent Society:

All activities related to the local aspects of the workshop - dissemination of Workshop information within the country (web-site, electronic and/or written dissemination) venue (suitable venue with the requested educational and technical assets), registration of participants (lists, name-badges), logistics, coffee breaks, lunches, transport, social programme, certificates (signed by FEBS Education Committee Chair and the President of the Constituent Society) are in the hands of the Constituent Society. If a poster session is programmed, the selection and organisation of posters will be done by the Hosts with help from the FEBS Education Committee. In addition, the wrap-up of the Workshop, including the final list of participants is done by the Constituent Society.

7. Responsibilities of FEBS Education Committee:

All activities related to the "programme" of the workshop- trainers, their organisation, their flights, preparing the Workshop Booklet, photocopies to be distributed, preparing feedback forms and taking feedback, running of the FEBS Education Platform (uploading of slides and necessary materials) are in the hands of FEBS Education Committee. The Workshop is also disseminated through FEBS channels by the Education Committee (FEBS web-site, electronic distribution to FEBS Constituent Societies, etc). The final report of the Workshop is prepared by the Education Committee, with input from the Constituent Society. FEBS has no liability on any accident that could occur during the workshop and liability disclaimer form should be signed by the Organisers.

8. Programme

The scientific (educational) programme is based on the topics selected by the Hosts. The session is organised using different educational techniques depending on the character of the topics. These will include lectures, small-group discussions, meet the expert sessions, panel discussions, and, if requested, selected short talks and poster sessions. The posters are based on educational issues.

9. The types of workshops conducted may be categorized into three groups:

- ***Workshops to "promote molecular life sciences education"*** *in the Eastern European countries , bringing together both young scientists and experienced faculty to reflect on educational issues of the country, in particular, discuss what could be done, and, also to set an example of how to train young scientists for professional scientific skills . In addition, workshops focused on particular topics such as "teaching molecular evolution" could also be designed with similar aims.*

- ***Workshops on "Innovations in Education****"- the type that the Education Committee has just successfully run in Cambridge- to bring together faculty and young scientists from all over Europe to discuss together innovations in teaching and learning, in the area of molecular life sciences and biosciences (Example: Cambridge Workshop 2012).*

- ***"Revisit Workshops":*** *It was generally felt that a "revisit" could be performed to the same country where the workshop was first held, in order to discuss what has been done and to reflect on what could be done in the future. This type of workshops could be pursued in 4-5 years after the first experience (Example: Sofia Workshop 2008- Sofia Workshop 2013).*

V. Educational Activities During Yearly FEBS or FEBS/IUBMB Congresses

The first educational activites were organised by the Working Group on Teaching Biochemistry, during the Istanbul FEBS Congress. In the following years, these events were organised with an increasing impact- organised either by FEBS education Committee, or, in case of a common topic, in collaboration with IUBMB Education Committee, with FEBS Sciences and Society Committee, etc.

It is interesting to note the variety of topics and their evolution:

EDUCATION EVENTS ORGANISED DURING FEBS CONGRESSES (2002-)

The events presented in the table below were organised by the following:

FEBS Working Group on Teaching Bochemistry (Chaired by Prof. Jean Wallach (Lyon) (2001-2006)

FEBS Education Committee (Chaired by Prof. E.J. Wood (Leeds) (2007-2008)

FEBS Education Committee (Chaired by Prof. Gül Güner Akdogan (Izmir) (2009-)

FEBS/ IUBMB-FEBS Congress	***FEBS Education Committee (ED-COM) Event(s)***
2002-Istanbul-28th FEBS Congress (organised by ISBMB)	*1. Symposium on "Virtual Learning"* *2. Computor-Lab Activity on "Virtual learning" (Activity of the FEBS Working Group on Teaching Biochemistry)*
2004-Warsaw-29th FEBS Congress	*3. Workshop on "Problem-Based Learning" (Activity of the FEBS Working Group on Teaching Biochemistry)*
2005-Budapest-30th FEBS Congress	*1. Workshop: "Laboratory Practicals" (Activity of the FEBS Working Group on Teaching Biochemistry)*
2006-Istanbul-31th FEBS Congress	*1. Workshop on "New Approaches to Post-graduate Education"* *2. Workshop on "How to Write Successful Research Grants"* *3. Data-base Searching-Computor Lab* *(Activity of the FEBS Working Group on Teaching Biochemistry)*
2007-Vienna-32nd FEBS Congress	*1. Symposium: "How to go from Biochemistry Research to Commercial Biotechnology"* *2. CV Clinics*
2008-Athens IUBMB-33th FEBS Congress	*1. Symposium: "Post-Graduate Education" (With HSBMB)* *2. Workshop: "E-learning"* *3. CV Clinics*
2009-Prague34th FEBS Congress	*1. Workshop: "Teaching Systems Biology"* *2. Workshop: "Bioethics"(Co-funded with IUBMB)* *3. CV Clinics*
2010-35th Gothenburg FEBS Congress	*1. Workshop: "Research in Undergraduate Education" (Co-funded by IUBMB)* *2. Workshop on "Research Oriented Education in High Schools"* *3. Practical Systems Biology Workshop (With the SSBMB)* *4. CV Clinics*

