

# IBO 2015

## FINAL REPORT



INTERNATIONAL  
BIOLOGY OLYMPIAD  
2015 AARHUS DENMARK



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## IBO2015 · FINAL REPORT

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# FINAL REPORT

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INTERNATIONAL  
BIOLOGY OLYMPIAD  
**2015 AARHUS DENMARK**

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# PREFACE



# PREFACE • PART I

**Organising an International Biology Olympiad is an extremely comprehensive task for the host country. This final report documents the planning as well as the implementation of the 26th International Biology Olympiad 2015 (IBO2015) in Aarhus, Denmark.**

In order to share experiences while preparing for IBO2015, a progress report was finalised on December 1, 2014. This report was sent to the IBO Coordinating Centre in Prague as well as to a few selected IBO jury members in order to inform about the progress. A few suggestions for improvements were received from the IBO Coordinating Centre. A second progress report was planned for the period from December 1, 2014, to March 15, 2015, but only an internal document was developed.

Future IBO hosts can request this internal report from the IBO2015 Project Coordinator.

The final report follows the general outline of the final report of IBO2013 in Bern. It is a joint effort by Annika Büchert Lindberg (IBO Project Manager), Jens Mogens Olesen (Chair of Scientific Committee), Kristine Bilgrav-Nielsen (Head of Communication), Nanna Teisner (Head of Guides) and Christian Haaber Rasch.

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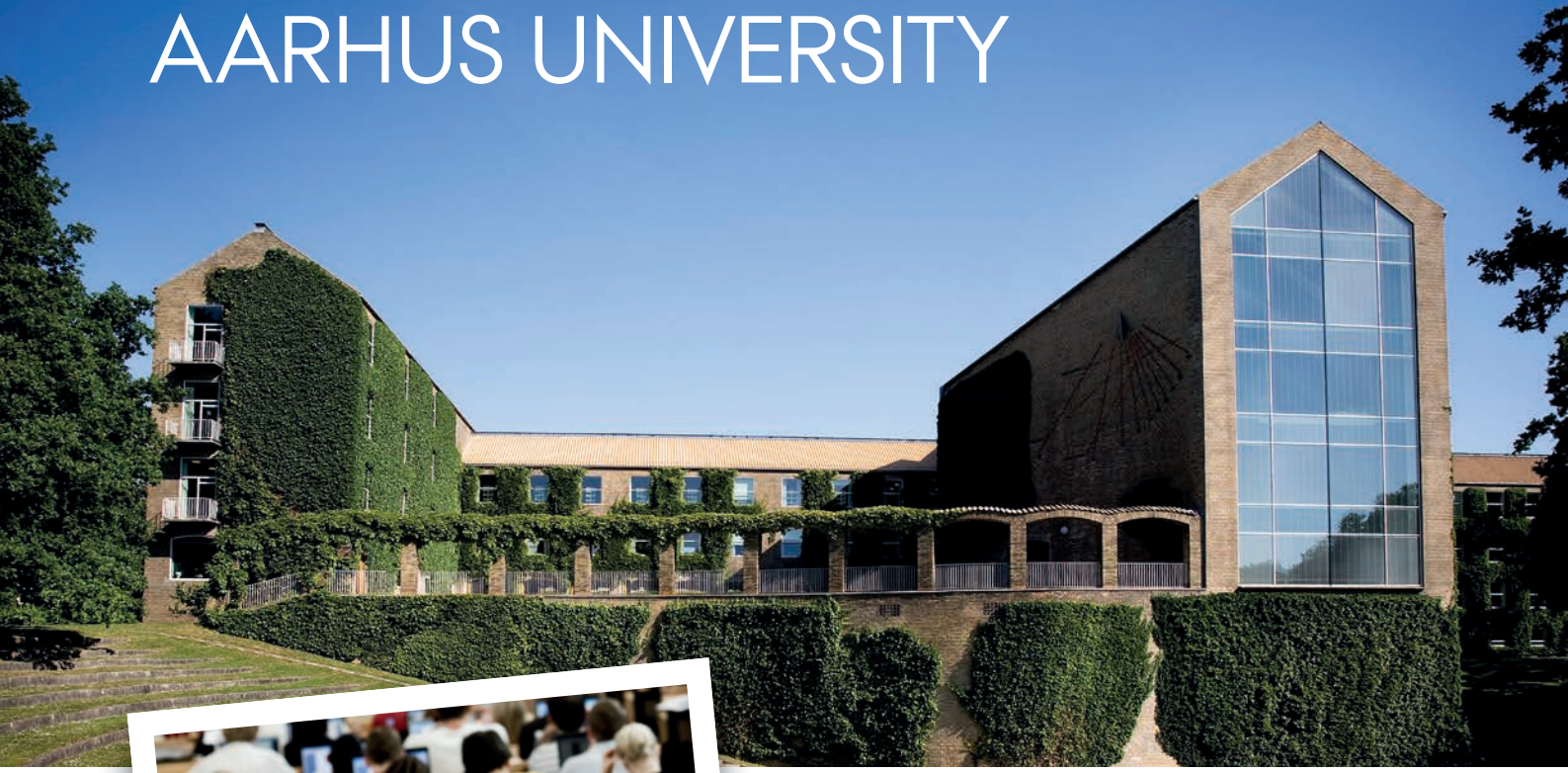
Aarhus, Denmark December 2015

**Annika Büchert Lindberg**  
IBO Project Manager

**Erik Meineche Schmidt**  
Chair of Organising Committee



# AARHUS UNIVERSITY





# CITY OF AARHUS DENMARK



Welcome to the  
IBO2015 host city



ARHUS UNIVERSITY HOSTED THE EVENT  
WHERE 62 IBO MEMBER COUNTRIES AND FOUR  
OBSERVER COUNTRIES PARTICIPATED



# IB 2015

## IN A

## NUTSHELL





# IBO2015 IN A NUTSHELL ♻️ PART 2

The 26th International Biology Olympiad, IBO2015, was held on July 12-19, 2015, in Aarhus, Denmark. Aarhus University hosted the event where 67 IBO member countries and four observer countries were invited. In total, 459 participants (from 62 IBO member countries and four observer countries) took part in IBO2015 together with 109 support staff.

IBO2015 was sponsored with DKK 10.350.000, which covered all expenses excluding the in-kind contribution from the host, Aarhus University, as well as the Technical University of Denmark.



From the IBO2015 opening ceremony







BRIGHT MINDS FROM  
ALL OVER THE WORLD  
- GATHERED IN ONE PLACE





## IBO2015 OPENING CEREMONY AND CULTURAL DIVERSITY



## 2.1 IBO FACTS AND FIGURES

|               |                          |
|---------------|--------------------------|
| Venue         | Aarhus, Denmark          |
| Dates         | July 12-19, 2015         |
| Fund/Expenses | 10.350.000 Danish kroner |

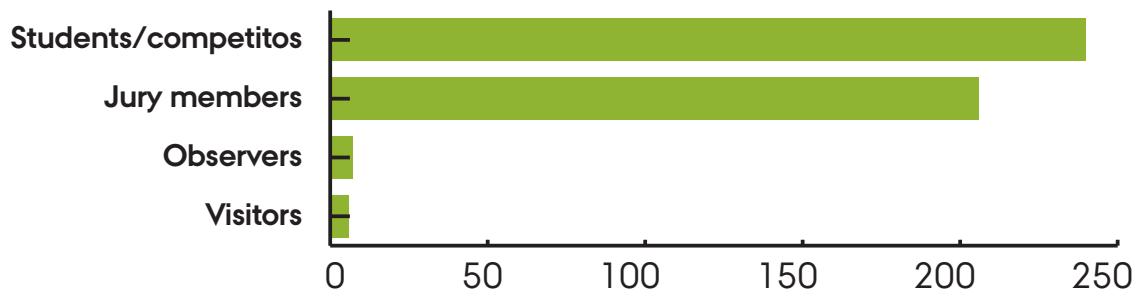


Figure 2.1: Number of different IBO2015 participants

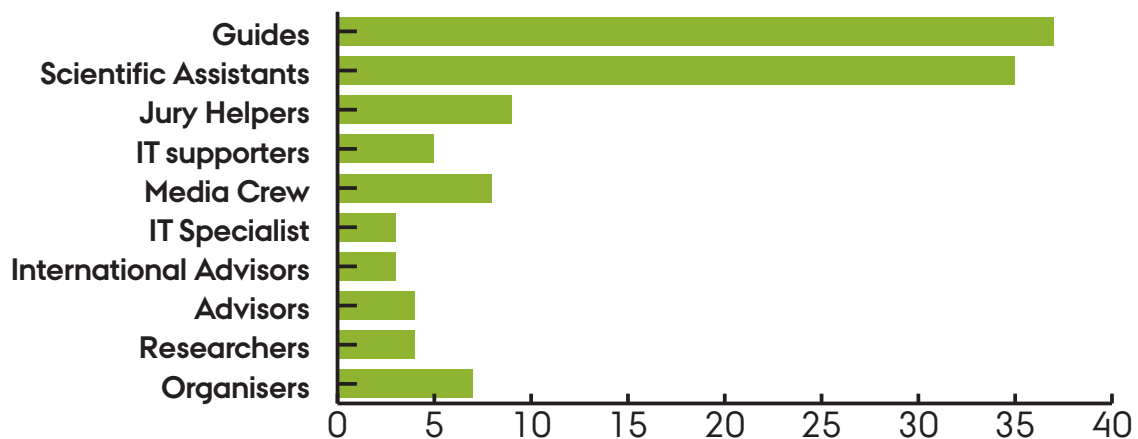


Figure 2.2: Number of different IBO2015 personnel



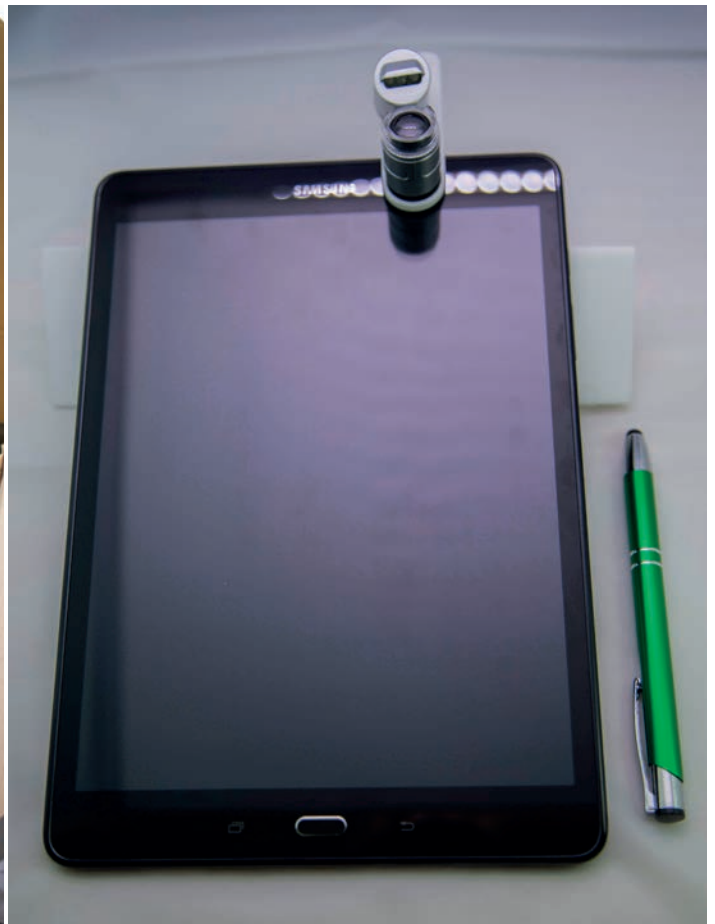
## 2.2 EXAMS

The competitors/students were during IBO2015 tested in four practical exams and two theoretical exams. The four practical exams (90 minutes each) tested laboratory skills, planning of practical work, precision and biological knowledge. The two theoretical exams (three hours each) included 98 multiple true/false questions that tested the students' abilities to calculate, analyse, compare, deduct and, to a minor degree, recall knowledge within all major biological disciplines.

**All exams were translated from the official English and Russian versions into the native languages of the delegations (40 languages). The jury members discussed and translated the four practical exams in one day and hereafter the theoretical exams in two days.**

| Duration            |                                                      |
|---------------------|------------------------------------------------------|
| Practical exams     | 1. Plant anatomy, biosystematics and evolution       |
|                     | 2. Molecular biology and microbiology                |
|                     | 3. Animal functional morphology                      |
|                     | 4. Biochemistry                                      |
| Number of questions |                                                      |
| Theoretical exams   | 25% Animal anatomy and physiology                    |
|                     | 20% Cell biology, molecular biology and microbiology |
|                     | 20% Genetics, population genetics and evolution      |
|                     | 15% Plant anatomy and physiology                     |
|                     | 10% Ecology                                          |
|                     | 5% Ethology                                          |
| 5% Biosystematics   |                                                      |





TABLETS WERE USED IN BOTH PRACTICAL AND THEORETICAL EXAMS





## 2.3 PROGRAMME FOR THE STUDENTS AND JURY MEMBERS

### Student programme

#### SUNDAY, JULY 12

Till 15:00 – Arrival and Registration, Hotel Radisson  
 16:00-18:00 – Opening Ceremony, Concert Hall Aarhus  
 18:00-20:30 – Welcome Reception, Concert Hall Aarhus  
 20:30 – Bus departs  
 21:00 – Welcome Evening and Ice Breakers, Helnan Marselis Hotel

#### MONDAY, JULY 13

7:00-8:00 – Breakfast, Helnan Marselis Hotel  
 8:30 – Bus departs  
 9:30-13:00 – Visit four places: Lab equipment at Aarhus University, The Open-Air Museum, The Greenhouses in the Botanical Garden and Natural History Museum.  
 13:00-14:00 – Lunch, the Greenhouses or Aarhus University  
 14:00-14:15 – Walk to next place  
 14:15-18:30 – Continue visiting the four places  
 19:00-20:00 – Dinner, Aarhus University  
 20:00 – Bus departs to Helnan Marselis Hotel

#### TUESDAY, JULY 14

7:00-7:30 – Breakfast, Helnan Marselis Hotel  
 8:00 – Bus departs  
 9:00-10:30 – Practical Exam 1  
 10:30-11:30 – Change place and break  
 11:30-13:00 – Practical Exam 2  
 13:00-14:30 – Change place and lunch  
 14:30-16:00 – Practical Exam 3  
 16:00-17:00 – Change place and break  
 17:00-18:30 – Practical Exam 4  
 18:30-20:00 – Dinner, Aarhus University  
 20:00 – Bus departs  
 20:30 – Social night, Helnan Marselis Hotel

#### WEDNESDAY, JULY 15

7:00-7:30 – Breakfast, Helnan Marselis Hotel  
 8:00 – Bus departs  
 10:00-14:00 – Excursion to the Ecolarium  
 14:00 – Bus departs  
 15:00-20:00 – Excursion to Legoland  
 20:00 – Bus departs

#### THURSDAY, JULY 16

7:00-8:00 – Breakfast, Helnan Marselis Hotel  
 8:30 – Bus departs  
 9:30-12:30 – Theoretical Exam 1  
 12:30-13:45 – Lunch, Aarhus University  
 14:00-17:00 – Theoretical Exam 2 (17-18 – Phone pick up)  
 18:00-21:00 – Cultural Night, Aarhus University  
 21:00 – Bus departs

#### FRIDAY, JULY 17

7:00-8:30 – Breakfast, Helnan Marselis Hotel  
 9:00 – Bus departs  
 9:30-13:00 – Tour of Aarhus City  
 13:15 – Bus departs  
 14:00-17:00 – Excursion to Moesgaard Museum  
 17:30 – Bus departs  
 18:00-20:15 – Dinner, Helnan Marselis Hotel  
 20:15 – Social Night, Jury members visit Helnan Marselis Hotel

#### SATURDAY, JULY 18

7:00-10:00 – Breakfast, Helnan Marselis Hotel  
 10:00-13:00 – Fun and play, Helnan Marselis Hotel  
 13:30 – Bus departs  
 15:00-17:30 – Closing Ceremony  
 18:30-00:00 – Gala dinner and party, Centralværkstedet  
 00:00 – Last bus departs

#### SUNDAY, JULY 19

7:00-10:00 – Breakfast, Helnan Marselis Hotel  
 All day – Departures

### Jury programme

#### SUNDAY, JULY 12

Till 15:00: Arrival and Registration, Hotel Radisson  
 16:00-18:00 – Opening Ceremony, Concert Hall Aarhus  
 18:00-20:30 – Welcome Reception, Concert Hall Aarhus

#### MONDAY, JULY 13

07:00-08:30 – Breakfast, Radisson Blu Hotel  
 09:00-13:00 – Jury session, practical exams  
 13:00-14:00 – Lunch  
 14:00-19:00 – Jury session, practical exams  
 19:00-20:00 – Dinner  
 ? Upload of final version of practical exams

#### TUESDAY, JULY 14

07:00-08:30 – Breakfast, Radisson Blu Hotel  
 09:00-13:00 – Jury session, theoretical exams  
 13:00-14:00 – Lunch  
 14:00-19:00 – Jury session, theoretical exams  
 19:00-20:00 – Dinner  
 20:00 – Relax

#### WEDNESDAY, JULY 15

07:00-08:30 – Breakfast, Radisson Blu Hotel  
 09:00-13:00 – Jury session, theoretical exams  
 13:00-14:00 – Lunch  
 14:00-19:00 – Jury session, theoretical exams  
 19:00-20:00 – Dinner  
 ? Upload of final version of the theoretical exams

#### THURSDAY, JULY 16

07:00-09:00 – Breakfast, Radisson Blu Hotel  
 09:30-10:00 – Find bus outside Radisson  
 10:00-18:00 – Excursion to Silkeborg and Himmelbjerget  
 18:00-21:00 – Cultural Night, Aarhus University

#### FRIDAY, JULY 17

07:00-08:00 – Breakfast, Radisson Blu Hotel  
 09:00-09:15 – Inspectores report from theoretical tests  
 09:15-13:00 – Review exams and approval of raw score  
 13:00-14:00 – Lunch  
 14:00-18:00 – Coordinators meeting  
 18:00-19:00 – Final approval of ranking  
 19:00-20:00 – Dinner  
 20:00-20:15 – Bus to Hotel Helnan Marselis  
 20:15-22:00 – Social night, Helnan Marselis

#### SATURDAY, JULY 18

07:00-09:00 – Breakfast, Radisson Blu Hotel  
 10:00 – Optional programme: educational session at Radisson Blu Hotel, excursion to Moesgaard Museum or free time  
 12:00-13:00 – Lunch (sandwich to go)  
 15:00-17:30 – Closing Ceremony, Concert Hall Aarhus  
 18:30-00:00 – Gala dinner and party, Centralværkstedet

#### SUNDAY, JULY 19

07:00-10:00 – Breakfast, Radisson Blu Hotel  
 All day – Departures



## 2.3 IBO2015 CHARACTERISTICS

In 2013, the theoretical exams were digitised with a system for translation and for the conduction of the theoretical exams on tablets. During IBO2015, the software from 2013 was extended to include the practical exams. The practical exams are more diverse, have longer texts and require multiple ways of answering. The students read the protocol for the practical exams on the tablets and answered the exams with numbers, multiple choice answers and by photos taken with the tablets. Some photos were taken with a small click-on microscope attached to the tablet.

Furthermore, the news and communication during IBO2015 was digitised, and the traditional daily newspaper was replaced by IBOnews, in which online videos showed the events of the day. The students could follow the IBOnews on secured tablets that prohibited other websites than IBOnews.

The focus on sustainability was predominant in the merchandise given to the participants. Whenever possible, the participants could bottle clean Danish drinking water into their water bottles from Aarhus Water, just to give one example.

**Right:** Students practicing taking pictures with click-on microscope the day before the exam

IBO2015 WAS  
CHARACTERISED BY THE  
FOCUS ON **DIGITISATION**  
AND **SUSTAINABILITY**



# INNO VATIONS

IBO2015 OFFERED LOTS  
OF INSPIRING ACTIVITIES  
AND EXCITING EXPERIENCES





IBO is in many ways an event steeped in tradition, but IBO2015 took the liberty of shaking things up a bit and offered lots of inspiring activities and exciting experiences.

## 3.1 DIGITAL INNOVATIONS



IBO2015 wanted to be more digitised than previous IBOs. This was done in the following way.

### 3.1.1 TABLET EXAMS

A programme for implementation of practical exams on tablets was developed for IBO2015, and for the first time, tablets were used for conducting both the practical exams as well as the theoretical exams. This was achieved by redesigning the tablet programme for running the theoretical exams that was developed for IBO2013. In addition, the translation programme for theoretical exams used in IBO2013 was developed to include the translation of the practical exams.

