

Summary of *Light and Confocal Microscopy*, 3HEC

Autumn 2010

The course had 14 participants (Appendix 1); 9 women and 5 men. Eight came from the Department of Plant Biology and Forest Genetics, four from the Department of Forest Mycology and Pathology, one from the Department of Molecular Biology (Uppsala University) and one from the museum of Natural History (Stockholm). The participants were generally PhD students (12 people), one was a technician (responsible for the microscopes at her department) and one person had completed her PhD education.

For the evaluation, 10 out of 14 students handed in their course evaluation (Attached as Appendix 2). Today, 2020-11-19, 12 students have completed the course.

The course started off with three lectures (two on light microscopy and one on confocal microscopy) by Stefan Gunnarsson from EBC, Uppsala University. They were held three days in a row 9-12, with a coffee/tea-break with sandwiches and fruits.

The students had a practical part where they booked a morning (9-12) or an afternoon (13-16) with me at the light microscope to learn Köhler illumination, different contrast techniques and many other aspects of handling a microscope. The students were then asked to go to their home department and learn how to handle the microscope and make a presentation of their work to be presented the last day of the course. There was also a possibility to book more time at the microscope with me, something that two students took advantage of.

We did a study visit to the Ångström laboratory to have a look at a confocal microscope. Ulla Sundberg from Leica gave the demonstration 9-12 and 13-16 with the class divided in two groups. The last day of the course, Bettina Ryll from EBC talked about her research (mainly confocal microscopy) and what to think about when choosing fluorescent dyes. After that, the students presented microscopy pictures that they had taken.

In general the course evaluation was very positive. The demonstration of the confocal microscope was the course activity that received the lowest points on the course evaluation. The reason for that was that the room was not optimal for teaching and that many people would have liked to work on the microscope themselves. I hope that this activity can change next year as EBC plan to buy a confocal microscope. Stefan could then give the demonstration himself in small groups and the student would have the opportunity to try the microscope out themselves.

The course certificate (Appendix 3) and the schedule for the course (Appendix 4) are attached.

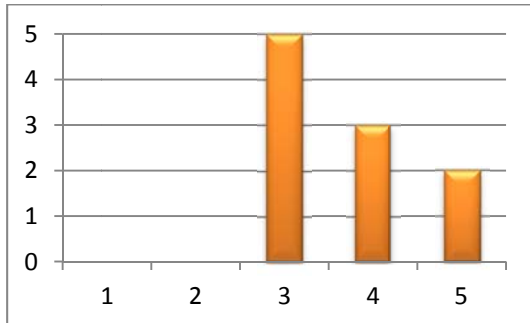
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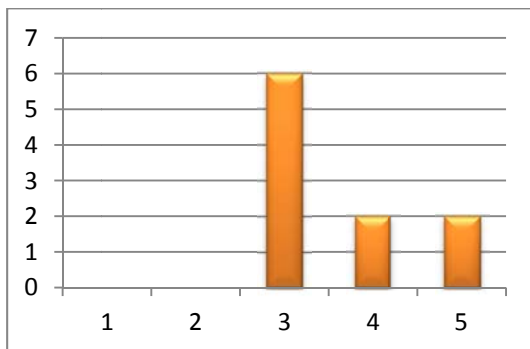
Cajsa Lithell, course administrator

Summary of the course evaluation, with comments below

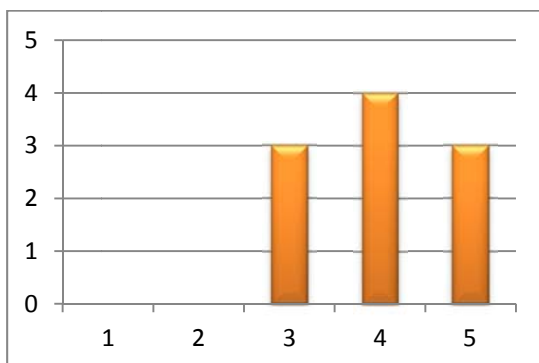
- 1.) How well did the content of the course match your expectations (1 = Not at all, 5 = Perfectly)?



- 2.) I think the level of the course was (1 = too low, 5 = too high):

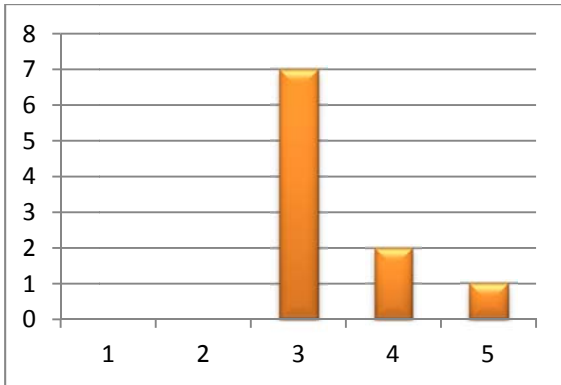


- 3.) The combination of lectures, practical work and demonstrations was (1 = bad, 5 = very good):



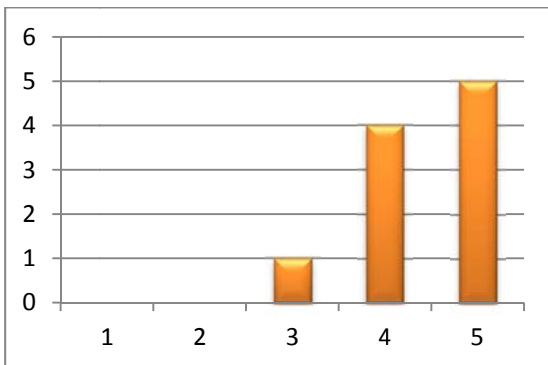
Comments to the three questions above: One person would like to have more practical work and suggests that slides are handed out to the students that they can look at at their home department.