2011-Turin 36th FEBS Congress	*1. Workshop: "PhD Training in Europe: Where Are We Heading?"* *2. Workshop on "Integrating Molecular Bioscience Education with Medical Training"* *3. CV Clinics*
2012-Seville-22nd IUBMB-37th FEBS Congress	*1. Workshop: "Research into Effective Learning Strategies: What Biochemistry Is Learning from the Other Sciences" (Co-funded with IUBMB Education Committee)* *2. Workshop: "Teaching Molecular Evolution: A Unifying Principle of Biochemistry" (Co-Funded with IUBMB and FEBS Science and Society Committee)* *3. Workshop: "Science in School: Biodiversity and Evolution "Co-funded with FEBS Science and Society Committee)* *4. CV Clinics* *5. Poster Session on Biochemistry and Molecular Biology Education*
2013-St. Petersburg 38th FEBS Congress	*1. Workshop: "Molecular Life Sciences Education for the Needs of the Industry"* *2. CV Clinics* *3. Poster Session on Educaiton in Molecular Life Sciences*
2014-Paris FEBS-EMBO Congress	*1. Skills and Key Knowledge for a Molecular Life Scientist* *2. New Educational Technologies* *3. CV Clinics* *4. Poster Session on "Education, Training, and Career Planning in Molecular Life Sciences"*

VI. Web-Site of the Education Committee

FEBS Education Committee has maintained an interactive internet site (Virtual Classroom) where information material relevant to the Education Events were posted. Several discussion forums related to the topics of the workshops have been available for discussion among participants and with the lecturers and moderators. In addition, slides from the Congress education events have also been uploaded, with the approval of the speakers. The site has been available at ***http://edu.febs.unibe.ch.*** *To access the site, participants had to go through a short registration process which is explained on the opening page of the site. The Education Committee appreciates the time and expertise offered by Prof. Peter Ott who has successfully managed this site.*

VI. Future Prospects

The evaluation of what the Committee has accomplished so far is done periodically. It is generally agreed that we have established an infrastructure and an acceptable standard for Workshops on Biochemistry and Molecular Biology Education at the European level, on innovative topics on education, and many Constituent Societies from all over Europe expressed interest. In line with the Statutes and By-laws of FEBS Education Committee, with the mission of promoting Biochemical Education to the highest level within Europe, further

development in the exchange of learning resources and further dialogue with bodies within and outside of FEBS are aimed. On top of continuing these activities, the Committee has started thinking on "European Strategies for High Quality Undergraduate and Post-Graduate Education" . Further enhancement of the synergy of cooperation within the Committee, among all Constituent Societies of FEBS, and other international organisations will be promoted. In order to provide a wider network and stronger funding to attain the mission of FEBS Education Committee of promoting molecular life sciences education throughout Europe, the possibility of submitting a project to the EU is considered. It is thought that such a Project on the European level is needed because the education and training of molecular life scientists to a high standard is critical to the advancement of science, innovation, productivity, wealth, and social cohesion of European society. Standards and content of molecular life sciences education programmes are inconsistent, and the transparency and comparability of qualifications are limited. There is a growing need to train contemporary scientists who are well-qualified not only in science and research, but also in the educational aspects of scientific research. Therefore, the new generation molecular scientists should be equipped with the transferable scientific skills and be capable of training students in this aspect, as well.

FEBS Education Committee is committed to continue fulfilling the vision and mission of FEBS in the area of education.

Gül Güner Akdoğan
Chair, FEBS Education Committee
Izmir, Turkey, December 2013

8. Collaborations

As it was generally agreed, collaborations within and outside of FEBS were continued and new collaborations solicited. Within FEBS, collaboration with Science and Society Committee and with the Working Group on Integration has been fruitful. Within the framework of Paris 2014 FEBS-EMBO Congress, a new collaboration was started with the French Society of Biochemistry and Molecular Biology, while Worldlab 2014 offered a platform for collaboration with IFCC and with ORPHEUS.

The collaboration with IUBMB has been restarted and an Oslo Education Workshop proposal has been successful- FEBS Education Workshop in Oslo, on 18-19th September, 2015, will be co-supported by IUBMB, in the order of 9, 000 $ (Please see page 36 for the application).

FEBS Education Committee has been continuing its fruitful collaborations with its Constituent Societies. The workshops and educational events offer a platform for these collaborations.

- **Ambassadors to FEBS Education Committee from FEBS Constituent Societies**:

In order to promote these collaborations further, FEBS Education Committee is asking all Constituent Societies to assign an ambassador for FEBS Education Committee. The ambassador can either be the leader of the local education group of the Constituent Society, or, in case the group is not yet formed, a person who is involved in molecular life sciences education at a higher level than only teaching. An Ambassador Meetign will be arranged in Prague, hosted by Prof. Tomas Zima, Rector of Charles University and member of FEBS education Committee. This Meeting will take place in the spring of 2016, the exact date to be determined later.

9. Conclusions

FEBS Education Committee has made an effort to fulfil its mission of promoting molecular life sciences education throughout Europe. In spite of the reduction of budget due to the general economy strategy of FEBS, a number of high impact educational events have been successfully carried on, due to collaborations within and outside of FEBS.

In addition, FEBS Education Committee has made an effort to reflect on its future path. The elections at the Berlin FEBS Council in 2015 will make –up for those members who have very well served for the Commitee. The Chair of FEBS Education Committee is thankful to all its members, to the FEBS Executive Committee and FEBS Constituent Societies for their valuable support.