### 3.1.2 ONLINE ANSWER SHEET FOR PRACTICAL EXAMS

The protocols for the four practical exams were adjusted to fit a tablet format, and the answering possibilities were extended to accommodate the specific practical exam. The use of tablets increased focus on testing biological knowledge and skills by reducing the testing of simple calculation skills. In addition, the digital answering of practical exams enabled students to take their own photos during the exam. With a click-on microscope, these photos could also be taken of smaller plant organs.

Testing the tablets



### 3.1.3 INTRODUCTION VIDEOS AND DK QUIZ

Prior to the IBO2015, three introductory videos were uploaded, which gave the students an opportunity to learn about the equipment for the practical exams beforehand.

To make sure that no students were disadvanta-

ged due to little experience with tablets and click-on microscopes, as well as the exam format and the different types of questions they experienced during the IBO2015 exams, we developed a quiz about Denmark. The quiz featured all the different answering types and in addition gave the students an insight into Danish culture, geography and the city of Aarhus before they arrived at IBO2015.

## 3.2 OTHER INNOVATIONS

### 3.2.1 INTERNATIONAL ADVISORS

The quality of the theoretical and practical exams is the key to a successful IBO. As in previous IBO's, a sub-jury met four days before the IBO2015 to discuss and improve the quality of the exams. As

a new initiative, three members of the sub-jury were selected as International Advisors. They visited Denmark in January to give an early input and quality assurance of the exams, which could be incorporated.

---

**Below:** The tablets are being tested before the practical and theoretical exams

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### 3.2.2 INSPECTORS ON ALL LOCATIONS

It is important that all IBO exams run as fair and smoothly as possible and that all students are secured optimal and equal conditions. Therefore, a team of inspectors was selected among the jury members. Their duty was to be present in all laboratories during the practical exams and in all auditoriums during the theoretical exams. The inspectors reported the problems that occurred during the exams and how these problems were handled. Afterwards, the inspectors reported to the jury members that all problems were dealt with professionally by the scientific assistants and confirmed that affected students were awarded additional exam time if necessary.

### 3.2.3 IBONEWS

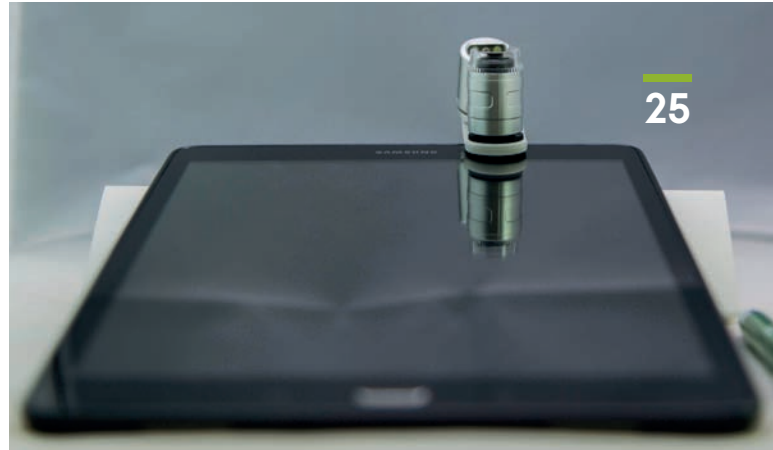
IBOnews was created to make coherence between the jury and the students during IBO2015. The daily online videos provided a more lively and present expression. Read more about IBOnews in 5.7.3.

### 3.2.4 IBOMAGAZINE

IBOmagazine was created instead of the traditional daily newspaper. It provided the opportunity to write more detailed and thorough articles. Read more about IBOmagazine in 5.7.3.

### 3.2.5 SPEED DRAWINGS

IBO2015 wanted to provide the audience with surprising elements during the ceremonies. So instead of a traditional presentation of the delegations at the opening ceremony, speed-drawings that presented each delegation and showed significant cultural and/or biological features of each delegation's country were shown.



After exam: "My mind is empty. I used it all" – Arne, Belgium



# IBO2015 MERCHANDISE

WOOD ON  
A STICK



GENUINE TAP WATER



ORGANIC BAG







CORN CALCULATOR

SUPPORTING THE IDENTITY OF THE EVENT & PARTICIPANTS  
- WITH A SUSTAINABLE FOCUS





### 3.2.6 VOUCHER

It was difficult to imagine what type of Danish present the IBO participants would value. Therefore, the Cultural Night on July 16 offered many possibilities to obtain different kinds of souvenirs. All participants received a voucher for 75 Danish kroner to trade for a souvenir. The students received their vouchers after finishing the theoretical exams as they had their phones handed back to them. The jury members received their vouchers in the busses on the way back from the excursion to Silkeborg. The souvenirs included Danish Viking

beer, Danish honey, biological “teddy” cell (blood cells, brain neurons, Ebola virus, etc.) and LEGO bricks.

### 3.2.7 ORGANIC MERCHANDISE

The participants received different merchandise with a sustainable focus. The T-shirts and tote bags were made out of organic fairtrade cotton. The students got a calculator produced from corn, and jury members received an USB-stick made out of wood. If it rained during the week, the participants could use IBO umbrellas, which are a part of the Aarhus city recycling umbrella system. All participants received a water bottle from Aarhus Water that they used the entire week where tapping their own drinking water.

### 3.2.8 FORMER IBO PARTICIPANTS AS HOSTS

For the opening and closing ceremonies, two Danish former IBO participants were chosen as



hosts. We wanted the hosts to be as integrated and passionate about IBO as any of the participants and organisers. The hosts used their own experiences and their relation to the people behind IBO as the foundation for their presentations on stage. It was clear that the participants felt a special relation with the hosts, who also worked as student guides during the week. The hosts certainly added a personal and unique quality to the ceremonies. Read more about the ceremonies at 5.3.1.

### 3.2.9 FAREWELL PARTY

After the closing ceremony, it was important for us that there was a joint celebration for all participants. We wanted to make sure that both students, jury members and organisers had a party together where they could relax, have fun and talk about the week. Read more at 5.3.3.

Due to a delay of the ranking results for the students the medals were given at the Farewell party and not during the closing ceremony. This delay resulted in a relaxed ceremony.



Two former IBO participants passionately played the role as hosts at the ceremonies.



# ORGA- NISATION

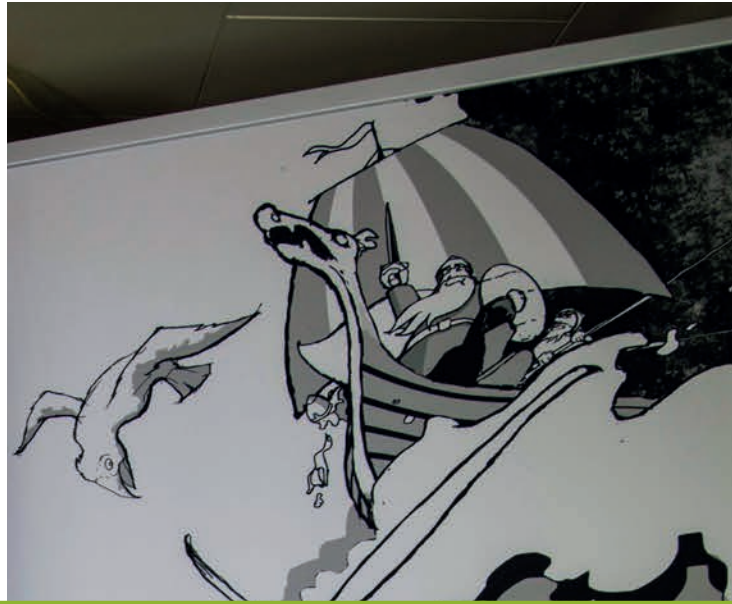
IN 2011, AARHUS UNIVERSITY  
AGREED TO HOST IBO2015





# ORGANISATION

## ❁ PART 4



## 4.1 THE HISTORY OF NBO AND IBO2015

In 2004, Denmark sent observer Birthe Zimmermann to Brisbane, Australia, and from 2005 to date, Denmark has been a member country of IBO. High school teachers Kirsten Wøldike, Birthe Zimmermann and Vibeke Birkmann have constituted the Steering Committee of the National Biology Olympiad (NBO).

Aarhus University has been involved in the finals of the NBO for many years, and in 2011, the Dean of Faculty of Science and Technology, Erik Meineche Schmidt, agreed to host IBO2015.

**For further information about the history, please see progress report 1.**



## 4.2 IBO2015 ORGANISATION

IBO2015 was organised in three closely related units with several members represented in more than one unit.

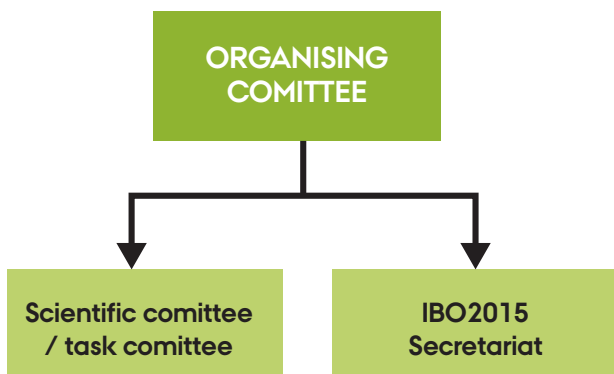


Figure 4.1: IBO2015 organisation

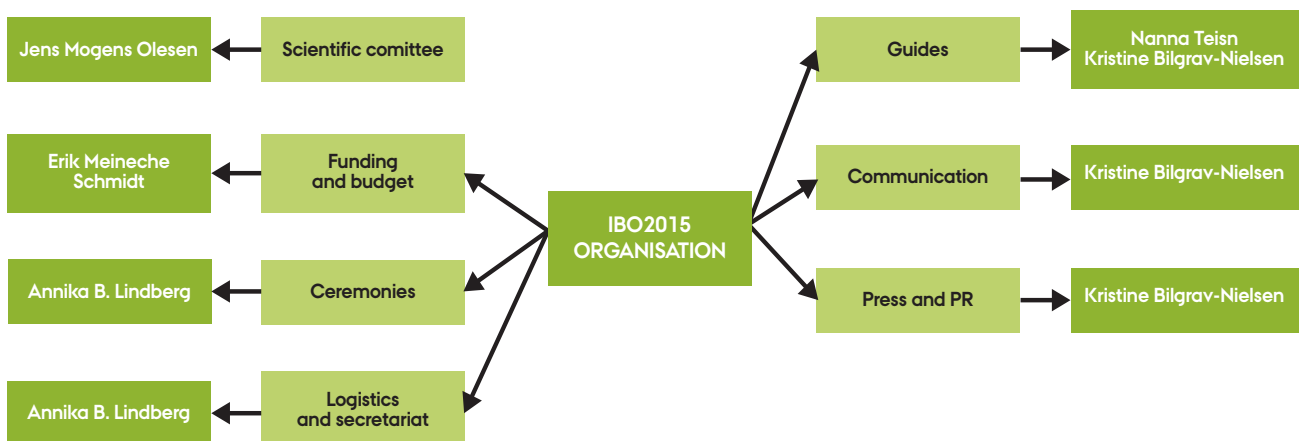
### 4.2.1 ORGANISING COMMITTEE.

The Organising Committee was responsible for all strategic decisions concerning the organisation of IBO2015. The Organising Committee supervised the work of the main responsible person of each sub-unit and was itself directly involved in this work. The main responsible persons are shown below.

The Organising Committee consisted of:

- Chair of Organising Committee: Erik Meineche Schmidt, Chief Advisor, Aarhus University
- Chair of Scientific Committee: Jens Mogens Olesen, Professor, Aarhus University

Figure 4.2 IBO2015 main responsible for major organisation units. Each unit was further subdivided into sub-units with additional responsible persons



- National IBO Coordinator: Kirsten Wøldike
- IBO2015 PR Coordinator: Jens Holbech, Chief Advisor, Aarhus University
- IBO2015 Project Coordinator: Annika Büchert Lindberg, Special Consultant, Aarhus University

The Organising Committee started up in 2011 and the Project Coordinator was assigned at this stage. The final members of the Organising Committee were determined in 2012.

## 4.2.2 SCIENTIFIC COMMITTEE

The IBO2015 Scientific Committee was responsible for overseeing the development of the theoretical questions and practical tasks as well as the development of IT support and logistic organisation of the tests.

### **The Scientific Committee consisted of:**

- Chair of Scientific Committee: Jens Mogens Olesen, Professor, Aarhus University
- Vice-chair of Scientific Committee: Vibeke Birkmann, High school teacher, Greve Gymnasium
- Chair of inspectors: Birthe Zimmermann, High school teacher, Alsundgymnasiet, Sønderborg
- National IBO Coordinator: Kirsten Wøldike
- Head of Logistics for practical tests: Rasmus Buchanan, Academic staff, Aarhus University

## 4.2.3 IBO2015 SECRETARIAT

The IBO2015 Secretariat aided the Project Manager with creating coherence between the major organisational themes as well as organising and implementing plans within these.

The IBO2015 Secretariat was officially established at Aarhus University in 2014 and obtained an IBO office. The members were two permanent staff (working 25% in 2012-2013, 50% in 2014 and 100% in 2015 on IBO) and two student assistants (one working 12 hours/week since 2013 and one assistant 8 hours/week since 2014. In 2015, the number of hours/week increased for both student assistants).

### **The IBO2015 secretariat consisted of:**

- IBO2015 Project Coordinator: Annika Büchert Lindberg, Special Consultant, Aarhus University
- Chair of Scientific Committee: Jens Mogens Olesen, Professor, Aarhus University
- Head of Communication: Kristine Bilgrav-Nielsen, Student Assistant, Aarhus University
- Head of Guides: Nanna Teisner, Student Assistant, Aarhus University





# IBO 2015

“ THE IDENTITY COMMUNICATES THE NORDIC,  
SUSTAINABILITY AND INNOVATION



INTERNATIONAL  
BIOLOGY OLYMPIAD  
**2015 AARHUS DENMARK**



INTERNATIONAL  
BIOLOGY OLYMPIAD  
**2015 AARHUS DENMARK**

## 5.1 LOGO

**The IBO2015 logo was designed by Astrid Friis Reitzel, Aarhus University.**

The designer's own description of the logo: "The identity communicates the Nordic mentality, sustainability and innovation. At the same time, the expression should be ORGANIC/NORDIC/SIMPLE.

Biology is per definition the science of the origin of living organisms, evolution, development of life forms and their interaction with the surrounding environment.

This is the basis for the IBO2015 logo, and the identity is therefore the smallest building block within us, the cell. The cell is the smallest unit in all living organisms and is common for all life."

The main logo was green, and indicated IBO2015 and the students, as shown above, but it was also used in three additional colour codes to indicate the different people involved: jury (blue), student guides (pink), all other helpers, supporter, organisers etc. (yellow).



ORGANIC



NORDIC



SIMPLE

## 5.2 FUNDING AND BUDGET

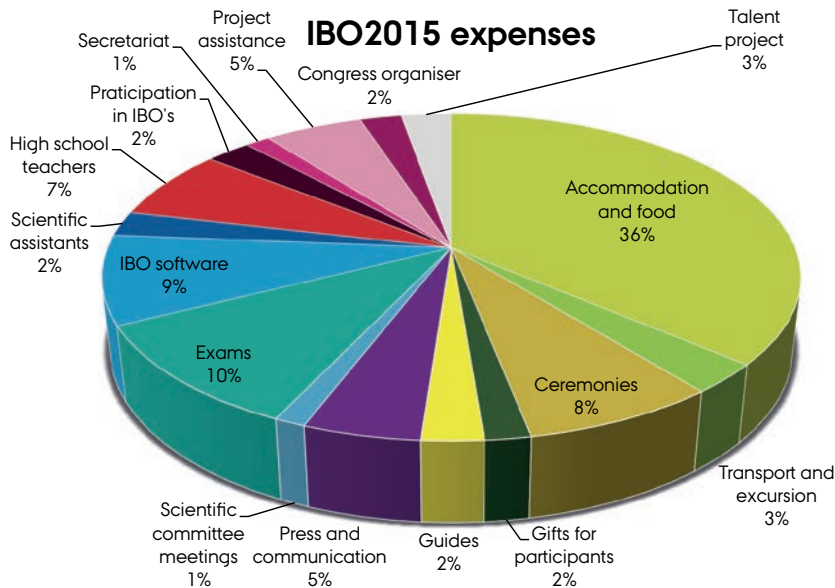


Figure 5.1: Expenses of each budget line as percentage of the overall expenses.

A total of 10.350.000 DKK was secured through major donations from the Danish Ministry of Education and five private funds (Villumfonden, Novo Nordisk fonden, Lundbeckfonden, A.P. Møllerske støttefond, Carlsbergs Mindelegat) and smaller donations (Knud Højgaards fond and Region Midtjylland). In-kind contributions from the Technical University of Denmark were provided through the development of two of the practical exams, and in addition to developing two additional practical exams, Aarhus University accommodated the IBO2015 Secretariat and provided staff for the Organising Committee and the Scientific Committee. A major part of the programme for the competitors was held in auditoriums and labs at Aarhus University. The funds were sufficient to secure the expenses during IBO2015.

### 5.2.1 FEES

According to the IBO guidelines, the IBO fee for a delegation is approx. 2.000 USD, equivalent to 12.000 DKK. The IBO2015 fee was split into a lower fee before March 1, 2015, and a higher fee after March 1 to reflect that organisation, prices and workload is lower for the host if countries and delegations register early.

| IBO2015 fee                 | Delegation | Additional jury member | Visitor |
|-----------------------------|------------|------------------------|---------|
|                             | DKK        | DKK                    | DKK     |
| <b>Before March 1, 2015</b> | 10.000     | 10.000                 | 10.000  |
| <b>From March 1, 2015</b>   | 14.000     | 14.000                 | 14.000  |

Figure 5.2: IBO2015 fees

43 countries registered before March 1, 2015, and 32 countries had also paid at this point.



## 5.3 PROGRAMME



The IBO2015 Secretariat made an overall programme for students and jury members, which was put on the website in the autumn of 2014. The final programmes are shown in 2.3. In the beginning of 2015, the organisers started developing specific and detailed programmes for the different groups of support staff working with IBO2015: Guides, Jury Helpers, researchers, Scientific Assistants and IT Supporters.

With inspiration from the jury member programme for IBO2013, the organisers of IBO2015 also developed a detailed programme for the jury members to ensure sufficient time for translation, reporting from sub-jury and inspectors, and discussions with the researchers who developed the practical and theoretical exams as well as the marking and approval of scores.

Minor delays were experienced in the student programme due to Wi-Fi and software problems. Similar Wi-Fi problems created delays during the translation, and software problems delayed the correction and approval of exams in the jury programme.

### 5.3.1 CEREMONIES

The Concert Hall in Aarhus was the venue for the opening and closing ceremonies. The Organising Committee wanted to create ceremonies with a Danish touch right from the start of IBO2015. An

important part of this atmosphere was promoted by the two former IBO students hosting both ceremonies. On stage, they provided the audience with anecdotes of their own time at the IBO and presented the delegations, the speakers and the musical entertainment (see also 3.2.8). In addition, an IBO2015 orchestra was on the stage during both ceremonies. The two musicians Peter Vuust and Per Frost organised the musical entertainment and invited a performing artist for each ceremony. Both ceremonies were tightly managed by professional stage manager Jes Busk.

During the opening ceremony, the focus was on the formality of presenting the students, but it was also important to convey a relaxed and comfortable atmosphere and provide the audience with some surprising elements. Each student delegation entered the stage accompanied by a speed drawing that described their country and its nature together with live music inspired by music from their homeland. Another surprising element was that musician Peter Vuust is an esteemed brain scientist at Aarhus University. During the opening ceremony, he stepped out of the orchestra to give a short lecture on evolution and music. Singer Hannah Schneider performed three emotional and beautiful songs together with the IBO2015 orchestra.

For the closing ceremony, the focus was on the celebration of IBO and the participants with speeches from the IBO Coordinating Centre and the organisers of IBO2015. All guides, helpers, assistants and crew were thanked for their engagement in IBO2015 with the “fairy tale of IBO2015”. The festive ceremony was evident in the upbeat musical entertainment delivered by Danish star Ida Corr, who sang about IBO. All guides and organisers were dressed up in gala outfits. After the closing ceremony, there was time for photo sessions in the lobby of the Concert Hall, and afterwards, all participants and organisers walked through downtown Aarhus to the venue of the Farewell party.

### 5.3.2 EXCURSIONS

In the programme for students, three days included excursions. On July 13, they went on several tours around and at Aarhus University. On July 13, the students went on an excursion to the Ecolarium in Vejle and LEGOLAND in Billund, and after finishing all exams on July 17, there was a trip to downtown Aarhus and Moesgaard Museum.

The jury members had one larger excursion on July 16 to the Silkeborg Lakes.

#### Monday in Aarhus

On July 13, the students visited Aarhus University to get an introduction on how to use tablets. In combination with their visit to Aarhus University

The Botanical Garden in Aarhus





they also visited three museums in close vicinity of the university: the Open-Air Museum, the Green Houses and the Museum of Natural History. The Open-Air Museum, which is like walking into a living picture of Denmark in the last couple of centuries, was a fun experience for the students. They had a guided tour where they learned about Danish history and culture. The newly opened Green houses offered the students a quick update on botany, while the Natural History Museum focused on sustainability.

### The Ecolarium and LEGOLAND

For the excursion on July 15, the students went to the Ecolarium in Vejle where they learned about groundwater in Denmark, waste management and sustainability. At the museum, the students received a questionnaire guiding them through all the exhibits. In addition, they also went on one of six different tours in and around Vejle where each tour had a specific focus concerning nature restoration projects. One of the employees at the Ecolarium, who went on a guided tour in Vejle, showed examples of nature in the city and asked the students to come up with examples on how

to incorporate more natural environments in their hometowns. This led to many interesting ideas, the students had fun being creative, and we got a very positive feedback from the employees at the Ecolarium as well.

In the afternoon, after finishing the visit at the Ecolarium, the students went to LEGOLAND. LEGOLAND and especially the LEGO bricks are an important part of the childhood of every Danish child. The LEGO bricks encourage children to play and be innovative, and the bricks are used in higher education to demonstrate creativity and collaboration. In LEGOLAND, the students received LEGO money (a voucher corresponding to 150 DKK) that they could use for dinner and souvenirs. This was a great excursion for the students, because they had a lot of fun together, and they were very fascinated by the world of LEGO, which many of them had heard about beforehand.



# IBO2015 EXCURSIONS

MOESGAARD  
MUSEUM







GETTING TO KNOW EACH OTHER  
AND HAVING FUN





## Aarhus City tours and Moesgaard Museum

On July 17, the students started the day with a trip to downtown Aarhus, where they could spend a couple of hours shopping, sightseeing or visiting the modern art museum Aros. The ones who went to Aros were very excited about the museum's exhibits and the beautiful Rainbow Panorama on the rooftop. Other students had a lot of fun shopping for souvenirs to bring back home for their friends and families.

In the afternoon, there was a tour to the newly opened Moesgaard Museum, which offers exhibitions about pre-historic events and findings, for example the Grauballe Man, and the students got an insight in the life of the Vikings. The students also enjoyed the outside activities. The museum employees had arranged different Viking games, which were very popular.

## Silkeborg Lakes

The jury members had a full day excursion on Thursday, July 16. They visited The Sky Mountain – 147 meters above sea level. Many of them enjoyed a walk around the area and to the top of the “mountain”. A lunch buffet was served at Hotel Himmelbjerget. In the afternoon, the boats “Hejren” and “Mågen” in the Silkeborg Lakes took the jury members to Silkeborg. From here, busses drove them back to Aarhus. All the jury members enjoyed the beautiful views and the walking tours.. It was a great environment for the jury members to relax before starting the marking and approval of the exams.



MOESGAARD MUSEUM,  
AARHUS

## 5.3.3 EVENING PROGRAMMES

The evening programmes for students were determined by the guide-panel. The guide-panel also helped plan the Cultural Night, and they were responsible for the social nights at the hotel.

### Welcome Evening

After the arrival of all participants and the opening ceremony, the students went to Hotel Helnan, where they stayed during IBO2015. After checking into their hotel rooms, they met with all the guides in a large dance hall, where one of the Chief Guides had arranged “speed-dating” for all the students. To get the conversation started, the Chief Guide had prepared specific questions for the students to get to know each other, have fun and relax. This was a great success! The Activity Guides had also rehearsed choreography for the song “Witch Doctor”. The song and dance was really fun and the students repeated it many



times during the week, for example after finishing the practical exams. The song thereby became a common activity for the students and hopefully it will always remind them of having a fun time at the IBO2015.

## Cultural Night

Inspired by the Cultural Night during IBO2013, the IBO2015 Secretariat and the guides came up with Danish ideas for the Cultural Night on 16 July. An event coordinator organised the evening. The idea was to present different aspects of Danish lifestyle and focus on nature, biology and sustainability. We had different non-governmental organisations and local manufacturers to set up small stands, where they would present and talk

about their products and environmental purposes. All participants had received a voucher that could be exchanged for a souvenir.

The dinner during the Cultural Night offered a variety of traditional Danish open sandwiches in addition to other local dishes. Outside, small cosy areas with bonfires had been set up, and the participants could make headbands out of flowers. In the tent, where one of the four practical tests had taken place, there was a bar, a jazz band and later in the evening a DJ. The DJ turned the floor into an energetic dance floor.

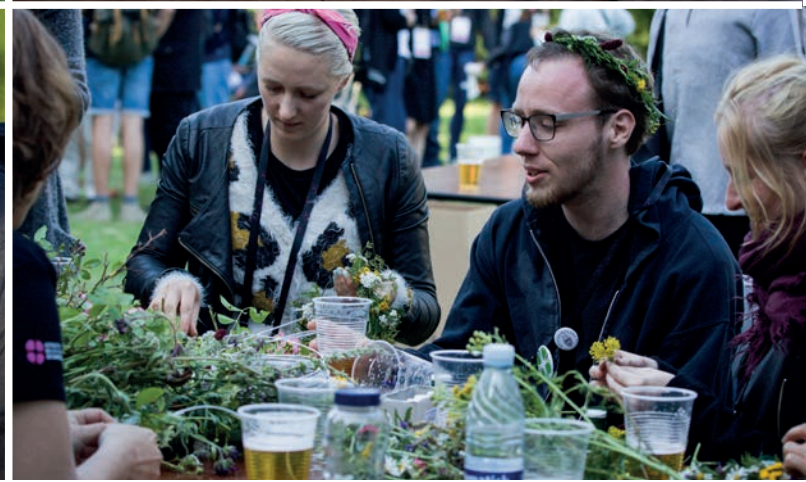




# IBO2015 EVENINGS



## CULTURAL NIGHT CELEBRATING DIVERSITY AND SUSTAINABILITY







PLAYING  
WITH  
LEGO





Cultural Night was filled with many different experiences and it was a perfect opportunity for the students and the jury members to meet up again after the exams and enjoy the event together. The students celebrated finishing their exams with dancing in the tent. Unfortunately, we had not expected the Cultural Night to turn into the celebration that it did, so we had to close the party down at 21.00. But it is noteworthy to have in mind that the students really want to have fun and celebrate this evening!

### **Video Competition and visit by the jury**

On Friday evening, July 17, the students had a dinner together at the hotel with their guides. After dinner, the jury members visited their students. The students showed the jury members the beach and forests close to the hotel and they could all enjoy ice cream served from a small cart outside the hotel. Later in the evening, the students gathered once again in a large hall at the hotel, where one of the hosts from the ceremonies presented the five finalists for the IBO Video Competition. The students watched all five videos and then each student voted for the video they thought should win. The IBO Video Competition had the theme "IBO and me" and the finalists had come up with very different, and all very fun, takes on this theme. The students had a lot of fun watching the videos together.

### **Farewell party**

The Farewell party was arranged by the Secretariat and was held at a large venue in downtown Aarhus. After the closing ceremony, the participants took a short, guided walk from the Concert Hall to the venue. The party started with a drink in the outside area, where the participants could use their creative skills in painting and playing with unicycles and other fun stuff. After the three-course dinner, the students received their medals. The medal ceremony had been rescheduled to the farewell party due to delays in the ranking of students. Fortunately, the students enjoyed the relaxed atmosphere. After the dinner, two DJs, both inside and outside the venue, filled the dance floors with happy students, jury members, volunteers and organisers. The Farewell party was a great success and the perfect way to end and celebrate IBO2015.





# IBO2015 EVENINGS



## IBO2015 FAREWELL PARTY AND MEDAL CEREMONY





# IBO2015 EVENINGS



RECEIVING THE MEDALS  
IN A RELAXED ATMOSPHERE









## 5.4 LOGISTICS AND INFRASTRUCTURE

The professional congress organiser “Kongres-Kompagniet” supported the planning and organisation of logistics.

### 5.4.1 ACCOMMODATION

Aarhus has a limited number of hotels. The two largest hotels available were booked for IBO2015 in 2012. The Radisson Blu was the only hotel with a conference room that could accommodate the jury sessions, and therefore, the jury and jury helpers were placed there. The students, their guides and the media crew were accommodated at Hotel Helnan Marselis. Hotel Helnan is situated in a beautiful location, which gave the students the possibility of exploring the beach and the forest for outdoor activities.

Scientific Assistants from the Technical University of Denmark, situated in Copenhagen, were staying at Aarhus University. The Scientific Assistants living in Aarhus were not provided with accommodation.

The sub-jury session that proceeded IBO2015 was held from July 8-12 in Comwell Hotel, Aarhus. A different location was chosen to avoid that the sub-jury members would meet up with students and jury members during the sub-jury meetings.

### 5.4.2 JURY ROOM

The jury room was located in Aarhus Congress Centre, the same building as the Radisson Blu Hotel, where the jury members stayed. The hall in front of the jury room was used for snacks and drinks during breaks as well as a place for the jury members to relax while building with LEGO bricks.

The jury room was set up with one large screen showing two images and two whiteboards showing the programme for the day plus additional information. The seating of jury delegations was organised according to native languages and inspired by seating arrangements from previous IBOs. Each seat had a power supply. The jury members had to bring their own computer to reduce costs. The WiFi connection in the jury room caused some problems on the first day, mainly due to the WiFi set-up in addition to the configuration and firewalls at individual computers. A voting system with clickers was set in place for votings during the jury session. Printers were available in the jury room although the exams did not need to be printed. In the jury room, eight to ten Jury Helpers assisted the jury members during and between jury sessions.

### 5.4.3 FOOD AND BEVERAGE

During IBO2015, the participants experienced a variety of Danish specialities. A detailed plan for food and beverage for the three major groups during IBO2015 (students, jury and scientific assistants) was developed. The students had many of their meals provided by the Mathematical Canteen at Aarhus University. The jury members enjoyed the “Brain food” served at Radisson Blu. KongresKompagniet made lists for all special diets available at the different venues, and participants fasting during IBO could set aside food in refrigerators for later consumption.



**Figure 5.3:** Example of food and beverage for students (Sunday to Wednesday shown here)

| Date            | Competitors/Students | Time        | Food                      | Location and rooms                              | Provider                          | Status |
|-----------------|----------------------|-------------|---------------------------|-------------------------------------------------|-----------------------------------|--------|
| Sunday 12.07    | Reception            |             | sandwich at registrations | Radisson                                        | Radisson                          | booked |
|                 |                      | 18.00-20.00 | Welcome dinner            | Concert Hall Aarhus                             | Johan R                           | booked |
| Monday 13.07    | Excursion            | 12.00       | Lunch                     | Mathematical cantina (150) + green houses (150) | Mathematical cantina/green houses | booked |
|                 |                      | 19.00       | Dinner                    | Mathematical cantina                            | Mathematical cantina              | booked |
| Tuesday 14.07   | Practical exams      | 10.30-11.30 | Snack during break        | rooms near labs                                 | Mathematical cantina              | booked |
|                 |                      | 13.00-14.30 | Lunch                     | rooms near labs                                 | Mathematical cantina              | booked |
|                 |                      | 16.00-17.00 | Snack during break        | rooms near labs                                 | Mathematical cantina              | booked |
|                 |                      | 19.00-20.00 | Dinner                    | Mathematical cantina                            | Mathematical cantina              | booked |
| Wednesday 15.07 | Excursion            | 12.00       | Lunch                     | To go                                           | Egestrand                         | booked |
|                 |                      | 18.00       | Dinner                    | In Legoland                                     | Dinner Legoland                   | booked |

## 5.5 TRANSPORT

There was a limited need for transportation during IBO2015 as many of the events were located close to each other. Rented busses were used whenever needed.

Pick-up service was offered at two airports (Billund and Tirstrup; not Copenhagen) and the railway station in Aarhus. The airports' pick-up times were announced, and here, delegations were met by Jury Helpers. Although pick-up times and places

were clearly stated during IBO2015 and on the website, a few jury members were surprised about this.

The guides placed the students in different bus groups during the week, according to the programme. KongresKompagniet had on-going contact with the bus company and rescheduled when needed.

Figure 5.4. Example of bus schedule for students (Monday and Tuesday shown here).

| Students             | From                                                                 | To                                                                                 | Arrival | Departure | Arrival at destination | Persons |
|----------------------|----------------------------------------------------------------------|------------------------------------------------------------------------------------|---------|-----------|------------------------|---------|
| <b>Monday 13.07</b>  | Helnan Marselis Hotel, Strandvejen 25, 8000 Aarhus C                 | Aarhus Universitet, Naturhistorisk museum, Wilhelm Meyers Allé 210, 8000 Aarhus C  | 8.30    | 8.45      | 9.15                   | 150     |
|                      | Helnan Marselis Hotel, Strandvejen 25, 8000 Aarhus C                 | Botanisk Have og Væksthusene, Peter Holms Vej, 8000 Aarhus C                       | 8.30    | 8.45      | 9.15                   | 150     |
|                      | 13.07 Naturhistorisk museum, Wilhelm Meyers Allé 210, 8000 Aarhus C  | Hotel Helnan Marselis                                                              | 20.00   |           |                        | 300     |
| <b>Tuesday 14.07</b> | Helnan Marselis Hotel, Strandvejen 25, 8000 Aarhus C                 | Aarhus Universitet, Natural history museum, Wilhelm Meyers Allé 210, 8000 Aarhus C | 7.45    | 8.00      | 8.30                   | 300     |
|                      | 14.07 Natural history museum, Wilhelm Meyers Allé 210, 8000 Aarhus C | Helnan Marselis Hotel, Strandvejen 25, 8000 Aarhus C                               | 20.30   |           |                        | 300     |





## 5.6 GUIDES, JURY HELPERS, SCIENTIFIC ASSISTANTS AND IT SUPPORTERS

Based on experiences from IBO2013, it was decided not to use volunteers, but instead to pay all helpers a fee of 5000 DKK. The helpers had the following titles and numbers

|                              |           |
|------------------------------|-----------|
| <b>Guides</b>                | <b>37</b> |
| <b>Jury Helpers</b>          | <b>9</b>  |
| <b>Scientific Assistants</b> | <b>28</b> |
| <b>IT Supporters</b>         | <b>5</b>  |
| <b>Media Crew</b>            | <b>10</b> |

### 5.6.1 RECRUITMENT OF THE GUIDES

The guide-panel of 10 former IBO participants was recruited in September 2014. From the guide-panel,

two guides were selected as Chief Guides. In collaboration with the IBO2015 Secretariat they recruited the additional guides.

The job advert for the 27 Country Guides was published in the end of January 2015 on Aarhus University's job portal. The closing date was February 25, and we were very pleased that the great interest in IBO2015 resulted in over one hundred applications. The two Chief Guides chose 48 applicants who, because of the quality of their applications, were asked to come for an interview. The interviews were held on March 9-11 in Copenhagen and Aarhus, and there was one Chief Guide and a member of the Secretariat present at each interview.



Figure 5.5: Structural hierarchy for guides

After the interviews, the Chief Guides selected 27 young people to be Country Guides at IBO2015, as well as one who became an additional Activity Guide. The Country Guides were then invited to join a Facebook-group, which was the platform for the communication between the guide-panel and the Country Guides, as well as between the Secretariat and the entire guide team up until the week of IBO2015.



### 5.6.2 ORGANISING THE GUIDES

The structural hierarchy of the guides was organised with the purpose of spreading out the workload as much as possible while maintaining a hierarchy that illustrated who had the overall responsibility and the right to authorise other guides. The two Chief Guides had responsibility for the eight Activity Guides and the 27 Country Guides as well as logistics during the week. The Activity



Guides each had the responsibility for four Country Guides and two delegations. The 27 Country Guides each had responsibility for two delegations.

By having a guide-panel that consisted of only previous IBO students, both Chief Guides and Activity Guides felt a sense of genuine ownership because they cared about IBO just as much as all other organisers. They had a clear interest in making IBO2015 a great experience for all participants. In their interviews with the applicants for the positions as Country Guides, the Chief Guides also put emphasis on finding people who showed integrity and ownership towards the event. By encouraging the guides' sense of ownership, IBO2015 had responsible guides who worked hard without too much detail management.

### 5.6.3 GUIDE MEETINGS

The ten members of the guide-panel met with the IBO2015 Secretariat on September 20, 2014, for a workshop with focus on the responsibility and the tasks ahead for the guide-panel. We also brainstormed ideas for the social activities for the students' programme as well as logistic issues concerning the students and the guides. The result was an incredibly motivated guide-panel who put a lot of inspiring ideas on the table. The Chief Guides had monthly meetings with a member from the Secretariat to follow up on tasks and deadlines regarding the guides.

On February 28, 2015, the second meeting with the guide-panel was held. In this meeting, the ten members of the guide-panel, The Head of Guides and the Head of Communication discussed risk management regarding the students, the guides, the programme and the logistics concerning these. The structure of the guide-team was also discussed, and it was agreed that one of the applicants for the job as Country Guide should be made Activity Guide, because it would simplify organising the responsibility of the Activity Guides if they were eight people instead of seven.

In the afternoon, the guides went to Moesgaard Museum so they could experience one of the excursions of the student programme during IBO2015 beforehand.

In the beginning of May, the Secretariat and Chief Guides sent out a guidebook introducing the IBO with the history, rules and overall organisation. The guidebook also contained the programme for IBO2015, the delegations, risk management, important info concerning emergencies and contact information on the other guides and the Secretariat.

On June 25, a small social event was set up for the guides in Aarhus, and the same thing was set up for the guides in Copenhagen on June 26. Both to make sure that the guides had an opportunity to meet each other and have fun together before the IBO2015.





On June 27, the third and final meeting with the guide-panel was held in Copenhagen. A member of the Secretariat was present and the agenda was to follow up on the last details and arrangements for IBO2015 concerning the guides and the participating students. Among other things, we discussed the bus plan and how to organise it so we were sure that all students were on the busses when leaving for the next destination. We made a plan where one Activity Guide was responsible for one bus each day. We had a list of which delegations should be on which bus. Each Country Guide had to make sure that his/hers two delegations were on the bus and then check it with the Activity Guide responsible for that particular bus. This system worked very well and ensured that we always left on time. During the meeting, we also decided what would happen at each social night at the Hotel Helnan and what to buy for the activities.

### 5.6.4 INTRO DAYS AND THE IBO WEEK

We arranged intro days for the Guides as well as Jury Helpers, Scientific Assistants, IT Supporters

and Media Crew the two days before the beginning of IBO2015. On July 10-11, the guides met and were introduced to each other and to the programme. We went through different things regarding the programme, risk management and first aid. We also walked some of the tours that the students were going to walk at the excursions and between the practical exams to make sure that all guides were familiar with the area around Aarhus University. At Hotel Helnan, we set up a meeting room for the guides.

During the week of IBO2015, the guide-panel held a meeting each evening to evaluate the day gone by and go through the programme for the next day. The guide-panel was always in contact with each other through WhatsApp, which turned out to be a recommendable app for keeping in contact and making sure that all messages quickly reached the many people involved. WhatsApp was especially great when making sure that all students were on the busses before leaving from a destination, and when walking from one location to the next during the practical exams.

### 5.6.5 JURY HELPERS

A Chief Jury Helper was appointed in February 2015. The Chief Jury Helper assisted in the detailed planning of the programme for the Jury Helpers as well as the social programme for the jury members, especially the excursion to Silkeborg on Thursday, July 16. The Chief Jury Helper and Kirsten Wøldike were in charge of recruiting the



additional eight Jury Helpers. The Jury Helpers organised the registration and the jury room during the intro days. The Jury Helpers followed the programme of the jury members and their work consisted of all kinds of technical and practical assistance in the jury room. To allocate the workload, the Jury Helpers were split into two teams with separate working hours. Some jury members were working late during the translation days, and it was important that there were Jury Helpers present at all times.

### 5.6.6 SCIENTIFIC ASSISTANTS

The Scientific Assistants were primarily recruited by the researchers responsible for the four practical exams. Researchers that were not employed at Aarhus University had a number of assistants recruited by the IBO Secretariat to secure that the

assistants were familiar with the laboratories at Aarhus University. The majority of the Scientific Assistants had performed the practical exams and all were introduced to the exams during the intro days.

During the intro days, the Scientific Assistants were in charge of setting up the laboratories and they prepared all materials for the practical exams. On the day of the practical exams, they assisted the researchers. In the evaluation by the inspectors present during the practical exam, the Scientific Assistants and the IT Supporters were acknowledged for their efficiency and friendliness. After the marking of the exams, the Scientific Assistants set up the auditoriums for the theoretical exams and assisted with setting up the closing ceremony and the Farewell Party.