Annex: Application to IUBMB for Oslo Workshop support

IUBMB Committee on Education
Application Form for IUBMB Educational Events
All applications for funding must be made using the form below. The completed application should
be submitted electronically to:
Prof. Paulo S. L. Beirão
Dept. of Biochemistry and Immunology - ICB
Universidade Federal de Minas Gerais
Av. Antonio Carlos 6627
31270-250 Belo Horizonte, MG - Brazil
Phone/Fax: +55 31 3409 2663
e-mail: pslb@ufmg.br
Submission deadlines (for funding in 2015): First round: October 31, 2014
Second round: April 1, 2015
Name and position of applicants
1) Gul GUNER-AKDOGAN (Prof. Dr.) (Chair, FEBS Education Committee)
2) Winnie Eskild, prof. (Deputy Treasurer of FEBS)
Institutional addresses 1) Dokuz Eylul University-Graduate School of Health Sciences, Department of Biochemistry, School of Medicine, Inciralti/ IZMIR- TURKEY
2) Department of Biosciences, University of Oslo, Norway
Zipcode 1) 35340 2) 0316
Telephone: (include country and area code)
1) + 90 232 412 44 03 mobile: + 90 533 749 17 96
2) + 47 22856170 mobile: +47 97696883
Fax: (include country and area code)
1) + 90 232 277 65 84
2) + 47 22 85 47 26
Email: 1) gul.guner@deu.edu.tr
2) winnie.eskild@ibv.uio.no
Name of person responsible for receipt and expenditure of funds
(if different from Applicant)
FEBS Treasurer (Sir Alan Fersht)
(His Secretary: Barbara Baron)
Institutional address
University of Cambridge
Zipcode CB2 1EW
Telephone: (include country and area code)
+44 01223 336300
Fax: (include country and area code)
+44 01223 336362
Email: arf25@cam.ac.uk
Detailed description of activity (if necessary continue on separate page)
Higher education institutions constantly need to renew and adapt their approaches to education in order to achieve the best possible outcome with regard to student learning. The

aim is that students after graduation, will be able to meet the demands of a work-life in continuous development successfully. To meet these requirements, FEBS in collaboration with The Norwegian Biochemical Society, has planned an Education Workshop with focus on practical skills to be held in Oslo next fall. The programme, as presented below, is structured including stimulating topics on education; to be treated by experts in their fields, as well as giving opportunity to students to express their views; and allocating sufficient time for interactive sessions. The "Small group discussion" are components which are designated for allowing ample interaction between the participants. In addition, sufficient time is accorded for coffee breaks, buffet dinner on the first day, and lunch on the second day in order to facilitate communication and networking between the participants.

”IUBMB-FEBS Workshop on Education in Molecular Life Sciences”

Hosted by the Norwegian Society of Biochemistry

Oslo, Sept 18-19, 2015

Friday Sept 18th

12:15-12:30: Welcome

”New Trends in Teaching and Learning”

12:30-13:10 ”How do people learn” Robin Wright, University of Minnesota, USA

13:10-13:50 ”Think-pair-share” and “peer instruction” Michael Caspersen, University of Aarhus, DK

13.50-14:30 ”Story of a paper” Jane Saffell, Faculty of Medicine, Imperial College, London, UK

14.30-15:10 ”What key knowledge and skills are required from a Molecular Life Scientist?” Francesco
Michelangeli, University of Birmingham, UK

15.10-15.20 Introduction to the Small Group Discussions

15:20-15:40 ”Coffee and Break into groups

15:40-16:40 **Small group discussions (1)**(Education approaches, student involvement, integration of
research, Key Knowledge, Generic Skills)

16:40-17:20 Presentation of small group discussions and panel discussion.

17:20-17:40 ”Student wishes for efficient education” A representative from the student council of IBV/BIO
and Estafania Mucino Costillo, The German Society of Biochemistry.

17:40-18:20 ”The Bologna Process and the ECTS system, how to calculate credits”. Trine Meza, NOKUT, Oslo, NO

Buffet dinner

Saturday Sept 19th

”New methods and technologies available in molecular life science education”

09:00-09:40 ”Flipped lectures” and “recorded lectures” Jeremy Pritchard, University of Birmingham, UK

09:40-10:00 “Problem-based-learning-Philosophy and Manchester Model” Keith Elliott

10:00-10:20 “ Applicaiton of PBL- Izmir Model” Gül Güner, Dokuz Eylul University, Turkey

10:20-11:00 “Different methods of giving students feedback, Julian Park, University of Reading, UK

11:00-11:20 Coffee and break into groups

11:20-12-00 **Small group discussions (2)** (one group on each of the four topics: Flipped lectures, recorded lectures, problem-based learning, student feed-back)

12:00-12:30 Presentation of small group discussions and panel discussion.
12:30-13:20 Lunch
13:20-13:50 ”Centre of Excellence in Biology Education” Vigdis Vandvik, University of Bergen, Norway
13:50-14:50 ”Designing laboratory practicals”
1). eBioLabs (w/hands-on) Gus Cameron, University of Bristol, UK
2) Labster Virtual Laboratories (w/hands-on) Tamara Tjitrowirjo, Labster, Copenhagen, DK
14:50-15:50 **Coffee and small group discussions (3)** (Virtual laboratory excersises)
15:50-16:20 Presentation of small group discussions and panel discussion.
16:20-17:00 Feedback and close.