### 5.6.7 IT SUPPORTERS

In June 2015, the five IT Supporters prepared the 275 tablets for IBO2015. During IBO2015, on July 13, the IT Supporters ran a tablet test for the competitors/students. This test familiarised the students with the tablet, the layout of the questions and the click-on microscope. All pictures taken with the click-on microscope were approved for all students to secure that they knew how to take the perfect picture. During the practical and theoretical exams (July 14 and 16) one-two IT Supporters were present at each exam. They started the exams, made sure all students were online and gave additional minutes for the exam to individual students if the Scientific Assistants had verified that the student was delayed due to technical problems. The IT Supporters communicated every problem to each other via Viper to ensure that all exams ran at approximately the same time. In addition, the IT Supporters assisted the IT Specialist with improving figures, coding of the automatic scoring of the practical exams and the recovery of pictures from the practical exams. The IT Supporters worked extremely hard and had very long workdays during IBO2015. They were all very relaxed and well-organised, even in stressful situations where exams were delayed.

### 5.6.8 MEDIA CREW

In April 2015, the Media Crew was recruited. The Head of Communication organised interviews with the applicants and in collaboration with the IBO2015 Secretariat recruited the Media Crew. In June 2015, the Head of Communication, a graphic

designer and three journalists worked on the IBO Welcome Magazine, which all participants received at their arrival on Sunday, July 12, 2015. During the week of IBO, the Media Crew consisted of the graphic designer, three journalists, five photographers/editors and one PR assistant. To allocate the workload, the Media Crew met each morning for a meeting held by the Head of Communication where the different editorial tasks were spread out amongst the members of the Media Crew - so there was always one team covering the programme of the participants and one team covering the jury room or editing videos.

The Media Crew all stayed at the hotel with the students where they had their own room for meetings and work, which was close to the guides' meeting room. This allowed the Media Crew to follow the participants and their guides closely - even outside of the official programme, which meant that the Media Crew could easily feel the vibe and follow the great experiences that the participants had with each other and their guides. This vibe certainly came across in the IBO Goodbye Magazine, which all participants received before departing on July 19.



## 5.7 MEDIA AND PR

The overall media coverage during IBO2015 took place on different platforms: Website, social media, IBOmagazine (print version) and IBOnews. Both national broadcast television and major national newspapers covered the event.

The IBO2015 issued four press releases, and a total of 39 news articles (both online and printed), radio broadcasts and TV features were made about IBO2015. See more in annex 1.

### 5.7.1 IBO2015 WEBSITE

Due to some minor challenges, the set-up of the website ([ibo2015.org](http://ibo2015.org)) was a bit delayed. But we ended up with a good result where we tried to split the information on the website into three parts: “IBO2015” (general information about IBO2015), “For participants” (information relevant for the participants) and “About IBO” (general information about IBO, history etc.). The purpose was to make it easier to find the right information the first time.

### 5.7.2 SOCIAL MEDIA

IBO2015 was primary active on Facebook (International Biology Olympiad 2015) and Instagram (@IBO\_2015). The social media platforms were used for direct contact with all the participants and their families at home. It was an easy way to keep them continuously updated, to make connections before the week and of course to keep in touch after the IBO2015.



In October 2015, we had over 2000 followers on Facebook, and the number kept increasing every week – even three months after the end of IBO2015.

Our Instagram profile was created in late February and have approx. 300 followers. The aim of the profile was to go back-stage. We started with a guide-takeover where we followed a new Activity Guide every week. It was a very good way to present the guides.

### 5.7.3 IBONEWS AND IBOMAGAZINE

For IBO2015, we chose to replace the daily newspaper with a live channel called IBOnews. A channel that continuously transmitted news during the IBO week. Screens were located at key spots during IBO2015, which enabled the participants to stay updated with the latest IBOnews at



all times. It also enabled the jury members to be more involved in the students' programme. All the IBOnews items were also posted on Facebook so that friends and families at home could keep up with the participants and their activities.

The IBOmagazine was published in two versions. The first one, the Welcome Magazine, was distributed to the participants when they arrived on July 12. It contained practical information, such as the programme, and several in-depth articles about what to expect during the week. In the Welcome Magazine, we presented Danish values and cultural characteristics, ranging from sustainability and the drinking water system to freedom of expression and Danish history. The #keepintouch book, with pictures of all the participants, was included in a goodie bag together with the Welcome Magazine.

At the end of the IBO week, we published the Farewell Magazine, with stories and articles about the participants' experiences and highlights of the week.

The professional congress organiser "KongresKompagniet" also collaborated with the IBO2015 Secretariat on everything that had to do with registration and administration of the participants. "KongresKompagniet" was responsible for all communication related to the registration.

### 5.8.1 INVITATIONS

The invitation letter was sent out by e-mail (according to the address list available from the Coordination Centre in Prague) from the IBO2015 Secretariat to all 66 IBO member countries by November 26, 2014. Lichtenstein is part of the Swiss delegation. Malaysia was invited as a new IBO member country in May 2015. Four observer countries - Egypt, Norway, Bangladesh and Iceland - were invited. No students from Lichtenstein qualified to be part of the Swiss delegation.

Seven countries received a second invitation by e-mail on February 17, and five responded to it. Invitations were sent by postal mail to Uzbekistan and Kuwait on March 9. The invitation letter to Uzbekistan was in addition translated to Russian. On April 1, Kuwait informed that they would not participate. On April 4, Uzbekistan requested a new invitation letter and informed that they would participate. Several countries requested additional invitation letters to ministries and new jury members.

### 5.8.2 ONLINE REGISTRATION

The deadlines for the online registration were planned as seen in Figure 5.6. Countries started registration right after receiving their invitation letters.

### 5.8.3 VISA

One third of the countries participating in IBO2015 needed to apply for a visa to enter Denmark. It was recommended to apply for visa at least three months in advance (suggested deadline was April 1, 2015). The IBO2015 Secretariat assisted delegations with the specific form VU3 from the Danish Immigration Service ([www.nyidanmark.dk](http://www.nyidanmark.dk)).

A few delegations requested help with the VU3 form before April, whereas the majority needed additional help in May and June. A few delegations asked for help in July.

The delegation from Syria applied for visa to Denmark in February-March, but was refused entry into Denmark. The Chairman and the Project Coordi-

nator of the Organising Committee contacted the Danish Immigration Service by e-mail and phone, as well as the Ministry for Children, Education and Gender Equality, to provide additional information in support of the Syrian delegation. The Syrian delegation was advised to appeal the visa refusal individually. Due to the critical situation in Syria and the vast number of Syrian refugees migrating to Denmark, Syrian citizens can only obtain visa to Denmark in extraordinary circumstances such as life-threatening diseases of family members living in Denmark. Therefore, unfortunately, it was not possible for the Syrian delegation to obtain visa and they were not able to participate in IBO2015. The organisers are deeply sorry that it was not possible to welcome the Syrian delegation.

| Registration                                                                | Deadline         |
|-----------------------------------------------------------------------------|------------------|
| Country participation                                                       | January 28, 2015 |
| Number of participants and payment (reduced participation fee)              | March 1, 2015    |
| Number of participants and payment (standard participation fee)             | May 27, 2015     |
| Names and personal details of participants (incl. student declaration form) | May 27, 2015     |
| Arrival and departure information                                           | June 17, 2015    |

**Figure 5.6:** Registration deadlines

| Date       | Numbers of countries registered                                                                 |
|------------|-------------------------------------------------------------------------------------------------|
| 2015.01.15 | 35 countries (34 delegations), 1 observer, 1 not participating                                  |
| 2015.01.26 | 49 countries (48 delegations), 1 observer, 2 not participating                                  |
| 2015.01.29 | 55 countries (54 delegations), 2 observers, 3 not participating                                 |
| 2015.03.03 | 61 countries (60 delegations), 2 observers, 3 not participating, 2 countries have not responded |
| 2015.03.31 | 61 countries (60 delegations), 4 observers, 3 not participating, 2 countries have not responded |
| 2015.04.04 | 62 countries (61 delegations), 4 observers, 4 not participating                                 |
| 2015.06.01 | 62 countries (62 delegations), 4 observers, 5 not participating                                 |

**Figure 5.7:** Number of countries registered. The registration of countries increased gradually.





# MULTIMEDIA & MULTI-PLATFORM IBO2015 MEDIA STRATEGY



**1660**

King Frederik 3. enforces absolutism as form of government. The king has now absolute power and control over Denmark.

**1849**

Absolutism is replaced by democracy when the Constitutional Act of Denmark is signed on June 5.

**1940**

World War II comes to Denmark when the German army occupies the country on April 9.

**1992**

The Danish national team in football wins the European Championship, which leads to decades of bragging about it at every opportunity.



Above: IBO2015 speed drawings



The world is coming to Aarhus!

IBO 2015 459 afspilninger



IBO Small talks: The Swede with the silver tape hat

IBO 2015 314 afspilninger



Niilo was lost in Legoland – watch what happened next!

IBO 2015 298 afspilninger



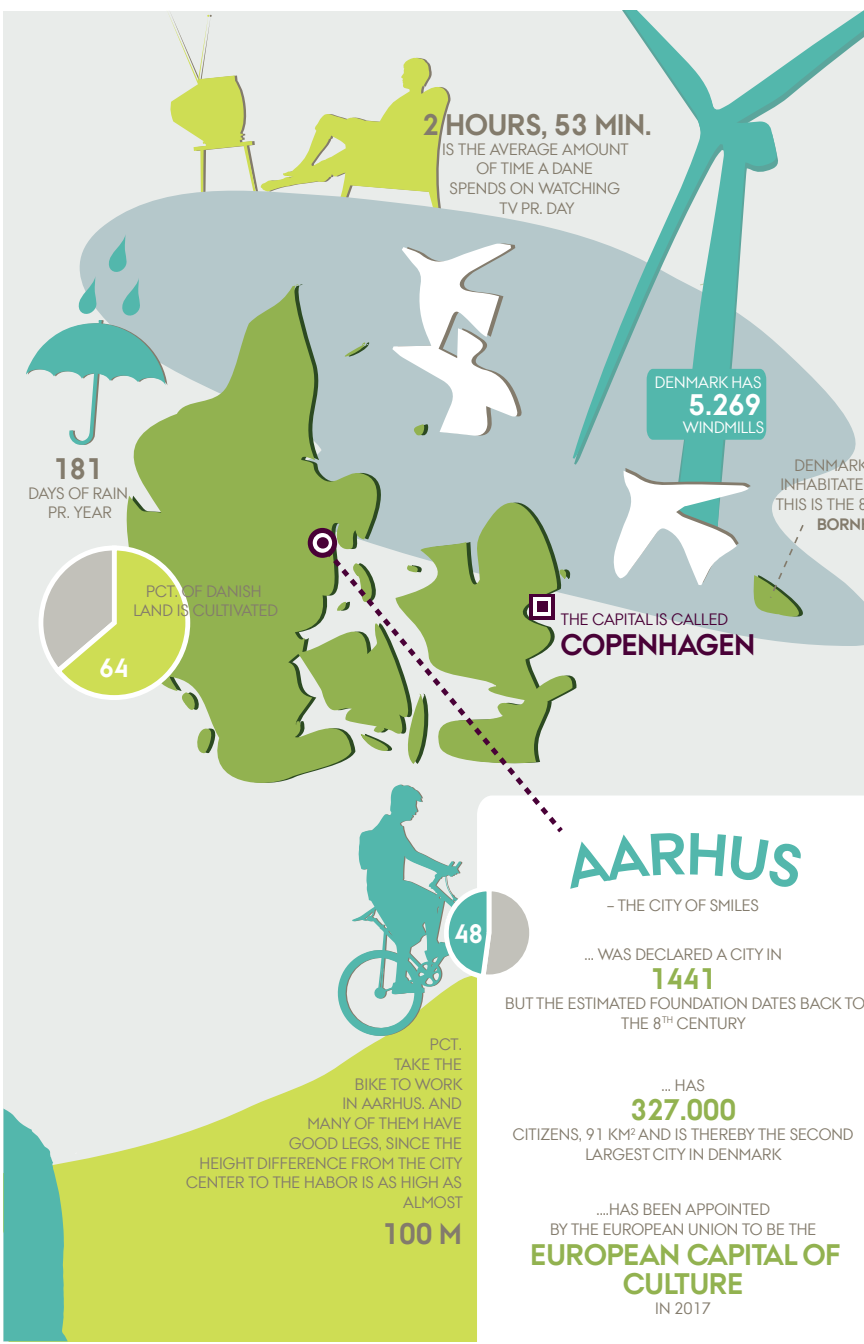
Exams tomorrow – pressure is on!

IBO 2015 361 afspilninger



Closing Ceremony and Good bye

IBO 2015 627 afspilninger

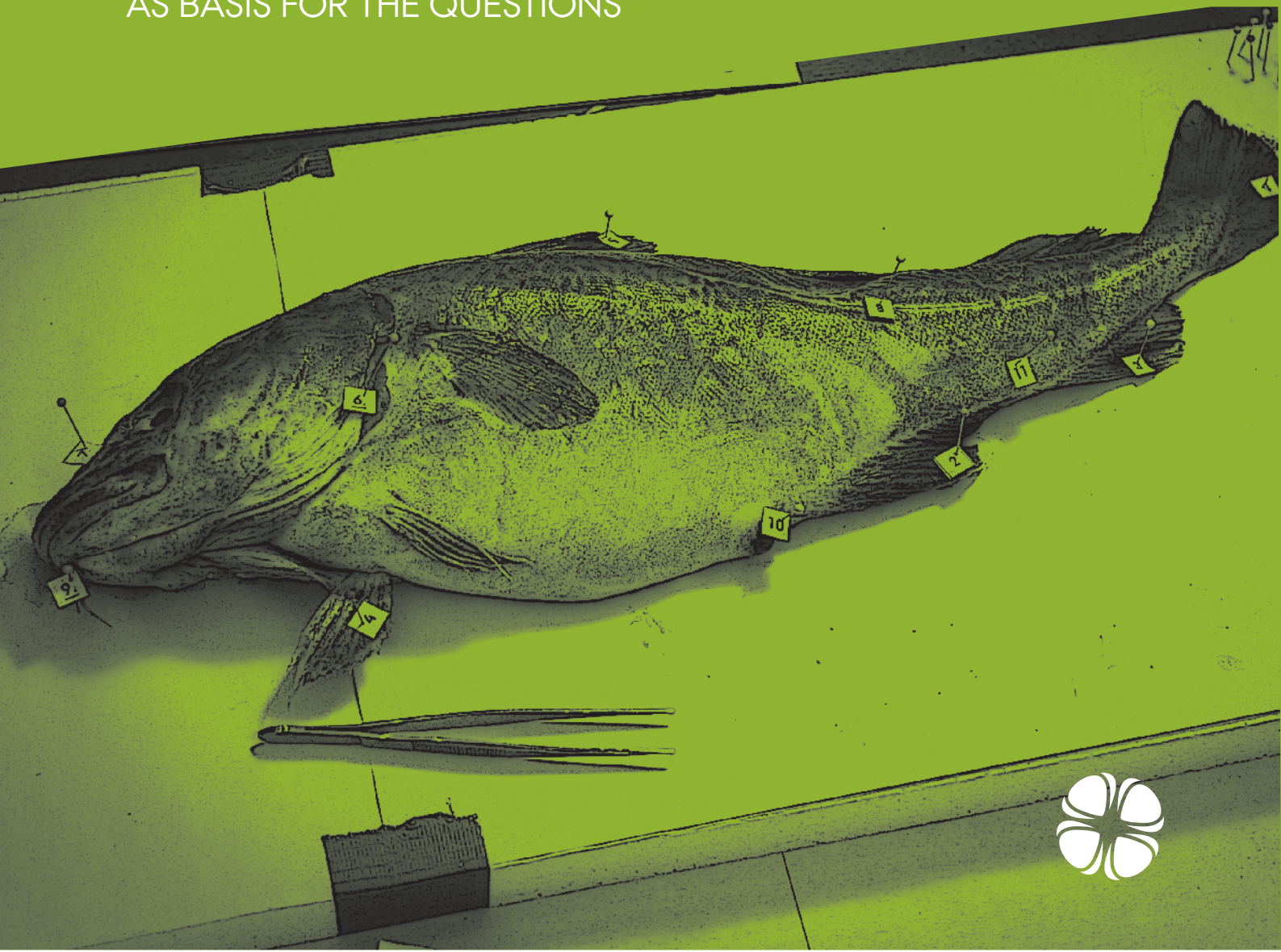






# EXAMS

IT WAS DECIDED TO MOVE FOCUS  
TOWARDS MORE REASONING AND  
CREATIVE THINKING, AND ALSO,  
AS FAR AS POSSIBLE, TO USE THE  
LATEST SCIENTIFIC RESEARCH  
AS BASIS FOR THE QUESTIONS



# EXAMS PART 6

The students competing in IBO2015 were tested in four practical and two theoretical exams covering all major disciplines in biology. All exam questions were translated from the official English and Russian versions into the native language of each delegation (a total of 40 languages). The jury members discussed and translated the four practical exams in one day whereas they spent two days on the theoretical exams.

## 6.1 INITIAL EXAM DEVELOPMENT

The work of the Scientific Committee started with a two-day workshop on January 31- February 1, 2013, facilitated by Hans Morelis (assessment expert with IBO). At this meeting, various question types were suggested for the theoretical exams. After IBO2013 in July 2013, it was suggested only to use multiple true/false questions, and only few of the questions developed after the initial works-

hop could be used. A few researchers took part in the development of the theoretical exams after July 2013. Details about the initial work and initial organisation are described in progress report 1.



The four practical exams tested laboratory skills, planning of practical work and biological knowledge







## 6.3 PRACTICAL EXAMS

The four practical exams (90 minutes each) tested laboratory skills, planning of practical work and biological knowledge.

### The four practical exams (P1 to P4) were in the disciplines:

- P1 – Plant biology (organiser Anders Barfod, Aarhus University),
- P2 – Molecular biology (organiser Rasmus Frandsen, Technical University of Denmark),
- P3 – Animal biology (organisers Tobias Wang and Rasmus Buchanan, Aarhus University)
- P4 – Biochemistry (organiser Macher Abou Hachem, Technical University of Denmark).

All practical exams were tested on previous IBO participants in the autumn of 2014. In January 2015, International Advisors evaluated the exams. The two practical exams in Molecular biology and microbiology and in Biochemistry were re-tested

on April 17, Animal functional morphology on April 29 and Plant anatomy, biosystematics and evolution on May 18.

Here, the intention also was to test the new software for tablets.

A manual describing the practical exams was developed for the researchers, Scientific Assistants and IT Supporters. The manual was updated and developed continuously until IBO2015 and included details about the set-up and logistics regarding the practical exams (See annex 2). In addition to this, a schedule for researchers and Scientific Assistants was developed.

The researchers and Scientific Assistants involved in the practical exams also did the marking. Parts of the exams were auto-corrected by the newly developed software.





## 6.4 THEORETICAL EXAMS



The two theoretical exams (three hours each) consisted of 98 multiple true/false questions that tested the students' abilities to calculate, analyse, compare and deduct.

The two theoretical exams (T1 and T2) encompassed 49 questions à four statements each. One, two, three or four correct answers earned the student 0, 0, 0.5 or 1 correct score. The 98 questions were categorised into seven biological disciplines: Animal biology: 25 questions, biosystematics: five questions, cell biology/microbiology/biotechnology: 16 questions, ecology: 12 questions, ethology behavioural ecology: five questions, evolutionary biology/genetics: 20 questions, and plant biology: 15 questions.

In order not to have too much emphasis on knowledge-based questions alone, it was decided to move focus towards more reasoning and creative thinking, and also, as far as possible, to use the latest scientific research as basis for the questions. Thus, about 75% of all questions were based on research from the last five years, and about 20% on research from 2015. Furthermore, 10% of all questions were mainly knowledge-based, 10% required mostly calculus skills and 80% required that the students did deductive and inductive reasoning.

---

**Below:** The practical exam where a cod was dissected was performed in a tent with a slight brise.

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## 6.5 QUALITY ASSURANCE OF EXAMS

The quality of the IBO exams were discussed with the International Advisors and sub-jury, whereas the inspectors oversaw the implementation of the exams.

### 6.5.1 SUB-JURY AND INTERNATIONAL ADVISORS

A sub-jury was selected during IBO2014. In addition to the sub-jury, it was decided to invite three members of the sub-jury to Denmark in January 2015. As described in Part 3 (Innovations), IBO2015 was the first IBO to involve a subset of sub-jury members (here called International Advisors) at an early stage in the development of the practical and theoretical exams. The International Advisors discussed the exams during a four-day meeting in Aarhus, January 28-31, 2015. The many meetings during these four days were video recorded to ensure that all suggestions could be incorporated at a later stage.

The three sub-jury members were not involved in the NBO in their home countries as they had knowledge of the exams. During IBO2015, the International Advisors supported the Scientific Committee and especially the Chairman of the Scientific Committee in the jury meeting.

#### Members of the sub-jury

- Poonpipope Kasemsap, Thailand (IBO chairperson)
- Shirley Lim, Singapore (IBO Steering Committee-representative)
- Mary Oliver, Australia (IBO Steering Committee-representative)
- Dinh Long Doan, Vietnam (host for IBO2016)
- Andrew Treharne, UK (host for IBO2017)
- Alexander Rubtsov, Russia
- Jan Cerny, Czech Republic
- Mats Carlberg, Sweden
- Kathy Frame, US
- Daniel Wegmann, Switzerland
- Anindya "Rana" Sinha, India
- Olga Waksman (Russian interpreter)
- Alexander Friedmann (Russian interpreter)

The sub-jury meeting prior to IBO2015 took place at the Comwell Hotel in Aarhus to ensure separation of the sub-jury and early arriving delegations.

#### The plan for the sub-jury meeting:

- July 8: Practical exam 1 and 3
- July 9: Theoretical exams question within Plant anatomy and physiology; Ethology; Genetics and evolution; Ecology
- July 10: Practical exam 2 and 4
- July 11: Theoretical exams question within Cell biology; Animal anatomy and physiology; Biosystematics



## 6.5.2 INSPECTORS

At the Advisory Board Meeting in Prague in 2014, Denmark suggested that inspectors should be present in each room during the entire time of the practical exams as well as the theoretical exams. This was suggested to ensure that all exams would run according to plan and to minimize any dispu-

tes about the exams. For the practical exams, minimum 12 inspectors were present, whereas the theoretical exams had minimum three inspectors. The inspector programme for practical exams is shown in Figure 6.2 and for theoretical exams in Figure 6.3.

| Date            | Time                                         | Jury members                                                                                        |
|-----------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Sunday 12.07    | 16.00-18.00                                  | Opening ceremony                                                                                    |
|                 | 18.00-20.00                                  | Opening reception                                                                                   |
|                 | 09.00-?                                      | Jury session                                                                                        |
|                 | 09.00-10.00                                  | Presentation of of practical tests and comments from subjury                                        |
| Monday 13.07    | 10.00-10.10                                  | Introduction of inspector team                                                                      |
|                 | 10.10-13.00                                  | Translation of practical tests and individual discussions with experts                              |
|                 | 13.00-14.00                                  | Lunch                                                                                               |
|                 | 14.00- 14.10                                 | Approval of inspector team                                                                          |
|                 | 14.00-17.00                                  | Plenum discussion of practical tests                                                                |
|                 | 17.00                                        | Final version of practical tests                                                                    |
|                 | 17.00-?                                      | Translation of practical tests / Inspector team meeting                                             |
|                 | ?                                            | Hand in of final version of practical tests                                                         |
| Tuesday 14.07   | 08.00-19.00                                  | Inspectors of practical exams                                                                       |
|                 | 08.00-8.30                                   | Transport to Aarhus University                                                                      |
|                 | 09.00-10.30                                  | Exam                                                                                                |
|                 | 10.30-11.30                                  | Break                                                                                               |
|                 | 11.30-13.00                                  | Exam                                                                                                |
|                 | 13.00-14.00                                  | Lunch                                                                                               |
|                 | 14.00-15.30                                  | Exam                                                                                                |
|                 | 15.30-16.30                                  | Break                                                                                               |
|                 | 16.30-18.00                                  | Exam                                                                                                |
|                 | 18.00                                        | Transport to hotel                                                                                  |
|                 | 18.30-19.30                                  | Dinner                                                                                              |
| 19.00           | Social event                                 |                                                                                                     |
| Wednesday 15.07 | 09.00-?                                      | Jury session                                                                                        |
|                 | 09.00-09.20                                  | Inspectors report from practical tests                                                              |
|                 | 09.20-09.45                                  | Presentation of theoretical questions (Cell biology; Animal anatomy and physiology; Biosystematics) |
|                 | 09.45-13.00                                  | Translation of subset of theoretical questions and individual discussions with experts              |
|                 | 13.00-14.00                                  | Lunch                                                                                               |
|                 | 14.00-17.00                                  | Plenum discussion of subset of theoretical questions                                                |
|                 | 17.00                                        | Final version of subset of theoretical questions                                                    |
|                 | 17.00-?                                      | Finalise translation of all theoretical questions                                                   |
| ?               | Upload of final version of theoretical tests |                                                                                                     |

Figure 6.2: Inspector programme for practical exams

|                |             |                                                    |
|----------------|-------------|----------------------------------------------------|
| Thursday 16.07 | 08.00-19.00 | Inspectors of theoretical exams                    |
|                | 08.00-8.30  | Transport to Aarhus University                     |
|                | 09.30-12.30 | Exam                                               |
|                | 12.30-14.00 | Lunch                                              |
|                | 14.00-17.00 | Exam                                               |
|                | 17.00-18.00 | Tour in the university park                        |
|                | 18.00-22.00 | Cultural night                                     |
| Friday 17.07   | 22.00       | Markings of practical and theoretical exams online |
|                | 09.00-09.15 | Inspectors report from theoretical tests           |
|                | 09.15-11.00 | Review practical exams and approval of raw score   |
|                | 11.00-13.00 | Review theoretical exams and approval of raw score |
|                | 13.00-14.00 | Lunch                                              |
|                | 14.00-16.00 | Coordinators meeting                               |
|                | 16.00-18.00 | Final approval of ranking                          |
| Saturday 18.07 | 20.00-22.00 | Social night                                       |
|                | 10.00       | Optional programme                                 |
|                |             | Educational session/excursion/free time            |
|                |             | Lunch                                              |
|                | 14.00-16.30 | Closing ceremony                                   |
| Sunday 19.07   | 16.3-17.30  | Photo session                                      |
|                | 17.30-18.30 | Farewell drinks                                    |
|                | 18.30-24.00 | Farewell party                                     |
|                | 7.00-11.00  | Departure                                          |

Figure 6.3: Inspector programme for theoretical exams



## 6.6 CALCULATION OF EXAM RESULTS

The results from the theoretical exams were calculated immediately after the exams were over. Due to problems with the upload of some of the exam pictures taken during the practical exams, the jury had to agree upon a procedure for appointing points to the students. Software problems delayed the final exam results, and the medal ceremony therefore had to be postponed to the gala dinner.

### 6.6.1 NORMALISING RAW STUDENT EXAM SCORES AND CALCULATION OF FINAL STUDENT SCORE

The way we calculated the final scores of each student is described below. It follows the procedure applied at IBO2013. In Figure 6.4, we show the normalisation of the raw scores for the four prac-

tical exams.

In Figure 6.4, 'Rank' gives each student final rank among all 239 students. 'Student' is a code for country and student number (1 to 4). 'Name' is name of student. P1 to P4 are the raw scores obtained by each student in each practical exam. N-P1 to N-P4 are normalised scores obtained according to the formula:

$$NP_i = \frac{(P_i - \overline{P_i})}{SD_i}$$

where  $\overline{P_i}$  is average raw score of the  $i$ 'th practical exam and  $SD_i$  standard deviation of the raw scores, e.g. for student f,  $N-P1 = (85.3 - 56.2) / 19.5 = 1.49$  (see column 'N-P1').  $N-Psum = \sum N-P_i$ , and  $NN-Psum = \frac{(NPsum_i - 0.0)}{SD_{NPsum}}$ , e.g. for student f,  $NN-Psum1 =$





$(4.4-0.0)/19.5 = 3.2 = 1.4$  (see column 'NN-Psum'). The last second normalisation is needed because our attempt is to make the practical exams different in order to test a variety of student skills (this is not the case of the two theoretical exams). The second normalisation was introduced in Bern 2013.

Theoretical exam scores are normalised in the same way after summing the students' scores for the two exams (Figure 6.5)

The calculation of final score is shown in Figure 6.6, and decision of medal is based on this final score.

$(NN-Psum+N-T)$  is the sum of the two columns in Figures 6.4-6.5, and:

$$\text{Final score} = \text{NN-Psum} + \text{N-T} / \text{SDNN-Psum} + \text{N-T} * 50 + 250.$$

The last transformation was used at IBO2013 in order to make all final scores positive, and we adopted it. Many other transformations could be used.

$$\text{'Difference}_i = \text{Difference}_i - \text{Difference}_{i+1}.$$

## 6.6.2 SUMMARY STATISTICS OF STUDENT SCORES AT THE EXAMS

The scores of the students at the six exams are summarised in Figure 6.7.

Since there is much discussion about how to test for normality of a distribution, we here give signi-

ficance results for both a parametric t-test and a non-parametric Wilcoxon test (all results were similar).

|    | T1  | P2  | P3  | P4  |
|----|-----|-----|-----|-----|
| T2 | *** |     |     |     |
| P1 |     | *** | *** | **  |
| P2 |     |     | *** | *** |
| P3 |     |     |     | ns  |

Figure 6.8. Significance of difference between scores of the six exams. \*\*\*,  $P < 0.001$ , \*\*,  $P < 0.01$ , ns, non-significance. T1 and T2 are theoretical exams, P1 is Plant biology, P2 is Molecular biology, P3 is Animal biology and P4 is Bioschemistry.

The samples of raw scores varied significantly between T1 and T2, and between all practical exams, except between P3 and P4. That is basically the reason for our efforts to normalise scores.

## 6.6.3 BOX-AND-WHISKER PLOT OF STUDENT SCORES

Box-and-whisker plots (Figure 6.9) present a simple visualization of the distribution of scores. All student scores are sorted according to quartiles. Quartiles (Q1-3) are the three points that divide the set of scores into four groups, each comprising a quarter of the scores. Q1 separates the lowest 25% of the scores from the highest 75%, Q2 separates the lowest 50% from the highest 50%, i.e. Q2 is the median of all scores, and finally, Q3 separates the lower 75% from the highest 25%. Thus, the box itself extends from Q1 to Q3. The length of the box is termed the interquartile range (IQR). The ranges of the lowest and highest 25% of the scores are

Figure 6.4. Normalisation of raw scores of the practical exams illustrated using scores from four students. Mean and SD are mean and standard deviation of all 239 students. T1 and T2 are morning and afternoon theoretical exams, respectively; P1-P4 are practical exams: P1 is Plant biology, P2 is Molecular biology, P3 is Animal biology and P4 is Biochemistry.

| Rank        | Student      | Name | P1   | P2   | P3   | P4   | N-P1 | N-P2 | N-P3 | N-P4 | N-P sum | NN-Psum |
|-------------|--------------|------|------|------|------|------|------|------|------|------|---------|---------|
| f           | country-no x | a    | 85.3 | 45.4 | 84.0 | 57.5 | 1.49 | 0.32 | 2.23 | 0.33 | 4.4     | 1.4     |
| g           | country-no y | b    | 78.7 | 86.0 | 62.5 | 76.5 | 1.16 | 2.31 | 0.90 | 1.22 | 5.6     | 1.7     |
| h           | country-no z | c    | 62.8 | 62.0 | 65.5 | 75.0 | 0.34 | 1.13 | 1.09 | 1.15 | 3.7     | 1.1     |
| l           | country-no æ | d    | 81.3 | 49.0 | 57.0 | 82.7 | 1.29 | 0.49 | 0.56 | 1.51 | 3.8     | 1.2     |
| <b>Mean</b> |              |      | 56.2 | 39.0 | 48.0 | 50.4 | 0    | 0    | 0    | 0    | 0.0     | 0.0     |
| <b>SD</b>   |              |      | 19.5 | 20.3 | 16.1 | 21.5 | 1    | 1    | 1    | 1    | 3.2     | 1.0     |

Figure 6.5. Normalisation of raw scores of the theoretical exams illustrated using scores from four students. Mean and SD are mean and standard deviation of all 239 students.

| Rank        | Student      | Name | T1   | T2   | T1+T2 | N-T |
|-------------|--------------|------|------|------|-------|-----|
| f           | country-no x | a    | 36.8 | 36.6 | 73.4  | 1.8 |
| g           | country-no y | b    | 35.2 | 34.0 | 69.2  | 1.5 |
| h           | country-no z | c    | 38.6 | 35.6 | 73.2  | 1.6 |
| i           | country-no æ | d    | 37.8 | 35.6 | 73.4  | 1.6 |
| <b>Mean</b> |              |      | 29.4 | 27.6 | 57.0  | 0.0 |
| <b>SD</b>   |              |      | 5.1  | 5.6  | 10.2  | 1.0 |

Figure 6.6. Calculation of final score and medal decision.

| Rank | Student      | Name | NN-Psum+N-T | Final score | Difference | medal |
|------|--------------|------|-------------|-------------|------------|-------|
| f    | country-no x | a    | 3.0         | 329.1       | 3.61       | gold  |
| g    | country-no y | b    | 2.9         | 325.5       | 1.47       | gold  |
| h    | country-no z | c    | 2.8         | 323.99      | 0.03       | gold  |
| i    | country-no æ | d    | 2.8         | 323.96      | 0.89       | gold  |

Figure 6.7. Summary statistics of student scores in the six exams (for definitions of quartiles see paragraph 3). T1 and T2 are theoretical exams, P1 is Plant biology, P2 is Molecular biology, P3 is Animal biology and P4 is Bioschemistry.

|                     | T1    | T2    | P1    | P2    | P3    | P4    |
|---------------------|-------|-------|-------|-------|-------|-------|
| <b>Minimum</b>      | 13.80 | 11.60 | 2.00  | 2.60  | 12.00 | 0.20  |
| <b>1st Quartile</b> | 26.30 | 23.80 | 41.71 | 22.51 | 36.00 | 36.31 |
| <b>Median</b>       | 29.80 | 28.20 | 58.25 | 37.15 | 47.50 | 52.82 |
| <b>Mean</b>         | 29.36 | 27.61 | 56.17 | 38.97 | 48.01 | 50.38 |
| <b>3rd Quartile</b> | 32.90 | 32.00 | 71.94 | 52.81 | 61.25 | 66.39 |
| <b>Maximum</b>      | 40.20 | 38.20 | 91.50 | 86.40 | 88.00 | 94.63 |





shown as whiskers (“the lines”) and outliers (dots). Lower and upper whiskers are  $1.5 \times \text{IQR}$  away from Q1 and Q3, respectively. Below and above the endpoints of the whiskers, we have outliers, shown as dots. The variation in length of the four intervals between the three quartile points shows the level of dispersion and skewness of the set of scores.

There is no consensus about how to compare box plots. Here, we used a set of simple “rules”.

1. “No overlap in spreads” or “75% is below 75%”, so there IS a difference between two plots.
2. “Boxes overlap but not both medians” or “75% below 50%”, so there IS LIKELY to be a difference between two plots.
3. 3) The distance between medians (DBM) of two plots as a percentage of overall visible spread (OVS), if sample size  $> 100$ , there is a difference if  $\text{BDM/OVS} > 20\%$ .

### Student scores in the six exams

The distributions of the scores of the students in the six exams are shown in Figure 6.9.

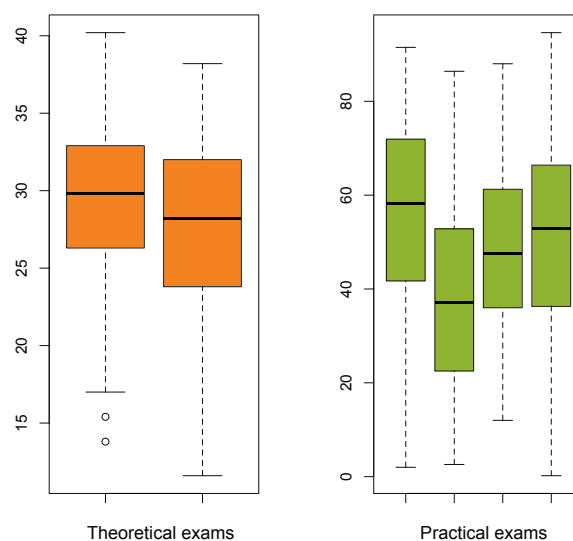


Figure 6.9. Box-and-whisker plots of the distribution of the scores of the students. X-axes are exams and Y-axes are student score (for exact values of Q1-3, see Figure 6.7). T1 and T2 are theoretical exams, P1 is Plant biology, P2 is Molecular biology, P3 is Animal biology and P4 is Biochemistry.

According to Rules 1 and 2, the distributions of T1 and T2 were similar (Rule 3 gives a  $\text{BDM/OVS} = 24\%$  indicating that there tends to be a difference). Thus, we conclude that the two theoretical exams (T1 is the morning exam, T2 is the afternoon exam) most likely had the same quartile distributions, i.e. student performance was the same at the two exams. If the scores in the afternoon at the T2 were lower, then it might show that the use of tablets in T1 did not affect the scores in T2 positively. Instead, we suggest that the reason might be student fatigue.

According to Rule 1, all practical exams also had the same quartile distributions. According to Rule 2, P2 had lower scores. According to Rule 3, P2 differed from P1 (43%), P3 (27%) and P4 (35%).

We conclude that the box-and-whisker plot analysis did not show any significant differences among exams in student performance. However, according to Rule 3, P2 (Molecular biology) tended to be lower in scores than the other three exams. This was confirmed in the subsequent analysis, but standardisation of scores corrected for this difference.

### 6.6.4 HISTOGRAMS OF STUDENT SCORES

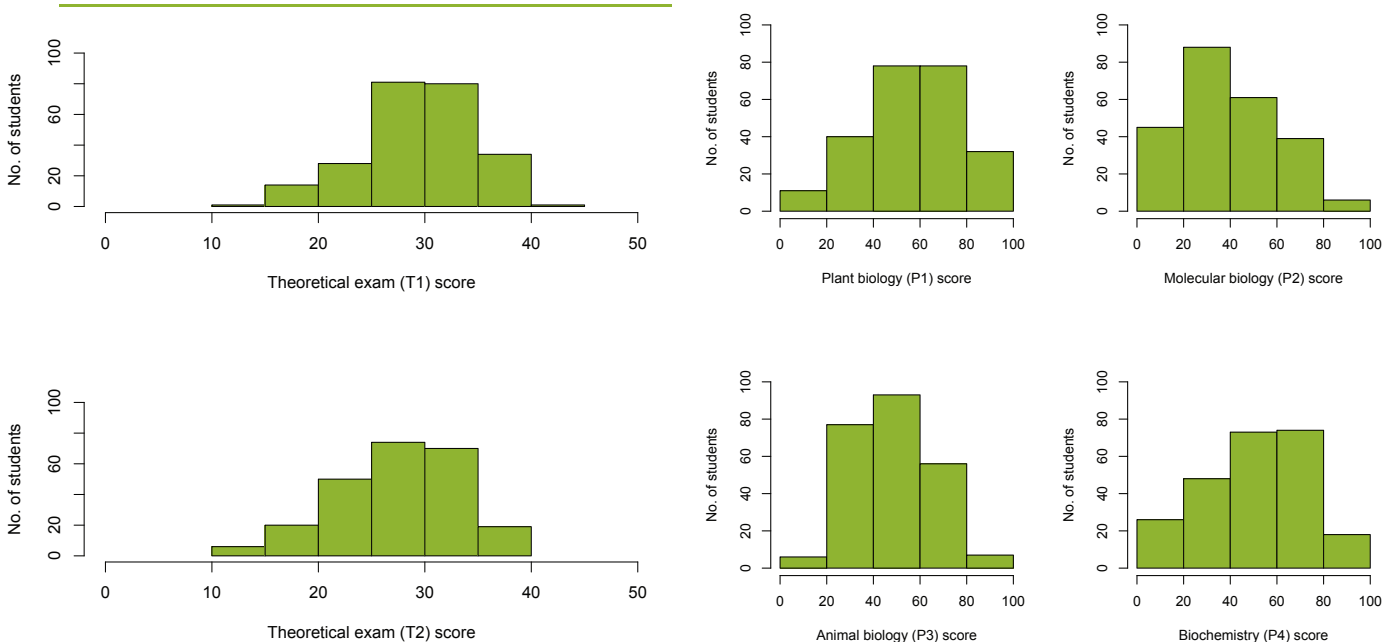
Histograms illustrating score distributions of the six exams are given in Figure 6.10.

No statistical analyses were made in order to compare the different distributions, because qualitatively they seem to confirm results from paragraph 3.

### 6.6.5 RELATIONSHIPS BETWEEN STUDENT PERFORMANCE IN THE DIFFERENT EXAMS

The two theoretical exams are regarded as replicates because they encompass the same number of questions (49), last the same amount of hours (three) and the number of questions from the seven disciplines is similar. Thus, we expect individual students to perform similarly in both. We tested this by a simple correlation analysis (Figure 6.11).