Invited contributors, with addresses (if necessary continue on separate page)

Co-chairs of the workshop:

Prof. Gül Güner-Akdogan, Dokuz Eylul University, Izmir, Turkey.
Department of Biochemistry, School of Medicine, Dokuz Eylül University, Izmir, Turkey
gul.guner@deu.edu.tr

Gül Güner-Akdogan is holder of BS and MSc in Biochemistry from Geneva University, Switzerland. After completing her PhD degree in Istanbul University in 1980, she had a post-doctoral period engaged in research and in biochemistry education. She was appointed to Assoc Prof degree in Izmir, Dokuz Eylül University School of Medicine, Department of Biochemistry in 1987 and to professorship in the same institution in 1992. Her first introduction to the Science of Biochemical Education was in 1988, during an IUBMB Workshop in Ankara, conducted by Frank Vella, Alan Mehler, and Ed Wood. In 1994, she translated the book entitled “Biochemistry in Medical Sciences: An Integrated-Case-Based-Approach“ (SJ HIGGINS, AJ TURNER, EJ WOOD) into Turkish.

Role in Medical School: She has had an active role in the practice and in management of education in her medical school. In 1996, she was awarded an ECFMG (USA) fellowship (Educational Commission for Foreign Medical Graduates) and was invited as a visiting professor to the Department of Biochemistry, Health Sciences Center, School of Medicine, West Virginia University, USA. She was first introduced to and had the opportunity of practicing Problem-Based Learning system to medical students. On her return to Izmir in 1997, she was incorporated into the PBL Committee of Dokuz Eylül Medical School, the first medical school in Turkey to apply PBL. Gül was reinvited to the USA medical school for a short-term “revisit” in 2001. She also served as the Vice- President of the School of Medical Biology between 1988-94. In 1999, the infrastructure Project which she coordinated: “Learning Resources Centre” was supported by the Governmental Planning Body at Ankara, and gave the Medical School the opportunity to modernise its infrastructure for PBL.

The R-LAB (Research Laboratory) designed in 1999 for providing laboratory facilities for the Special Study Modules of the PBL students has been working efficiently since then and a recent paper has been published in BAMBED (January 2011) reviewing this activity. Since 2002, Gül has been directing the Central Research Laboratory of Dokuz Eylul Medical School.

Role in Post-Graduate Education: Gül Güner Akdogan has been actively working in promoting the postgraduate education in health sciences and from 2000 to 2010, she was the Director of the Graduate School of Health Sciences responsible for the coordination and management of MSc and PhD degrees. Linked to this role, Gül is serving as the coordinator of Dokuz Eylül University on the Doctoral Council of EUA (EUA-CDE). She hosted the EUA-CDE Workshop on PhD training in Dokuz Eylul University in January 2014. She is on the Executive Committee of ORPHEUS (Organisation for PhD education for biomedicine and health

sciences in the European System) and organised the 6th ORPHEUS Conference in Izmir in April, 2011.Gül has been elected as the General Secretary of Orpheus during the Orpheus Conference in Lausanne, in March 2014.

Research Activity: Gül Güner Akdogan's research activity is focused on the extracellular matrix in health and disease and its communication with cells including fibroblasts, and lately, endothelial cells. She has over 75 publications on her research, cited in SCI, extended SCI, Index Medicus, etc. Gül was invited by FEBS (Federation of European Biochemical Societies) to join the FEBS Working Group on Teaching Biochemistry as a founding member in 2001. Since then, she has worked in this group and from 2008, on the FEBS Education Committee founded by late Prof. Edward Wood (Leeds). Gül organised, coordinated, or served as a trainer in over forty workshops, symposia, and meetings mostly including FEBS, IUBMB, etc. She is on the Editorial Board of BAMBED (Biochemistry and Molecular Biology Education Journal) and on the Editorial Board of "Bioscience Education". Since 2009, Gül Güner Akkdogan has been serving as Chair of FEBS Education Committee and was reelected for a second term during FEBS Council in 2012. She is also the General Secretary of ORPHEUS since March 2014 (http://www.orpheus-med.org/index.php/about-us/orpheus-exec-commitee-2)

Publications on Education:

1. Güner-Akdogan, G, Musal, B, Tuncal, P. PROBLEM-Based Learning in a Turkish Medical School: 15 years of experience In, Molecular Life Sciences Education (Eds Michelangeli, F., Güner-Akdogan,G. & Castanho, M.) In press.

2. Güner-Akdogan, G**.** Postgraduate Education Workshops as a Model of Education and Discussion Platforms. In: The Researching, Teaching, and Learning Triangle (Miguel A.R.B. Castanho & Gül Güner- Akdogan, Eds.), Springer, New York, Dordrecht , Heidelberg, London, 2012, pp.35-54.

3. Güner-Akdogan, G, Cavdar, Z, Yener, N, Küme,T, Yüksel-Egrilmez, M, Resmi H. Special-study modules in a problem-based learning medical curriculum: An innovative laboratory research practice supporting introduction to research methodology in the undergraduate curriculum. Biochemistry and Molecular Biology Education 2011; 39(1):47–55.

4. Çavdar, Z, Oktay, G, Egrilmez, MY, Genc, S, Genc, K, Altun, Z, İslekel, H, Güner, G. In vitro reoxygenation following hypoxia increases MMP-2 and TIMP-2 secretion by human umbilical vein endothelial cells. Acta Biochim Pol 2010;57(1):69-73.