Figure 6.10. Histograms of the frequency distributions of the raw scores for the six exams.





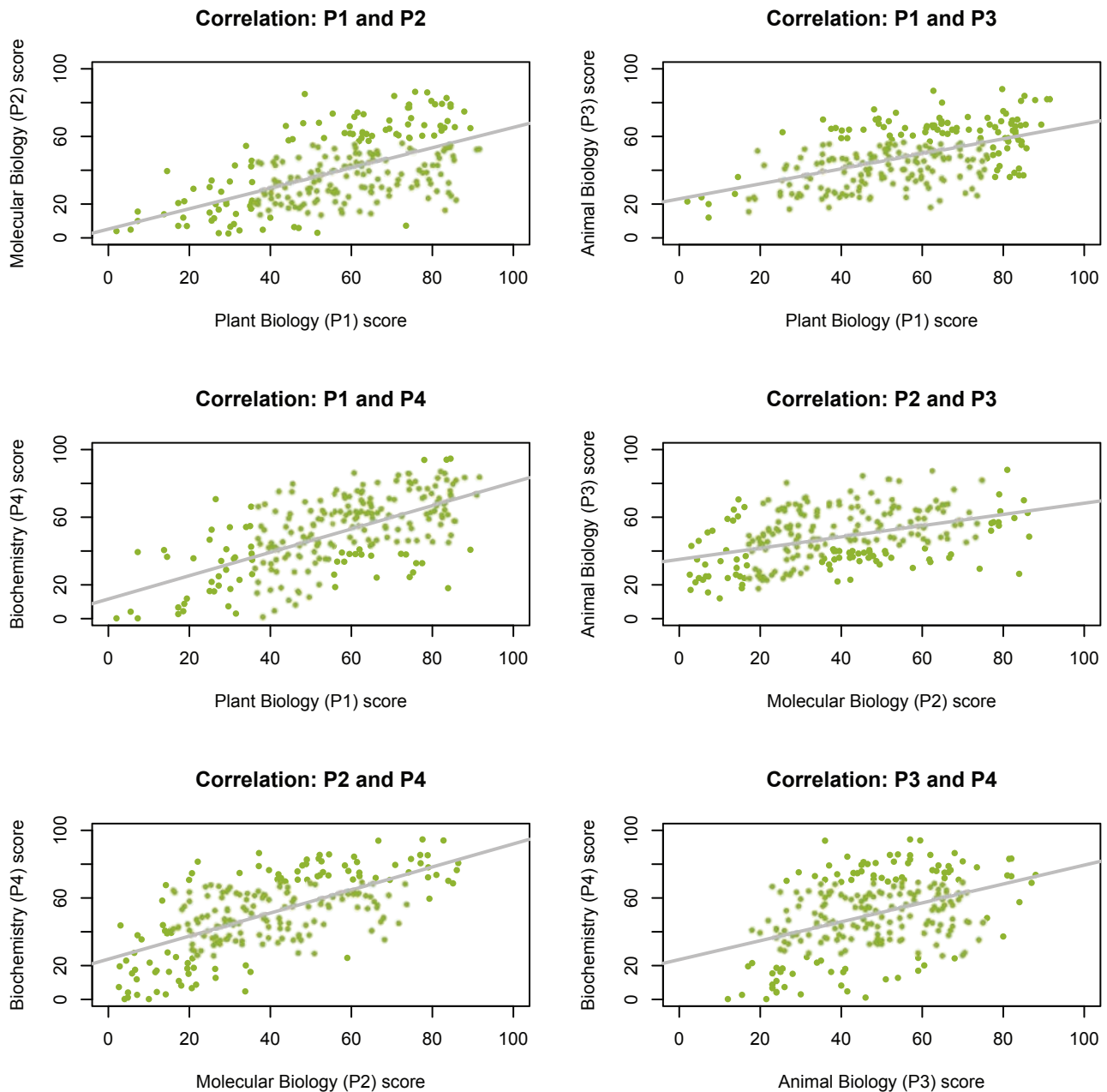
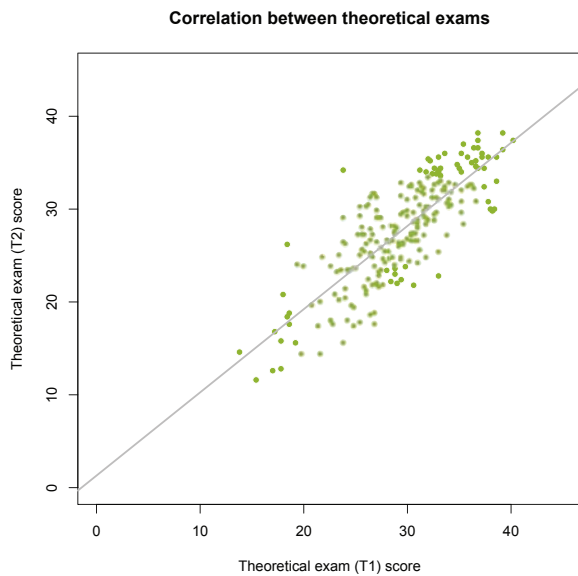


Figure 6.12. Correlation between raw scores in the four practical exams. P1 is Plant biology, P2 is Molecular biology, P3 is Animal biology and P4 is Biochemistry.

| R <sup>2</sup> (P-level) | P2 Molecular biology | P3 Animal biology   | P4 Biochemistry     |
|--------------------------|----------------------|---------------------|---------------------|
| P1 Plant biology         | 0.33 <sup>***</sup>  | 0.29 <sup>***</sup> | 0.39 <sup>***</sup> |
| P2 Molecular biology     |                      | 0.17 <sup>***</sup> | 0.41 <sup>***</sup> |
| P3 Animal biology        |                      |                     | 0.17 <sup>***</sup> |

Figure 6.13. R<sup>2</sup> and significance level (<sup>\*\*\*</sup>, P < 0.001) of the correlations between the different practical exams. P1 is Plant biology, P2 is Molecular biology, P3 is Animal biology and P4 is Biochemistry.



**Figure 6.11.** Correlation between raw scores in the two theoretical exams T1 and T2.

The individual student scores from the two theoretical exams were highly correlated ( $P < 0.001$ , if we regard the relationship as a regression (which we cannot!), we get  $R^2 = 0.66$ , i.e. 66% of the variation in one of the theoretical exams can be explained by the performance in the other).

On the other hand, the four practical exams should certainly not be replicates, but instead test different practical skills of the students. Therefore, we expected (and planned) weaker correlations. The possible six correlations between pairs of practical exams are shown in Figure 6.12. The strength of the correlations is given in Figure 6.13.

The individual student scores from the four practical exams were highly correlated ( $P < 0.001$ ), we get  $R^2$  varying from 0.17 to 39. However, these are much lower values than for the determination coefficient  $R^2$  for the correlation between the two

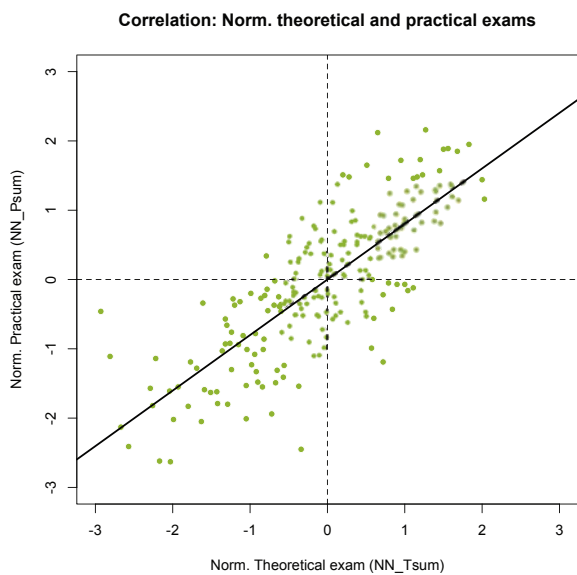
theoretical exams (0.66). Although, if a student is strong in one practical discipline, he/she generally does well in the other three practical exams, but there is still much differentiation in his/her skills. We got the strongest correlation between the scores for Plant biology and Biochemistry, and the lowest for the correlation between Animal biology and Biochemistry. For comparison, corresponding values for the Bern IBO practical exams ranged from 0.18 to 0.55.

### 6.6.6. FINAL SCORES AND MEDAL DECISION

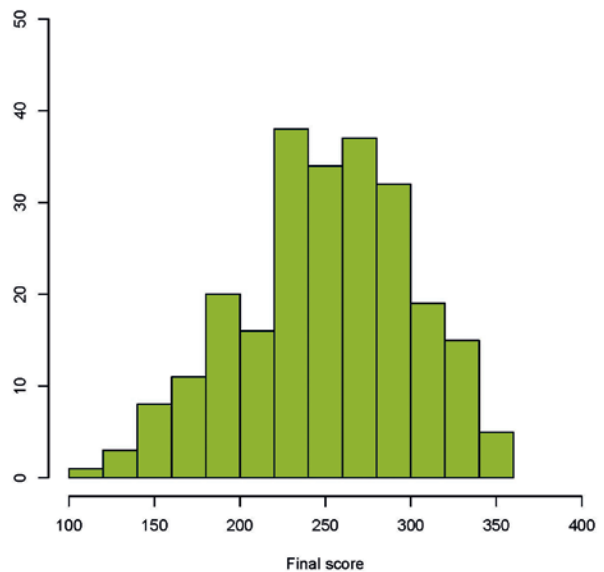
The normalised scores (N-T and NN-Psum, see Figures 6.7-6.8) for the exams were strongly correlated ( $R^2 = 0.64^{***}$ ). The distribution of the final scores of the students is given in Figure 6.15.







**Figure 6.14.** Correlation between the normalised scores for the two kinds of exam as defined in Figures 6.4-6.5.



**Figure 6.15.** Frequency distribution of the final scores for the students as defined in Figure 6.13.

Based on the final scores, we calculated the number of medals awarded to the students (Figure 6.16).

Based on the calculations in Figure 6.16, we awarded 26 students the gold medal, 48 the silver medal, 72 the bronze medal, and 24 got a certificate of merit.

Total number of students **239**

| Proportion of participants (n)        | Actual number | Extra ("gap" rule) | No. medals | Medal type |
|---------------------------------------|---------------|--------------------|------------|------------|
| 0.1                                   | 23.9          | 2                  | 26         | Gold       |
| 0.3                                   | 71.7          | 0                  | 48         | Silver     |
| 0.6                                   | 143.4         | 0                  | 72         | Bronze     |
| 0.7                                   | 167.3         | 0                  | 24         | Merit      |
| <b>Maximum possible no. of medals</b> | $0.7 n + 2$   | 170                | 170        |            |

**Figure 6.16.** Calculation of medal number and number of different medals awarded to students.

## 6.7 EXAM RESULTS

A total of 239 students participated in the exams, which resulted in the following distribution of individual medals (with a 10%-20%-30%-10%-30% distribution being the ideal required by IBO):

- **Gold** 26 (10.9%)
- **Silver** 48 (20.1%)
- **Bronze** 72 (30.1%)
- **Merit** 24 (10.0%)
- **No medal** 69 (28.9%)

On average in the theoretical exams, a student had 57% of the questions correct, whereas in the practical exams, the figure was 48%. Students from different regions of the world performed quite differently with respect to their final scores. Overall, students from the South East Asian countries got the highest exam scores with students from North America scoring second highest.

The national competition was won by China and USA, each with four gold medals, followed by Singapore and Taiwan, each with three gold medals and one silver medal.



# RISK MANAGEMENT PLAN

PREFERABLY, THERE WOULD BE DANISH  
AND INTERNATIONAL PRESS COVERAGE OF  
IBO2015, BUT IF NOT, THE EVENT WOULD  
NOT BE AFFECTED





# RISK • PART 7

During the IBO Advisory Board Meeting in Prague in 2014, it was suggested that the host country should prepare a risk management plan, and with advice from Olga Waksman, the following process was agreed upon in January 2015

- **STEP 1** Identify the risks through a brainstorming process
- **Step 2** Analyse the risks
- **Step 3** Prioritise and manage the risks
- **Step 4** Resolve the risks

The Organising Committee, together with the Head of Guides and the Head of Communication, brainstormed on risks. In this step (1), we concentrated our attention on only crucial items on the global level under the following headings: Budget, Ceremonies, Guides, Communication/PR, Logistics and Exams.

The following risks were identified and discussed. Priorities and detailed plans were made where needed:

## Budget

- During the project organising, the budget was re-evaluated, and in January 2015, the budget was still valid and IBO2015 had sufficient funds

## Ceremonies

- The entertainment would be organised by two professional musicians. They should be able to find replacements if needed
- The Concert Hall would be in charge of the technical aspect of the ceremonies.
- Two former IBO students would host the ceremonies. They would be each other's replacement. In addition, a professional stage manager would be engaged to assist them.

## Guides

- A detailed risk management plan would be discussed with both Chief Guides and Activity Guides on February 28, 2015. The organisation of the guides ensured that they could replace each other if needed.

## Communication/PR

- Any lack of press coverage should not be a problem. Preferably, there would be Danish and international press coverage of IBO2015, but if not, the event would not be affected.

- Handling bad press would be discussed with the University Press Office. Only the Chairman of the Organising Committee would talk to the press in case of bad press. Guides, helpers and supporters were all informed about this prior to IBO2015.

### Logistics

- Accommodation and transport would be organised by professional congress organiser “KongresKompagniet”, and they would solve any problems.

### Exams

- A new programme for translation of exams and implementation of theoretical exams on tablets would be developed. If the development was unsuccessful, the programme developed for IBO2013 would have been used.
- A programme for implementation of practical exams on tablets would be developed. If the development was unsuccessful, the practical

exams would have been printed out and answered on paper

- Some exams would be held near a construction site. According to the timetable for the construction site, the noise should end by week 21 and summer holiday was planned for week 28-29. The progression of the construction was followed.
- Spare labs were reserved but these were not suitable for molecular tests.

### Key personnel

- The Chairman of the Scientific Committee, Jens Mogens Olesen, could be replaced or supported by Vibeke Birkmann and the three International Advisors.
- The Project Coordinator, Annika Büchert, Lindberg documented her work through the progress reports and through weekly discussions with the IBO2015 Secretariat.





A part of the Aarhus University campus seen from above





ANNEX 1



# PRESS CUTTINGS

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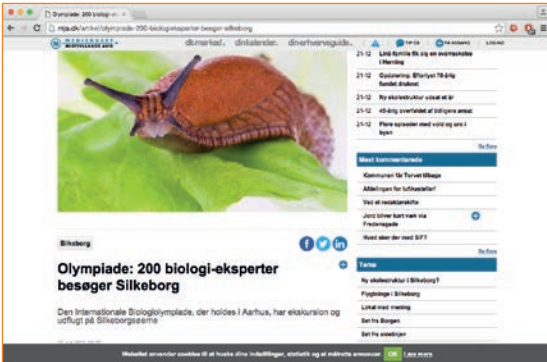
**IBO2015** IN THE MEDIA

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# PRESS ANNEX 1



**23 JULY** **Altinget (online news article)**  
[www.alinget.dk/miljoe/navnenyt.aspx?id=18898](http://www.alinget.dk/miljoe/navnenyt.aspx?id=18898)



**22 JULY** **Ugeavisen Vejle (printed news article)**  
**Frederiksborg Amts Avis (printed news article)**

**Sjællandske Nyheder (online news article)**  
[sn.dk/Rudersdal/Nordsjaellaender-tog-bronze-ved-OL/artikel/503993](http://sn.dk/Rudersdal/Nordsjaellaender-tog-bronze-ved-OL/artikel/503993)

**19 JULY** **B.T. (printed news article)**  
**P4 Østjylland (radio broadcast)**  
[www.dr.dk/p4aarhus/p4aarhus-morgen](http://www.dr.dk/p4aarhus/p4aarhus-morgen)



**17 JULY** **Jyllands-Posten (online news article)**  
[www.jyllands-posten.dk/protected/premium/indland/ECE7873951/Her-bliver-unges-fremtid-afgjort-og-venskaber-skabt](http://www.jyllands-posten.dk/protected/premium/indland/ECE7873951/Her-bliver-unges-fremtid-afgjort-og-venskaber-skabt)

**Vejle Amts Folkeblad (online news article)**  
[vafo.dk/article/20150716/ARTIKLER/150719343](http://vafo.dk/article/20150716/ARTIKLER/150719343)

**16 JULY** **P4 Morgen Østjylland (radio broadcast)**  
[www.dr.dk/radio/ondemand/p4aarhus/p4-morgen-2015-07-16-06-05-8#!](http://www.dr.dk/radio/ondemand/p4aarhus/p4-morgen-2015-07-16-06-05-8#!) (1.40 min. in)

**Vejle Amts Folkeblad (online news article)**  
[vafo.dk/article/20150716/ARTIKLER/150719364](http://vafo.dk/article/20150716/ARTIKLER/150719364)



**15 JULY** **TV2 Syd at 17.25, 18.25, 19.30 and 22.20 (TV feature)**  
[www.tvsyd.dk/arkiv?video\\_id=72344&autoplay=1](http://www.tvsyd.dk/arkiv?video_id=72344&autoplay=1)  
[www.tvsyd.dk/arkiv?video\\_id=72336&autoplay=1](http://www.tvsyd.dk/arkiv?video_id=72336&autoplay=1)  
[www.tvsyd.dk/artikel/291493:Her-er-godt-nok-koldt](http://www.tvsyd.dk/artikel/291493:Her-er-godt-nok-koldt)

**Midtjyllands Avis (online news article)**  
[mja.dk/artikel/olympiade-200-biologiekspertter-besoger-silkeborg](http://mja.dk/artikel/olympiade-200-biologiekspertter-besoger-silkeborg)



**14 JULY** **TV2 Nyheder at 19.30 and 22.20 (TV feature)**  
**Nyt om Østjylland (online news article)**  
[xn--nytostjylland-uqb.dk/himmelbjerget-befolkes-af-200-biologer-20150714/artikler/707149118/2284](http://xn--nytostjylland-uqb.dk/himmelbjerget-befolkes-af-200-biologer-20150714/artikler/707149118/2284)

**DR Viden (online news article)**  
[www.dr.dk/nyheder/viden/miljoe/biologi-ol-i-aarhus-gavner-hjemmebanen-de-fire-danske](http://www.dr.dk/nyheder/viden/miljoe/biologi-ol-i-aarhus-gavner-hjemmebanen-de-fire-danske)



## Skanderborg Lokalavis

(online news article)

[skanderborg.lokalavisen.dk/himmelbjerget-befolkes-af-200-biologer/Skanderborg-Lokale-nyheder/20150714/artikler/707149118/1395](http://skanderborg.lokalavisen.dk/himmelbjerget-befolkes-af-200-biologer/Skanderborg-Lokale-nyheder/20150714/artikler/707149118/1395)

## Dagbladet Ringkøbing-Skjern

(printed news article)



## Vejle Amts Folkeblad / Fredericia

Dagblad (printed news article)

[vafo.dk/article/20150713/ARTIKLER/150719718](http://vafo.dk/article/20150713/ARTIKLER/150719718)

## TV-Syd (online news article)

[www.tvsyd.dk/artikel/291206:250-biologi-noerder-skal-laere-om-danske-kyster](http://www.tvsyd.dk/artikel/291206:250-biologi-noerder-skal-laere-om-danske-kyster)



## TV2 Østjylland at 16.30, 18.10 and 19.30 (TV feature)

[www.tv2oj.dk/artikel/264665:Aarhus--Udvalgt-blandt-1-600-elever](http://www.tv2oj.dk/artikel/264665:Aarhus--Udvalgt-blandt-1-600-elever)  
[www.tv2oj.dk/arkiv?video\\_id=59355&autoplay=1](http://www.tv2oj.dk/arkiv?video_id=59355&autoplay=1)

## DR TV-Avisen (TV feature)

[www.dr.dk/tv/se/tv-avisen-med-sporten/tv-avisen-med-sporten-og-vejret-2015-07-12#!/12:06](http://www.dr.dk/tv/se/tv-avisen-med-sporten/tv-avisen-med-sporten-og-vejret-2015-07-12#!/12:06)

## DR Viden (online news article)

[www.dr.dk/nyheder/viden/miljoe/250-unge-fra-61-lande-dyster-ved-biologi-ol-i-aarhus](http://www.dr.dk/nyheder/viden/miljoe/250-unge-fra-61-lande-dyster-ved-biologi-ol-i-aarhus)

## DR P4 Radioavis (radio broadcast)

[www.dr.dk/radio/ondemand/p4kbh/radioavisen-2015-07-12-12-00#!](http://www.dr.dk/radio/ondemand/p4kbh/radioavisen-2015-07-12-12-00#!)  
(13 min. in)

## DR P4 Morgen (radio broadcast)

[www.dr.dk/p4aarhus/p4aarhus-morgen](http://www.dr.dk/p4aarhus/p4aarhus-morgen)  
[www.dr.dk/radio/ondemand/p4aarhus/p4-weekend-2015-07-12-07-03-8#!/01:08:05](http://www.dr.dk/radio/ondemand/p4aarhus/p4-weekend-2015-07-12-07-03-8#!/01:08:05)

## DR2 Morgen (TV feature)

[www.dr.dk/tv/se/dr2-morgen/dr2-morgen-2015-07-12#!/23:20](http://www.dr.dk/tv/se/dr2-morgen/dr2-morgen-2015-07-12#!/23:20)  
(23.20 min. in)

## Aarhus Stiftstidende (online news article)

[stiften.dk/aarhus/gymnasieelever-fra-hele-verden-indtager-aarhus](http://stiften.dk/aarhus/gymnasieelever-fra-hele-verden-indtager-aarhus)

## Jyllands-Posten (printed news article)



## DR P1 Morgen (radio broadcast)

[www.dr.dk/radio/ondemand/p1/p1-morgen-2015-07-11#!](http://www.dr.dk/radio/ondemand/p1/p1-morgen-2015-07-11#!)