5. Kossekova, G & Güner-Akdogan, G. Creation of web-based clinical case simulations and PBL tutorials in medical biochemistry: Turkish-Bulgarian collaboration. Procedia Social and Behavioral Sciences 2010;2 1597–1604.

6. Güner,G. "A Model of a Biochemistry Dry Practical in a Problem-Based Medical Curriculum"- "Educational Session on Biochemistry Practicals", 2-7 July 2005, FEBS Meeting, Budapest (Abstract Book).

7. Harris, CL, Güner, G, Arbogast, CL, Salati, L, Shumway, JM, Conners, J, Beattie, D.: Integrated problembased learning for first-year students- Does it teach biochemical principles? Biochem Educ 1997; 25(3):146- 150.

8. Güner, G, Sakizli, M, Erdamar, Đ, Onvural, B, Ceryan, K.: Preclinical medical training using the integrated system in Dokuz Eylul University Medical School. Biochemical Education 1995; 23(19): 21 – 24.

Dr. Winnie Eskild, Department of Biosciences, University of Oslo, Norway.

Winnie Eskild is professor at the Department of Biosciences and has taught biochemistry at bachelor and master levels for 19 years. She has continuously sought to improve the methods of teaching to enhance student learning and understanding. During the same years she has had an active research group with responsibility for the education of numerous master and PhD students. She was chair of the MBK-Bachelor Program Board, University of Oslo from 2003 till 2007.

1. Kong XY1, Nesset CK, Damme M, Løberg EM, Lübke T, Mæhlen J, Andersson KB, Lorenzo PI, Roos N, Thoresen GH, Rustan AC, Kase ET, Eskild W. 2014 Loss of lysosomal membrane protein NCU-G1 in mice results in spontaneous liver fibrosis with accumulation of lipofuscin and iron in Kupffer cells. Disease Models and Mechanisms, 7, 351-362.
2. Steffensen, KR, Bouzga, M, Skjeldal, F, Kasi, C, Karahasan, A, Matre, V, Bakke, O, Guérin, S, Eskild, W 2007 Human NCU-G1 can function as a transcription factor and as a nuclear receptor co-activator. BMC Mol Biol 8, 106-122.
3. Sporstøl, M, Mousavi, SA, Eskild, W, Roos, N, Berg, T 2007 ABCA1, ABCG1 and SR-BI: hormonal regulation in primary hepatocytes and human celle lines. BMB Mol Biol 8, 5-14.
4. Malerød, L, Sporstøl, M Jyvet, L, Mousavi, SA, Gjøen, T, Berg, T, Roos, N, Eskild, W 2005 Bile acids reduce SR-BI expression in hepatocytes by a pathway involving FXR/RXR, SHP and LRH-1. Biochem Biophys Res Commun, 336, 1096-1105.

Plenary speakers of the workshop:

Dr. Robin Wright, College of Biological Sciences, University of Minnesota, USA.

Professor and Associate Dean Robin Wright has led the development of the Student Learning Outcomes, which are now the approved standards by which undergraduate education at the University of Minnesota is measured. This has been based developing the effectiveness of team-based collaborative learning for more than 10 years. She is also very interested in how active learning classrooms support student learning and development of professional identities. Through her work with the Nature of Life program, she has begun to explore when and how students develop identities as biologists and how thatidentity impacts retention and graduation. Finally, through her work with the National Academies Alliance for Scientific Teaching and the new CourseSource journal, she is interested in faculty development and dissemination/adoption of specific teaching strategies.

Recent references:

1. Wright, R. 2014. It's not about you: A Simple Proposition for Improving Undergraduate Biology Education. Genetics *(in press).*
2. Wright, R. 2014. The Science Behind Parthenogenesis: Interesting things happen when meiosis goes "wrong". CourseSource *(in press).*
3. Wright, R., A. Connover, and R. Schnell. 2014. The Magic of Doctopus: A quick and easy way to deliver pre-named, pre-shared Google documents directly to your students' Google drive. Course Source *(in press).*
4. Pfund,C., S. Miller, K. Brenner, P. Bruns, A. Chang, D. Ebert-May, A.Fagen, J. Gentile, S. Gossens, I. Khan, J. Labov, C. M. Pribbenow, M. Susman, L. Tong, R. Wright, W. Wood, R.Yuan, J. Handelsman. 2009. Summer Institute to Improve Undergraduate Science Teaching. Science 324:470-471.
5. Wright, R., S. Cotner, and A. Winkel. 2009. Minimal impact of organic chemistry prerequisite on student performance in Introductory Biochemistry. Life Sci Educ. 8:44-54.

6. Wright, R. (2005) Points of View: Content versus Process: Is This a Fair Choice? Undergraduate Biology Courses for Nonscientists: Toward a Lived Curriculum; Cell Biology Education 4:189 -196.
7. Wright, R. and J. Boggs. 2002. Learning Cell Biology as a Team: A Project-based Approach to Upper-division Cell Biology. Cell Biology Education 1: 145-153.

Dr. Michael Caspersen, Centre for Science Education, University of Aarhus, Denmark.

Associate professor Caspersen is the director of the Centre for Science Education, which works to stimulate development oriented learning environments within technical and science related fields. Hence, its core activities are to initiate and participate in research and development activities that can motivate and qualify science teachers for developing their teaching and implementing new methods in their teaching. His work is based on a foundation of theory and evidence focusing on identifying, understanding and accommodating needs for educational development at the university, in upper secondary school and in other relevant parts of the educational sector.

Selected references:

1. Vicens, Q. and Caspersen, M.E. 2013 "Getting more scientists to revamp teaching"
Journal of College Science Teaching
2. Jens Bennedsen, Michael E. Caspersen, and Michael Kölling (Eds.) 2008
Reflections on the Teaching of Programming: Methods and Implementations
Lecture Notes in Computer Science, Volume 4821
Springer-Verlag

Dr. Jane Safell, Faculty of Medicine, Imperial College, London, UK.

Professor Saffell is a Senior Lecturer in the Department of Medicine **and** has been appointed Faculty of Medicine Academic Lead for Postgraduate Taught Courses**.** Dr Saffell is responsible for implementing the revision of the Faculty's Postgraduate Taught Courses programme and ensuring good communication channels between Departments, Faculty and the Graduate School. Dr. Saffell's considerable experience from her time in the Faculty of Natural Sciences and, more recently, in the Faculty of Medicine, has been central to enhancing the quality of the student experience.

Recent publications:

1. Neural cell adhesion molecule stimulates survival of premyelinating oligodendrocytes via the fibroblast growth factor receptor, 2009, Anne L. Palser, Adele L. Norman, Jane L. Saffell, Richard Reynolds, Journal of Neuroscience Research, 87, pp.3356-3368.
2. Morphoregulation by acetylcholinesterase in fibroblasts and astrocytes, 2008, Alexandra A. Anderson, Dmitry S. Ushakov, Michael A. Ferenczi, Ryoichi Mori, Paul Martin, Jane L. Saffell, Journal of Cellular Physiology. 215, pp. 82-100
3. Ligand concentration is a driver of divergent signaling and pleiotropic cellular responses to FGF, 2006, Mitla Garcia-Maya, Alexandra A. Anderson, Claire E. Kendal, Anna V. Kenny, Laura C. Edwards-Ingram, Andrew Holladay, Jane L. Saffell, Journal of Cellular Physiology 2, pp. 386-393
4. Elevated levels of neural recognition molecule L1 in the cerebrospinal fluid of patients with Alzheimer disease and other dementia syndromes, 2006, Helen Strekalova, Carsten Buhmann, Ralf Kleene, Christian Eggers, Jane Saffell, John Hemperly, Cornelius Weiller, Tomas Müller-Thomsen, Melitta Schachner,
Neurobiology of Aging 1, pp. 1-9

Dr. Francesco Michelangeli, School of Biosciences, University of Birmingham, UK.

Professor Michelangeli Senior Lecturer. He is the current head of Biochemistry degree programmes and teaches many aspects of biochemistry / biomedical sciences to undergraduates studying for degrees in Biochemistry, Biological Sciences, Medicine, Dentistry, Nursing studies and Biomaterial sciences.
More recently he has developed a compulsory final year biochemistry module, which trains the students in key analytical and problem solving skills, as well as giving all students an experience of 'real' research in a practical class setting prior to undertaking their research project.
Recent publications:
1. P. Lai & F. Michelangeli 2012 Bis(2-hydroxy-3-tert-butyl-5-methyl-phenyl)-methane (bis-phenol) is a potent and selective inhibitor of the secretory pathway Ca2+ ATPase (SPCA1) Biochem. Biophys. Res. Comm. 424, 616-619.
2. S. Costello, W. Alasari, J. Correia, S.K. Oxenham, L. Fernandes, J. Kirkman-Brown, F. Michelangeli, C. Barratt & S. Publicover 2013 Ca2+ signalling through CatSper and Ca2+ stores generates functional diversity in human sperm behavior. J. Biol Chem. 288, 6248-6258.
3. VKW Wong, T Li, BYK Law, EDL Ma, NC Yip, F Michelangeli, CKM Law, MM Zhang, KYC Lam, PL Chan, & L Liu 2013 Saikosaponin-d, a novel SERCA inhibitor induces autophagic cell death in apoptosis-defective cells. Cell Death & Disease 4, e720 .
4. F. Al-Mousa & F. Michelangeli 2014The sarcoplamsic-endoplasmic reticulum Ca2+-ATPase (SERCA) is the likely molecular target for the acute toxicity of the brominated flame retardant, hexabromocyclododecane (HBCD) Chemico-Biological Interactions 207; 1-6 .
5. O.A. Ogunbayo & F. Michelangeli 2014 Related flavonoids cause Cooperative inhibition of the the sarcoplasmic reticulum Ca2+ATPase by multimode mechanisms. FEBS Journal 281, 766-777.

Dr Estefania Mucino is a master student at Université Pierre et Marie Curie UPMC-Paris VI, Sorbonne Universities, Paris, France
Dr Mucino is member of The German Society for Biochemistry and Molecular Biology and represents the bachelor students at this meeting.