## Frederiksborgs Amts Avis

(printed news article)

## Sjællandske Nyheder (online news article)

[sn.dk/Rudersdal/18-aarige-Karen-til-OL-i-biologi/artikel/501718](http://sn.dk/Rudersdal/18-aarige-Karen-til-OL-i-biologi/artikel/501718)



## TV2 Lorry (TV feature)

[www.tv2lorry.dk/arkiv/2015/07/10?video\\_id=104880](http://www.tv2lorry.dk/arkiv/2015/07/10?video_id=104880)



## DR Aftenshowet (TV feature)

[www.dr.dk/tv/se/aftenshowet/aftenshowet-2015-07-09#!/12:38](http://www.dr.dk/tv/se/aftenshowet/aftenshowet-2015-07-09#!/12:38)



## Videnskab.dk (online news article)

[videnskab.dk/kort-nyt/stor-international-biologiolympiade-unge-kommer-til-danmark](http://videnskab.dk/kort-nyt/stor-international-biologiolympiade-unge-kommer-til-danmark)



## Gladsaxebladet (online news article)

[www.gladsaxebladet.dk/node/5974](http://www.gladsaxebladet.dk/node/5974)

## Rudersdal Avis (online news article)

[rudersdal.lokalavisen.dk/talentfulde-unge-fra-birkeroed-gymnasium-repraesenterer-danmark-ved-olympiader-Lokale-nyheder/20150706/artikler/707079498/1036](http://rudersdal.lokalavisen.dk/talentfulde-unge-fra-birkeroed-gymnasium-repraesenterer-danmark-ved-olympiader-Lokale-nyheder/20150706/artikler/707079498/1036)

## DR P4 Østjylland (radio broadcast)

[www.dr.dk/radio/ondemand/p4aarhus/regionale-nyheder-2015-07-06-09-30-4](http://www.dr.dk/radio/ondemand/p4aarhus/regionale-nyheder-2015-07-06-09-30-4)

## TV2 Østjylland (online news article)

[www.tv2oj.dk/artikel/263881:Aarhus--Anders-dyster-til-OL-i-biologi](http://www.tv2oj.dk/artikel/263881:Aarhus--Anders-dyster-til-OL-i-biologi)



## Aarhus Stiftstidende (online news article)

[stiften.dk/dagens-portraet/biologi-olympiade-paa-hjemmebane](http://stiften.dk/dagens-portraet/biologi-olympiade-paa-hjemmebane)



## Aarhus Stiftstidende (online news article)

[stiften.dk/aarhus/ol-i-aarhus-61-lande-dyster-ved-bio-olympiade](http://stiften.dk/aarhus/ol-i-aarhus-61-lande-dyster-ved-bio-olympiade)





## IBO2015 MEDIA ARCHIVE

THE MEDIA ARCHIVE IS AVAILABLE  
AT [WWW.IBO2015.ORG](http://WWW.IBO2015.ORG)





ANNEX 2

# MANUAL FOR PRACTICAL EXAMS



VERSION 6 · 08 JULY 2015

# MANUAL ANNEX 2

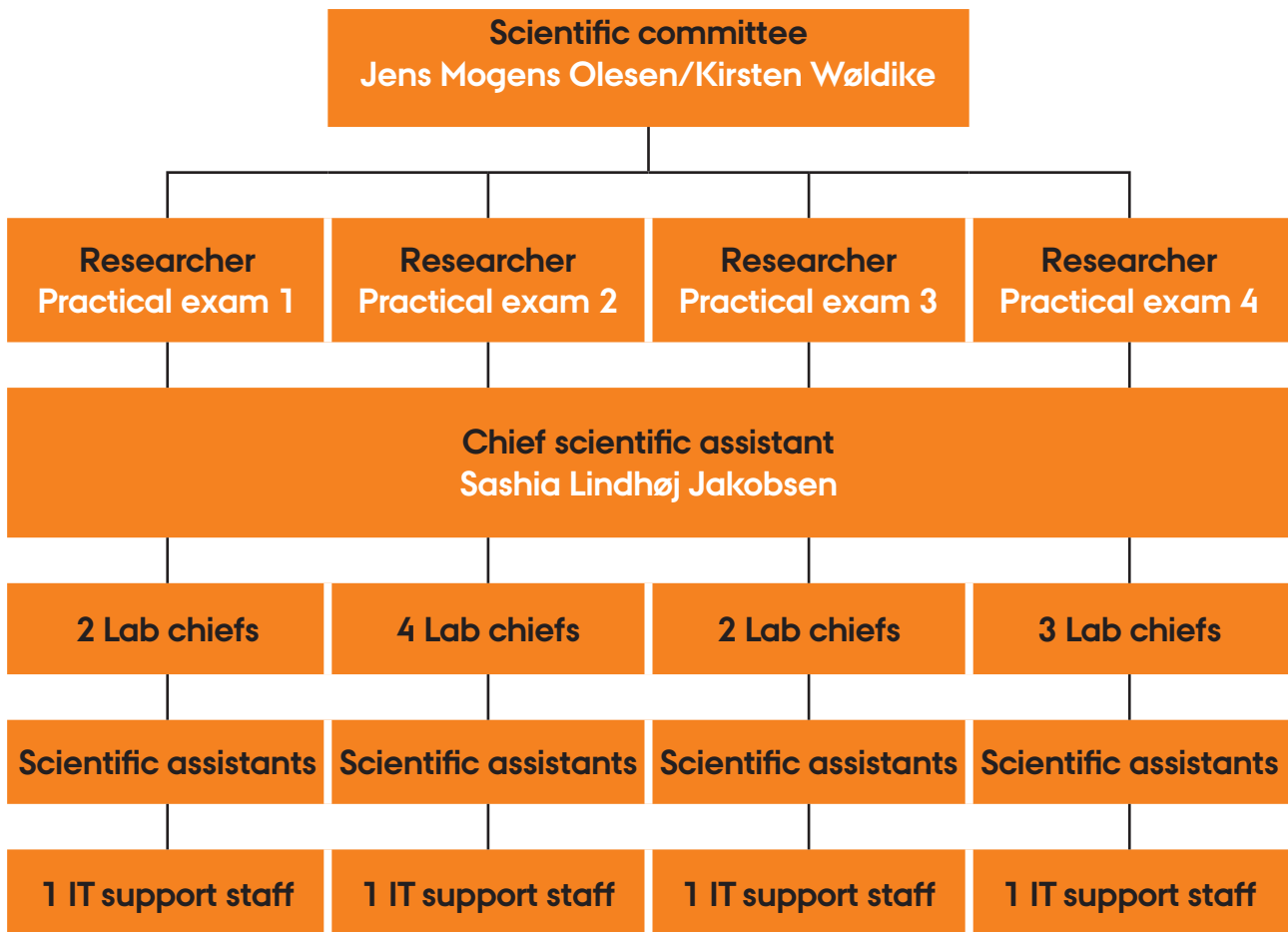
This manual is intended to give a brief introduction to the practical exams during the International Biology Olympiad IBO2015 for researchers, scientific assistants and IT supporters (helping before, during and after the exam) and student guides (helping during the exam). This is hopefully the final version of manual.

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# 1. ORGANISATION OF PRACTICAL EXAMS



**Table 1.1:** The present organization of the practical exams is suggested as illustrated above.

## 1.1. SCIENTIFIC ASSISTANTS

Scientific assistants will help during the practical exams, as well as setting up the laboratories, cleaning up the labs and marking the exams. Each researcher has recruited the assistants. Scientific assistants with specific knowledge of laborato-

ries will be suggested for exams developed by non-AU researchers. The salary for the scientific assistants is set to be 5.000 DKK for the entire IBO plus free food. Accommodations for scientific assistants from DTU will be provided at the university.

## 1.2. IT SUPPORT STAFF

---

The entire practical exam (protocol and answer sheets) will be accessible on tablets for all four practical exams. The tablets will be installed with necessary software by the IT support staff before

the exam starts. One IT support staff will be present at each of the four practical exams. IT support staff will be recruited in collaboration with Alexandra Institute.

## 1.3. IT SPECIALISTS

---

Daniel Wegmann and Jonas Helfer (from IBO2013) have developed the IBO software together with Morten Bohøj (Alexandra Institute).

Daniel and Jonas will be present during the practical and theoretical exams and they will start the exams.

## 1.4. EMPLOYMENT AND CONTRACT

---

The employment period is from 10-19 July unless special arrangements are agreed upon. For the employment of scientific assistants/IT supporters the employees will provide the following information (Name, CPR-number, Mail address, Mobile phone number, Address, Postal code, City) to IBO project manager, Annika B. Lindberg. Hereafter the scientific assistants/IT supporters will sign the employment form produced by the project manager. The salary will be paid after 19 July 2015.



## 2. TIME SCHEDULE FOR PRACTICAL EXAMS – 10-19 JULY

### 2.1. SCHEDULE FOR RESEARCHERS, SCIENTIFIC ASSISTANTS, IT SUPPORTERS DURING IBO2015

The time schedule for researchers, scientific assistants and IT supporters during IBO2015 is very extensive. The schedule is shown in a separate screenshot.

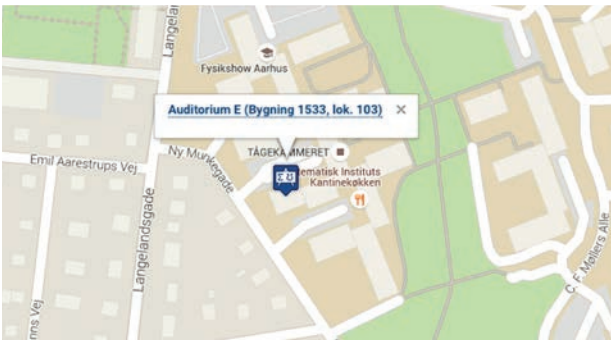


Figure 2.1. Meeting place on 10.07 at 12.00 is Auditorium E. See also figure 4.3 for larger map.

#### 2.1.1. Scientific assistants and IT supporters

Friday 10.07 (Auditorium E, Building 1533 room 103, Ny Munkegade 116, 8000 Aarhus C): 12.00-16.30: All helpers, assistants, guides and supporters meet for a general introduction to the IBO2015 event.

- 16.30-19.00: Scientific assistant will be introduced to the programme for the practical

exams. Hereafter the IT supporters and IT specialist will give a quick course in the use of the exam.

- 19.00: Dinner in Mathematical cantina

#### 2.1.2. Scientific assistants

- Saturday 11.07: Morning: Lab material distributed to all labs;
- 13.00: Lunch in Greenhouses;
- Afternoon: set up of laboratories; Introduction to tablets,
- 19.00: Pizza in Mat lab together with sub-jury
- Sunday 12.07: Set up of laboratories
- 16.00: Opening ceremony in the Concert Hall Aarhus. Wear IBO T-Shirt.
- Monday 13.07: Setting up of laboratories, prepare material for exams, 3\*100 Lab coats from Health (building 1241) to waiting room for exam 1,3,4. 100 lab coats from Molecular biology exam 2. Lunch in Mat lab 13.00; Dinner in Mathematical cantina 18.15. Remember not to talk about exam when you have dinner and lunch as the student will be there.
- Tuesday 14.07: Practical exams (see details later). Wear IBO T-Shirt. Meet in building 1540



at 06.30 to pick up tablets (breakfast will be provided here).

- Wednesday 15.07: Correction exams and cleaning up labs
- Thursday 16.07: Correction exams. Scientific assistants from DTU drive home. 18.00 - Cultural night
- Friday 17.07: Morning: Clean up after cultural night (scientific assistants); Afternoon: organisation of closing ceremony at Radisson
- Saturday 18.07: organisation of closing ceremony at Radisson
- 15.00: Closing ceremony in the Concert Hall Aarhus. Wear Gala ;-)
- 17.30-19.00: Flags and roll up from Music Hall to Radisson
- 19.00-24.00: Party at Centralværkstedet
- Sunday 19.07:
- 17.00: Farewell party Mathematical cantina

### 2.1.3. IT supporters

- Saturday 11.07: Morning: Tablet to Auditorium E, charging tablets and push IBO page
- 13.00: Lunch in Greenhouses;
- Afternoon: Tablets to secure room (Tablets for tent stay in Auditorium E)
- Sunday 12.07: Pick up guests at railway station
- 16.00: Opening ceremony in the Concert Hall Aarhus. Wear IBO T-Shirt.
- Monday 13.07: Tablet demonstration in Auditorium E. Meeting time 08.00 in Aud E (set up tablets + touch pen + calculator + rye bread). Password and login provided for each

student. Remember not to talk about exam when you have dinner and lunch as the student will be there.

- Tuesday 14.07: Exams (see details later) Wear IBO T-Shirt. Meet in building 1540 at 06.30 to pick up tablets (breakfast will be provided here).
- Wednesday 15.07: Preparation of tablets for Theoretical exams; Set up auditoriums for theoretical exams (cardboard in Auditorium E and F);
- Thursday 16.07: Theoretical exams; Collect tablets and return to Auditorium E. Assistance during Cultural night
- Friday 17.07: Morning: Tablet + equipment to IBO office at Katrinebjerg; Afternoon: organisation of closing ceremony at Radisson
- Saturday 18.07: Organisation of closing ceremony at Radisson
- 15.00: Closing ceremony in the Concert Hall Aarhus. Wear Gala ;-)
- 17.30-19.00: Guide guest from Music Hall to concert Hall
- 19.00-24.00: Party at Centralværkstedet
- Sunday 19.07:
- 17.00: Farewell party Mathematical cantina



## 2.2. PRESENTATION AND DISCUSSION OF PRACTICAL EXAMS FOR SUB-JURY AND JURY

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### Researcher

The researchers developing the practical exams will be presenting and discussing the practical exam and protocol with the sub-jury on the 08.07 (13.00 Tobias Wang, Rasmus Buchanan and at 16.00 Anders Barfod) and 10.07 (Rasmus Frandsen and Maher Hachem) 09.07. The sub-jury is a subset of jury members that will help improving the practical exams before the IBO2015 starts.

On Monday 13.07 the practical exams will be presented and discussed with the entire jury. Here the researcher will discuss improvements with the

jury. This will not be done in plenum, but in smaller groups in the jury room (from 10.10-14.00 – see detailed jury schedule below). At 14.00 the chairman will lead the plenum discussion of the practical tests. When a final version of the exams has been agreed upon the jury members will translate this into their native language.

During the presentation of practical exams for the sub-jury and jury a set of equipment will be displayed.

## 2.3. MARKING AND DISCUSSION OF MARKING

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Researcher and scientific assistants:

The researchers and scientific assistants will be marking the exams the practical exams on 15.07 and 16.07. The deadline for correction of practical exams 16.07 at 18.00 ;-).

On 17.07 the marking will be presented and discussed between researchers and the jury. The jury members will have the possibility to control the marking and the points given.

**Labs will be cleaned up in the morning of 15.07.**



## 3. SETTING UP LABS

### Researcher and scientific assistants:

The lab will be set up from Saturday 11.07. Saturday morning equipment will be brought to the lab. Each exam has boxes prepared specifically for this exam. Saturday afternoon and hereafter the labs will be setup and material for the exams prepared.

IBO has 20 key cards for the labs as well as the buildings with the Mathematical cantina, Mat lab and Auditorium E (see map 4.3).

### 3.1. SET UP OF LAB SPACE FOR EACH STUDENT

**For each exam the researcher decides how to organise the lab space for each student and how to secure that the lab space is ready for the next student.**

IT supporter will prepare the tablets between each group of students and provide password and login for each student. Each student needs an isolated lab space. Not all labs have chairs. Cardboard boxes will be used for separating students. **Each lab space belongs to a specific country and this is indicated with country name, country code and/**

**or flag in addition to the order the students will take the exam.**The countries should be set up in alphabetic order according to the country code (not the name of the country) (see Annex 1). A touch pen/pen, calculator, paper is available for each student. The students must not bring anything into the lab or out of the lab.

Each exam will prepare pictures of the materials and equipment according to the list in the exam protocol (Saturday afternoon). These lists should send to Annika (abl@cse.au.dk) for printing.

Figure 3.1: Indication of lab space from Singapore IBO2012





## 4. RUNNING PRACTICAL EXAMS (TUESDAY 14.07)

### 4.1. STUDENTS

The IBO students will take all four practical exams in one day. Four students represent each country and these students are assigned into the four different teams taking different exams at the same time. Team 1 (students with country code + 1 e.g. DNK-1) (green badge and armband), team 2 (blue badge and armband) team 3 (pink badge and band), team 4 (yellow badge and armband). The students from one team are not allowed to meet with students from another team. Each team will therefore rest in separate room between exams.

#### Receiving Lab coats

Monday evening the students will collect their lab coats. Team 3 (pink), will go to Mol X building 1120, seminar room to find their lab coat and receive badges and armbands. Team 1 (green), 2 (blue) 4 (yellow) will go to Health, building 1241, læsesalen to collect their lab coats.

#### Exam


In the morning (08.30-08.50) the students will find gloves in the first waiting room. Before each exam the students will take gloves in the waiting room. In the next break (10.45-11.20) they will have snacks in the waiting room assigned to the second exam. Lunch will be served in the waiting room (before their third exam) at 13.15-14.20 and in the last break (16.15-16.50) they will have snacks again.





**The students must not bring anything into the lab or out of the lab – only gloves.**

#### Return of lab coats

After the final exam students on team 1 (green), 2 (blue) 4 (yellow) bring their lab coats back to Exam 1 (Health, building 1241) and team 3 (pink), bring their lab coats back to exam 2 (Molecular biology 1120).

Figure 4.1: Example of lab space sign. Each student has a unique code (e.g. DNK-1) and all students with XXX-1 belong to the green team. The four different teams (indicated by four colours) will not be allowed to meet during the exams.

Practical exam 1 

| Time        | Group | Student | Colour                                                                                |
|-------------|-------|---------|---------------------------------------------------------------------------------------|
| 09.00-10.30 | 1     | DNK-1   |  |
| 11.30-13.00 | 2     | DNK-2   |  |
| 14.30-16.00 | 3     | DNK-3   |  |
| 17.00-18.30 | 4     | DNK-4   |  |

## 4.2. GUIDES

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Guides will hand out badges and armbands in the morning on 14.07 and make sure that the students wear badges and armbands in the correct colour. Students are not allowed to change colour.

During the practical exams some of the student-guides will assist in the laboratory while other guides will follow the students from one exam to the next. The guides helping in the labs will need a short introduction before the exams starts. Their duty is for example to follow students to the toilet

during exams. Between exams they help scientific assistants and researchers to clean each lab space and set up for the next exam.

After the final exam the guides will follow students from team 1 (green), 3 (pink), 4 (yellow) to Health, building 1241 and ensure that the students hand in the lab coats. Guide following team 2 (blue) will bring the lab coats back to exam 2 (Molecular biology 1120).

## 4.3. RESEARCHER, SCIENTIFIC ASSISTANTS AND IT SUPPORTERS

---

Scientific assistants, researcher and IT supporters will meet at 06.30 in building 1540 basement. Bring tablets to labs. Breakfast will be provided the waiting rooms.

### Before first exam

- Gloves in waiting room, student leave bags in waiting room.
- Prepare labs for the first group of students.
- Give short instruction to guides helping during and between exams
- IT supporters: provide print out of password to each student, check that the tablets are plugged-in
- IT developers open exams – Individual clocks will be running on each tablet.