Professor Vigdis Vandvik, Department of Biology, University of Bergen, Norway.
Professor Vigdis Vandvik chairs the recently inaugurated Centre for Excellence in Biology Education (bioCEED), which explores learning methods and approaches across situations varying in theoretical and practical content, goals, and exposure to societal pressures and demands. The centre actively explores, encourages and supports the often called for shift from a teacher -centered to learner-centered education and helps change the focus from what instructors do to how students learn.
Recent publications:
1. Bargmann, Tessa; Måren, Inger Elisabeth; Vandvik, Vigdis. 2014. Life after fire: smoke and ash as germination cues in ericads, herbs and graminoids of northern heathlands. Applied Vegetation Science. 17: 670-679.
2. Esaete, Josephine; Eycott, Amy; Reiniö, Jenny; Telford, Richard; Vandvik, Vigdis. 2014. The Seed and Fern Spore Bank of a Recovering African Tropical Forest. Biotropica. 46: 677-686.
3. Meineri, Eric Pierre F; Skarpaas, Olav; Spindelböck, Joachim; Bargmann, Tessa; Vandvik, Vigdis. 2014. DUBLETT: Direct and size-dependent effects of climate on flowering performance in alpine and lowland herbaceous species. Journal of Vegetation Science. 25: 275-286.

4. Paulsen, Torbjørn Rage; Högstedt, Göran; Ken, Thompson; Vandvik, Vigdis; Eliassen, Sigrunn. 2014. Conditions favouring hard seededness as a dispersal and predator escape strategy. Journal of Ecology. 102: 1475-1484

Dr. Tone Fredsvik Gregers, University of Oslo, Oslo, Norway

Dr Gregers is senior lecturer at The Laboratory School in Biology, University of Oslo.

Recent publications:

1. Sand, KM, Landsverk, OJ, Berg-Larsesn, A, Bakke, O, Gregers, TF 2014 The human specific invariant chain isoform Iip35 modulates Iip33 trafficking and function. Immunol Cell Biol 92, 791.798.
2. Wälchli S, Kumari S, Fallang LE, Sand KM, Yang W, Landsverk OJ, Bakke O, Olweus J, Gregers TF 2014 Invariant chain as a vehicle to load antigenic peptides on human MHC class I for cytotoxic T-cell activation. Eur J Immunol. 44, 774-84.
3. Berg-Larsen A, Landsverk OJ, Progida C, Gregers TF, Bakke O 2013 Differential regulation of Rab GTPase expression in monocyte-derived dendritic cells upon lipopolysaccharide activation: a correlation to maturation-dependent functional properties. PLoS One. 8, e73538.
4. Malmstrøm M, Jentoft S, Gregers TF, Jakobsen KS. 2013 Unraveling the evolution of the Atlantic cod's (Gadus morhua L.) alternative immune strategy. PLoS One. 2013, 8, e74004.

Dr. Trine Meza, The Norwegian Competence Centre for education, NOKUT, Oslo, Norway

Dr. Meza is Assistant Deputy Director General – Department of Quality Assurance (Higher education – programmes)

Dr Gus Cameron, Department of Biochemistry, University of Bristol, UK

Dr. Gus Cameron is a Research Fellow in the Department of Biochemistry at the University of Bristol. He obtained his BSc and PhD degrees at the South Bank University in London and worked there as a Lecturer in Biochemistry before leaving to undertake research in the USA. Dr. Cameron returned to the UK to take up a position in the Department of Biochemistry at Bristol, where he has worked as Lecturer and Unit Organiser as well as the Faculty e-Learning Advisor. In 2008 Dr. Cameron led a successful bid for funding to develop eBioLabs, a Dynamic Laboratory Manual for the biosciences, and became the second Bristol ChemLabS University Teacher Fellow.

Recent publications:

1. Rothnie, A, Clarke, AR, Kuzmic, P, Cameron, G. Smith, CJ. 2011 A sequential mechanism for clathrin cage disassembly by 70-kDa heat-shock cognate protein (Hsc70) and auxilin. Proc Natl Acad Sci USA 108, 6927-6932.

2. Chaikuad, A, Shafqat, N, Al-Mokhtar, R, Cameron, G., Clarke, AR, Brady, R. L., Oppermann, U, Frayne, J. & Yue, WW 2011 Structure and kinetic characterization of human sperm-specific glyceraldehyde-3- phosphate dehydrogenase, GAPDS. Biochem J 435, 401 – 409.

3. Frayne, J., Taylor, A., Cameron, G., Hadfield, AT. 2009 Structure of insoluble rat sperm glyceraldehyde- 3-phosphate dehydrogenase (GAPDH) via heterotetramer formation with *Escherichia coli* GAPDH reveals target for contraceptive design. J Biol Chem 284, 22703 – 22712.

Dr. Jeremy Pritchard, School of Biosciences, University of Brimingham, UK

Professor Jeremy Pritchard is Senior Lecturer and Head of Education, School of Biosciences. He is involved in the development of knowledge transfer at a national level and chairs the Society of Experimental Biology (SEB) Education and Public Affairs Committee (EPA). I speak on outreach and PuS policy issues nationally (e.g. ASE, BSF, Wellcome Trust Science

Engagement). In addition he is a school admissions tutor for Biology and heavily involved in various school liaison projects that aim to address the public understanding of science.
Recent publications:
1. Shakesby AJ, Wallace IS, Isaacs HV, Pritchard J, Roberts DM, Douglas AE . (2009) A water-specific aquaporin involved in aphid osmoregulation: *Insect Biochemistry and Molecular Biology* **39:** 1-10.
2. Kerton M, Newbury HJ, Hand D. Pritchard J. (2009) Accumulation of calcium in the centre of leaves of coriander (*Coriandrum sativum* L.) is due to an uncoupling of water and ion transport. *Journal of Experimental Botany* 60: 227-235.
3. Tseng, HM; Gattollin, S; Pritchard, J, Newbury HJ, Barett DA (**2009)** Analysis of mono-, di- and oligosaccharides by CE using a two-stage derivatization method and LIF detection *Electrophoresis* **30:** 1399-1405.
4. Daniels M, Bale JS, Newbury HJ, Lind RJ, Pritchard J. (2009). A sublethal dose of thiamethoxam causes a reduction in xylem feeding by the bird cherry-oat aphid (*Rhopalosiphum padi*), which is associated with dehydration and reduced performance. *Journal of Insect Physiology* **55:** 758-765
5. Gattolin, S Hunt, E Newbury, HJ Bale, JS Tseng, HM Barrett, DA Pritchard, J (2010) A mutation in amino acid permease AAP6 reduces the amino acid content f the Arabidopsis sieve elements but leaves aphid herbivores unaffected *Journal of Experimental Botany* **61:** 55-64.