### Between exams

- Clean up after students and prepare for new students
- Check that all lab spaces are set up correct
- IT supporters: provide print out of password to each student, check that the tablets are plugged-in

### After the final exam

- Scientific assistants and guides will bring cardboard, touch pens, calculators and paper from labs to Auditorium E.
- From Exam 3 extension cords will be brought to Auditorium E.
- IT supporters and guides will bring tablets to Auditorium E.

## 4.4. INSPECTORS DURING EXAMS

According to the IBO guidelines each exam should be observed by inspectors, which are members of the jury. The inspectors will observe the entire exam and note any irregularities during the exam. This will help researchers if a discussion of irregu-

larities arises after the exams. If Irregularities occur during the exam please inform the inspector (e.g. a microscope beaks down; student doesn't have enough substrate etc.)

## 4.5. CHEATING DURING EXAMS

Cheating can occur during the practical exams. The scientific assistants will observe and report to the lab chiefs if they notice any kind of cheating. The lab chiefs will report to the researcher, who will evaluate the situation, and if needed discuss it with Erik Meineche Schmidt.

During the exams the IT support staff will make sure that the username on the tablets matches the students' code.

Figure 4.2: Time schedule for practical exams

### uesday 14.07 practical exam at Aarhus University

|             | Students               |        |        |        | Guides in labs                          | Scientific assistants and researchers | Inspector     |
|-------------|------------------------|--------|--------|--------|-----------------------------------------|---------------------------------------|---------------|
|             | Team 1                 | Team 2 | Team 3 | Team 4 |                                         |                                       |               |
| 5.30-7.45   | Breakfast              |        |        |        | Breakfast                               |                                       |               |
| 7.00-08.30  | Bus to AU              |        |        |        | Bus to AU                               |                                       |               |
| 8.30-08.50  | rest in waiting room   |        |        |        | receive introduction to practical exams | gives introduction to practical exams |               |
| 8.50-09.00  | into lab               |        |        |        |                                         |                                       |               |
| 9.00-10.30  | exam 1                 | exam 2 | exam 3 | exam 4 | helping at exam                         | supervising exam                      | observe exams |
| 10.30-10.45 | walk to new break room |        |        |        |                                         |                                       |               |
| 10.45-11.20 | break                  |        |        |        | cleaning of lab space                   | change of material                    |               |
| 11.20-11.30 | into lab               |        |        |        |                                         |                                       |               |
| 11.30-13.00 | exam 2                 | exam 3 | exam 4 | exam 1 | helping at exam                         | supervising exam                      | observe exams |
| 13.00-13.15 | walk to new break room |        |        |        |                                         |                                       |               |
| 13.15-14.20 | Lunch                  |        |        |        | cleaning of lab space                   | change of material                    |               |
| 14.20-14.30 | into lab               |        |        |        |                                         |                                       |               |
| 14.30-16.00 | exam 3                 | exam 4 | exam 1 | exam 2 | helping at exam                         | supervising exam                      | observe exams |
| 16.00-16.15 | walk to new break room |        |        |        |                                         |                                       |               |
| 16.15-16.50 | break                  |        |        |        | cleaning of lab space                   | change of material                    |               |
| 16.50-17.00 | into lab               |        |        |        |                                         |                                       |               |
| 17.00-18.30 | exam 4                 | exam 1 | exam 2 | exam 3 | helping at exam                         | supervising exam                      | observe exams |
| 18.30       | Dinner                 |        |        |        |                                         |                                       |               |
|             | social event optional  |        |        |        |                                         |                                       |               |



## 5. SETTING UP TABLETS

08.07: Tablets to Building 1110, basement video room;

10.07: 40 tablets to Auditorium E at 11 am.

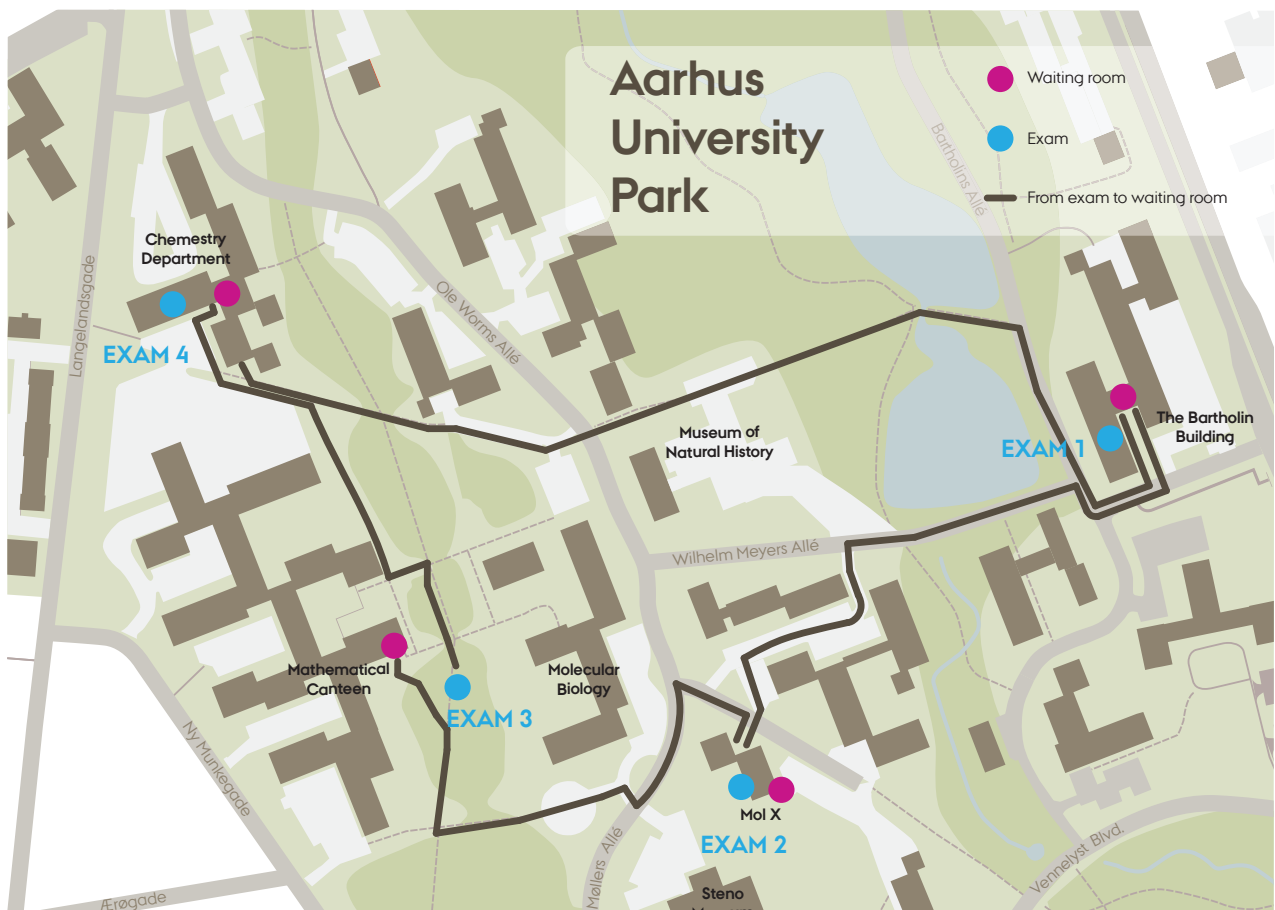
11.07: morning: all tablets to Auditorium E, afternoon tablets to labs (63 per lab); tablets for tent

stay in Auditorium E.

13.07: Tablets in Auditorium E for questionnaire + touch-pen, calculator and microscope. Student will visit the lab in groups of max 63 students:  
Group 1: 09.30 -11.00; Group 2: 09.30 -11.00;  
Group 3: 14.30-16.00 group 4 16.15-17.45

## 6. TRAINING AND SAFETY OF PRACTICAL EXAMS

Figure 4.3: The route on Aarhus University campus for IBO participants during practical exams



## 6.1. INSTRUCTION VIDEOS AND INSTRUCTION TO EQUIPMENT

Three small introduction videos have been developed to help the students use tablets, take photos with click on microscopes and use pipettes. The videos will be available on 1 July.

An exam about Denmark will also will be available on 1 July. Here the students can also pra-

ctice the answering possibilities for the practical and theoretical exams.

On Monday 13 July students will take a test in Aud. E with support from IT supporters. Here they will also learn to use the tablet.

## 6.2. SPECIAL LAB PROTECTION

- All students, scientific assistants, will wear lab coats borrowed from Health.
- All students can find gloves in the waiting room and bring them to the exam.
- In the chemistry department it is required to wear glasses at all times in the labs.
- First aid equipment will be available in Mat lab; in the Chemistry department.

# 7. PRACTICAL INFORMATION FOR SCIENTIFIC ASSISTANTS FROM DTU

### Accommodation

#### MATHEMATICAL DEPARTMENT, BUILDING 1530 (A)

1535 (B) and 1540 (R)

Ny Munkegade, 8000 Aarhus C

[www.math.au.dk/forskning/faciliteter/gaesteetage](http://www.math.au.dk/forskning/faciliteter/gaesteetage)

#### Single rooms

Daisy, Rasmus, Maher, and Preben

#### Single or double

Line Ledsgaard Jensen + Rikke Linnemann Nielsen

#### Appartment

Morten Philip Skovsted + Emil Tosti + Joachim Johansen

#### GÆSTEHUSET, OTTO RUDSGADE 67, 8200 AARHUS N

[www.studenterhusfonden.dk/gaestehusguesthouse.aspx](http://www.studenterhusfonden.dk/gaestehusguesthouse.aspx)

#### Room 1

Ditte Juhl Mogensen, Cecilie Dehnfeld Nørgaard, Marwa Adlouni

#### Room 2

Charlotte Beck, Anne Sofie Lærke Hansen, Christina Hansen, Line Hillerup Kristansen

**Sashia will follow you here Friday 10.07.**

## Meals outside the official program

**Breakfast** Saturday and Sunday morning will be in the refrigerator in Mat lab

**Lunch** Sunday – Pizza from Saturday or Voucher to Anettes Sandwich, Sashia will organize this.

**Breakfast** Monday, Wednesday, Thursday in Mathematical cantina with IBO voucher

**Lunch** Wednesday in Mathematical cantina with IBO voucher

**Dinner** Wednesday provided by Mathematical cantina and placed in the refrigerator in Mat lab

# 8. RISK MANAGEMENT

## 8.1. FAILURE OF TABLET SOFTWARE

If the tablet software is not functioning the protocol and answer sheet for the practical exams will be printed out by the jury members and placed in envelopes for each student.

On the exam morning each practical lab will receive envelopes with the translated version of the practical exam for all students labelled with student number. Some countries have several official languages and student number is therefore important.





## 9. LABORATORY DETAILS

All laboratories are booked from 10-16 July.

Waiting rooms are booked from 13-15 July.

ST= Science and Technology

Exams will be held Tuesday 14.07 from 9.00- 18.30

### EXAM 1

DEPARTMENT OF BIOMEDICINE

Faculty of Health

**Address** Wilhelm Meyers Allé 4, 8000 Aarhus C

**Buildings** Viggo Nielsen, 28992516,

vn@biomed.au.dk

**Labs** Bettina Winther Grumsen Laboratoriekoodinator Direkte phone: 87167032, Mobile phone: 5152 3951; E-mail: bwg@biomed.au.dk

**Keys and reservation** Pia Abrahamsen, Secretary; 8716 8404; E-mail: abrahamsen@biomed.au.dk

**IT** Rune Stenskjær Larsen, Phone 871 53147  
E-mail: rsla@au.dk

### EXAM 2

DEPARTMENT OF MOLECULAR BIOLOGY AND GENETICS, FACULTY OF SCIENCE AND TECHNOLOGY

**Address** C.F. Møllers Allé 3, 8000 Aarhus C

**Lab responsible** Magdalena Pyrz,

Mobile 30347836; E-mail: mp@mbg.au.dk

**Lab assistant** Lotte Stagsted,

mobile: 31512733, lottestagsted@hotmail.com

**IT** Johnny Skov Petersen jsp@au.dk, Direkte

telefon: 87151254, Mobiltelefon: 40776630

(Rasmus Vinge Netværks Administrator,

Bygning: 5123-120 Mobil tlf: 23 38 22 99

E-mail: rvinge@au.dk)

| Exam | Faculty/Department                 | Building            | Room                      | Activity     |
|------|------------------------------------|---------------------|---------------------------|--------------|
| 1    | Health/Biomedicine                 | 1241                | 221,229                   | Laboratory   |
| 1    | Health/Biomedicine                 | 1241                | Garden room, reading room | Waiting room |
| 2    | ST/ Molecular biology and Genetics | 1120                | 112, 115, 116, 212, 213   | Laboratory   |
| 2    | ST/ Molecular biology and Genetics | 1120                | Seminar room ground floor | Waiting room |
| 3    | ST/ Bioscience                     | Tent by Mat cantina |                           | Laboratory   |
| 3    | ST/ Mathematics                    | Mat lab             |                           | Waiting room |
| 4    | ST/ Chemistry                      | 1513                | 213, 226, 315, 326        | Laboratory   |
| 4    | ST/ Chemistry                      | 1510                | 213                       | Waiting room |

**EXAM 3:**

DEPARTMENT OF BIOSCIENCE,  
FACULTY OF SCIENCE AND  
TECHNOLOGY

**Address** Tent close to Mathematical cantina

**Buildings + labs** Tent close to Mathematical  
cantina

**Lab responsible** Rasmus Buchanan

**IT** Johnny Skov Petersen jsp@au.dk, Direkte  
telefon: 87151254, Mobiltelefon: 40776630  
(Rasmus Vinge Netværks Administrator Bygning:  
5123-120 Mobil tlf: 23 38 22 99  
E-mail: rvinge@au.dk)

**EXAM 4:**

DEPARTMENT OF CHEMISTRY,  
FACULTY OF SCIENCE AND  
TECHNOLOGY

**Address** Langelandsgade 140, 8000 Aarhus C

**Labs** Jens W. Clausen Head of Secretariat,  
Mobile: 51 44 29 39, Email: jclausen@chem.au.dk

**Lab assistant** Nadia Nasser Petersen,  
nadia.nasser.petersen@post.au.dk

**IT** Johnny Skov Petersen jsp@au.dk, Direkte  
telefon: 87151254, Mobiltelefon: 40776630  
(Rasmus Vinge Netværks Administrator Bygning:  
5123-120 Mobil tlf: 23 38 22 99  
E-mail: rvinge@au.dk)

## IN CASE OF CHEATING

**Exam 1** Anders Barfod, mobile 52993097

**Exam 2** Rasmus John Frandsen,  
mobile 22511435

**Exam 3** Tobias Wang 51377737 and Rasmus  
Buchanan, mobile 51379090

**Exam 4** Maher Abou Hachem, mobile 45252732

**Erik Meineche Schmidt, mobile 23382376**

**Annika Büchert Lindberg, mobile 60202756**

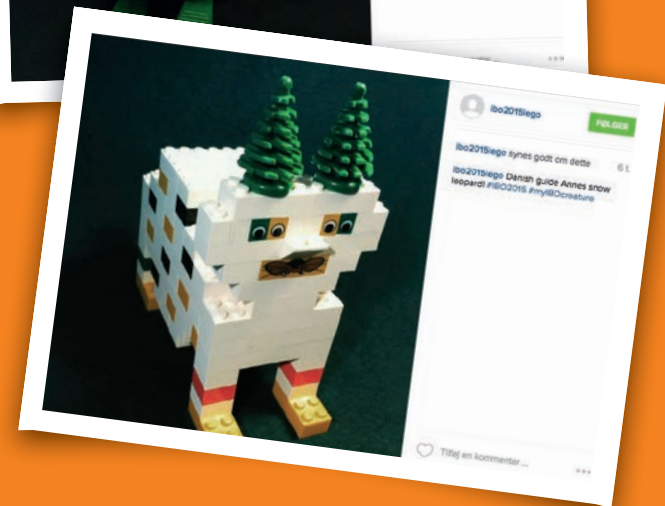
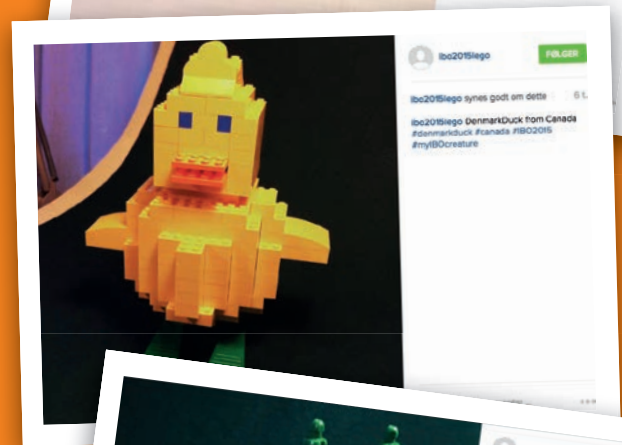
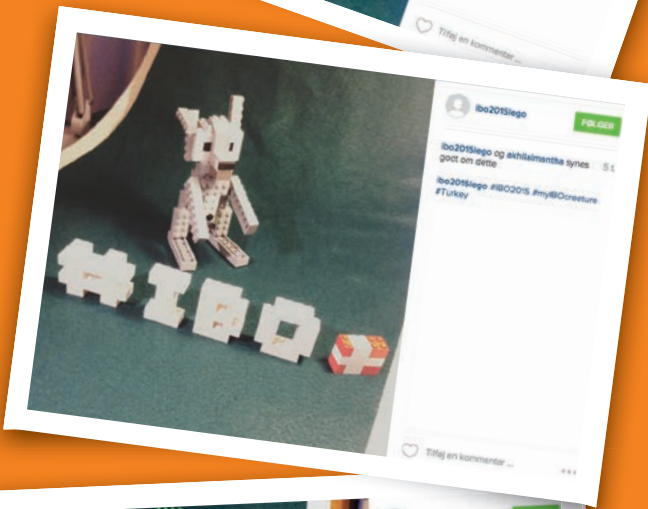


## 10. COUNTRY CODE AND SET UP OF LAB SPACES

|    |     |                |
|----|-----|----------------|
| 1  | ARG | Argentina      |
| 2  | ARM | Armenia        |
| 3  | AUS | Australia      |
| 4  | AZE | Azerbaijan     |
| 5  | BEL | Belgium        |
| 6  | BGR | Bulgaria       |
| 7  | BLR | Belarus        |
| 8  | BRA | Brazil         |
| 9  | CAN | Canada         |
| 10 | CHE | Switzerland    |
| 11 | CHN | China          |
| 12 | CYP | Cyprus         |
| 13 | CZE | Czech Republic |
| 14 | DEU | Germany        |
| 15 | DNK | Denmark        |
| 16 | ESP | Spain          |
| 17 | EST | Estonia        |
| 18 | FIN | Finland        |
| 19 | GBR | United Kingdom |
| 20 | GEO | Georgia        |
| 21 | GRC | Greece         |
| 22 | HUN | Hungary        |
| 23 | IDN | Indonesia      |
| 24 | IND | India          |
| 25 | IRN | Iran           |
| 26 | ITA | Italy          |
| 27 | JPN | Japan          |
| 28 | KAZ | Kazakhstan     |
| 29 | KGZ | Kyrgyzstan     |
| 30 | KOR | South Korea    |
| 31 | LKA | Sri Lanka      |

|    |     |                          |
|----|-----|--------------------------|
| 32 | LTU | Lithuania                |
| 33 | LUX | Luxembourg               |
| 34 | LVA | Latvia                   |
| 35 | MDA | Moldova                  |
| 36 | MEX | Mexico                   |
| 37 | MNE | Montenegro               |
| 38 | MNG | Mongolia                 |
| 39 | MYS | Malaysia                 |
| 40 | NGA | Nigeria                  |
| 41 | NLD | Netherlands              |
| 42 | NZL | New Zealand              |
| 43 | PAK | Pakistan                 |
| 44 | POL | Poland                   |
| 45 | PRT | Portugal                 |
| 46 | ROU | Romania                  |
| 47 | RUS | Russia                   |
| 48 | SGP | Singapore                |
| 49 | SVK | Slovakia                 |
| 50 | SVN | Slovenia                 |
| 51 | SWE | Sweden                   |
| 52 | SYR | Syria                    |
| 53 | THA | Thailand                 |
| 54 | TJK | Tajikistan               |
| 55 | TKM | Turkmenistan             |
| 56 | TUR | Turkey                   |
| 57 | TWN | Chinese Taipei (Taiwan)  |
| 58 | UKR | Ukraine                  |
| 59 | USA | United States of America |
| 60 | UZB | Uzbekistan               |
| 61 | VNM | Vietnam                  |
| 62 | ZAF | South Africa             |





A selection of lego figures from IBO2015, #MyIBOCreature

# IBO2015 FINAL REPORT



INTERNATIONAL  
BIOLOGY OLYMPIAD  
**2015 AARHUS DENMARK**