Dr. Julian Park, School of Agriculture, Policy and Development, University of Reading, UK

Professor Julian Park is Head of School and Director of Teaching and Learning at University of Reading.
In 2008 he was appointed National Teaching Fellow. As well as being an award-winning lecturer, Julian has been associated with a range of pedagogic projects linked to assessment, including the development of web resources, He was one of the founding members of the Applied Undergraduate Research Skills Centre of Excellence in Teaching and Learning.
Recent publications:
1. McFarlane, I., Park, J. and Ceddia, G. (2014) The extent to which potential benefits to EU farmers of adopting transgenic crops are reduced by cost of compliance with coexistence regulations. AgBioForum, 17, pp. 37-43.
2. Arpaia, S., Messéan, A., Birch, N. A., Hokannen, H., Härtel, S., Van Loon, J., Lovei, G., Park, J., Spreafico, H., Squire, G. R., Steffan-Dewenter, I., Tebbe, C. and Van der Voet, H. (2014) Assessing and monitoring impacts of genetically modified plants on agro-ecosystems: the approach of AMIGA project. Entomologia, 2, 79-86.
3. Gadanakis, Y., Bennett, R., Park, J. and Areal, F. (2014) Evaluating the sustainable intensification of arable farms. Journal of Environmental Management. ISSN 0301-4797 (In Press)
4. Mauchline, A. L., Peacock, J. and Park, J. R. (2013) The future of bioscience fieldwork in UK higher education. Bioscience Education, 21, 7-19.
5. Welsh, K. E., Mauchline, A. L., Park, J. R., Whalley, W. B. and France, D. (2013) Enhancing fieldwork learning with technology: practitioner's perspectives. Journal of Geography in Higher Education 3, 399-415.
6. Orsmond, P., Maw, S. J., Park, J. R., Gomez, S. and Crook, A. C. (2013) Moving feedback forward: theory to practice. Assessment & Evaluation in Higher Education, 38, 240-252.
5. Gomez, S., Andersson, H., Park, J., Maw, S., Crook, A. and Orsmond, P. (2013) A digital ecosystems model of assessment feedback on student learning. Higher Education Studies, 3.

Explain how this activity fits the vision and funding priorities of IUBMB Education (see http://www.iubmb.org/index.php?id=70)

This Education Workshop will contribute to improving the way life science is taught to students in this field at the university level. Experienced scientists/educators from USA, Europe and Scandinavia have confirmed their participation thus bringing together highlevel expertise from around the world. During the workshop speakers and participants will spend time discussing the various alternatives to traditional teaching and have the opportunity to experiment with virtual laboratory exercises.

The applicants:

Dr. Gul Guner-Akdogan, in the name of FEBS Education Committee, is the Chair of this Committee. FEBS is, actually, a regional associated organization for IUBMB.

Dr. Winnie Eskild is Deputy Treasurer of FEBS and has served as Secretary General of The Norwegian Biochemical Society (2005-2012).

IUBMB is not the sole supporter of the event. If the proposal is accepted, IUBMB will be co-sponsoring with FEBS and The Norwegian Biochemical Society, a member of FEBS.

An application for support will also be submitted to The Faculty of Mathematics and Natural Sciences, University of Oslo. This money would be spent Young Scientist Travel Awards. There will be a number of participants who will receive a Young Scientist travel award from FEBS- the number is not predictable at the moment. FEBS will also cover the dissemination costs of the Event- in FEBS News (both before and after the event), on posters in many lecture halls, and in the scientific program of the FEBS Congress. IUBMB will contribute to the travel and accommodation expenses of some of the invited speakers. The Norwegian Biochemical Society will be offering the coffee breaks, the opening reception, and the second day lunch. In summary, there will be “co-sponsorship”.

Breakdown of budget (itemise all costs of the activity, and show all sources of funding support)

Announcements € 500

Workshop hall and group rooms € 800

Tables and computers € 700

Audiovisual and teaching

Material € 1130

Travel cost of:

Gül Guner-Akdogan € 650

Francesco Michelangeli € 450

Jeremy Pritchard € 450

Mikael Caspersen € 350

Jane Saffell € 450

Robin Wright € 2400

Estafania Mucino Castillo € 350

Gus Cameron € 600

Vigdis Vandvik € 250

Tamara Tjitrowirjo € 300

Julian Park € 450

Accomodation costs:

Eleven persons for three days

(11 X 3 X €150) € 4950

One person for six days
(1 X 6 X 150) € 900
SUBTOTAL FEBS and IUBMB € 15680
To be covered by FEBS € 7840

Requested from IUBMB € 7840 (= $ 9763)