- 4.) The three lectures by Stefan were relevant and the content matched my expectations (1 = do not agree, 5 = totally agree):



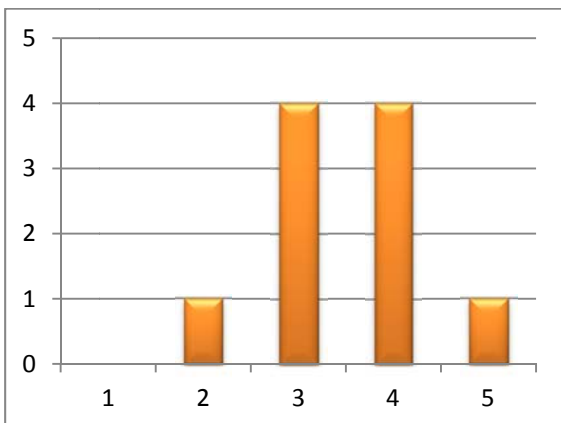
Comments: Two persons commented that the text on the slides was too small and two other students found the lectures hard to follow due to too many technical points.

5.) How did you like the microscope practical morning/afternoon with Cajsa (1 = Not at all, 5 = Excellent):



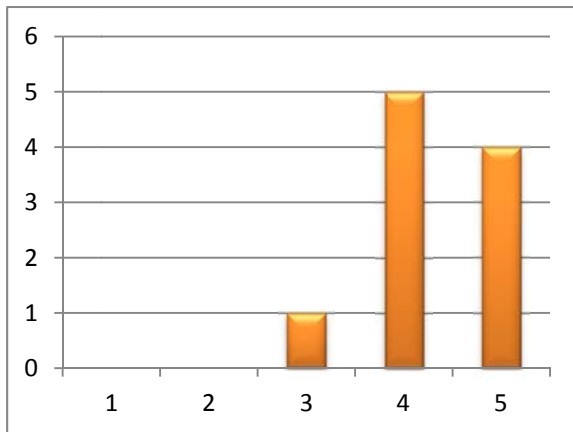
Comments: One person would have liked to look at more samples but then commented that it may be better to look at different things at the home department.

6.) The confocal microscopy study trip to Ångström was (1 = not interesting, 5 = very interesting):



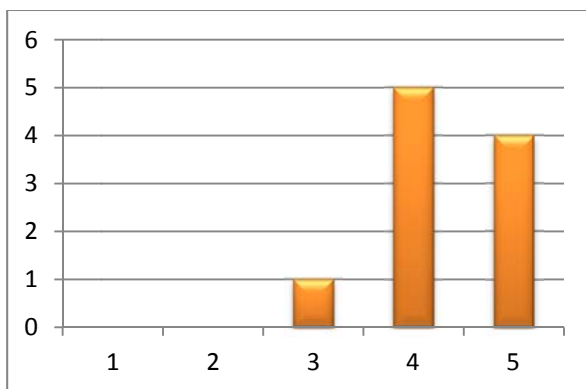
Comments: Three people commented that it was tiring to stand up for 3 hours (the room was not ideal for seven persons at a time...). Two found the trip "very interesting" and one student thought that it was too long and boring.

7.) The lecture by Bettina Ryll was (1 = not interesting, 5 = very interesting):



Comments: Interesting and more practical, inspiring, one student would like to have a little longer talk and one student commented that she talked a little too fast.

8.) How did you like the final day with the presentations (1 = Not at all, 5 = Excellent):



Comments: Interesting and useful comments from Stefan, it was good to learn from other people's pictures, very nice to hear about other people's work and see their pictures. It was very interesting to hear Stefan's feedback after the presentations. The presentations were good since it forced us to sit down and work with the microscope.

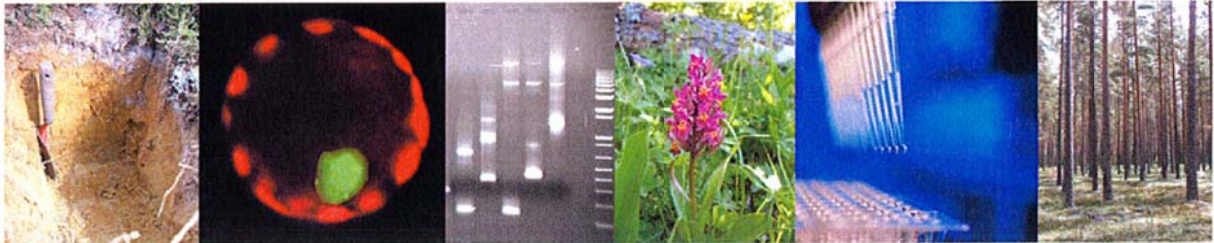
Suggestions for next year's course: Three students would like to have a chance to try out the confocal microscopy themselves. One student would like to have more lectures with practical applications of microscopy (similar to Bettina's lecture). And one student would not change anything since "everything was so cool".

Appendix 1.

Participants of *Light and confocal microscopy*, 3HEC, starting 19 October 2010

Name	Department	e-mail
Usman Arif	Dept of Plant Biology & Forest Genetics	Usman.Arif@vbsg.slu.se
Selcuk Aslan	Dept of Plant Biology & Forest Genetics	selcuk.aslan@vbsg.slu.se
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Syed Shah	Dept of Plant Biology & Forest Genetics	Syed.Shah@vbsg.slu.se
Sanjeewani Sooriyaarachchi	Department of Molecular Biology	sanju@xray.bmc.uu.se
Jia Sun	Dept of Plant Biology & Forest Genetics	Jia.Sun@vbsg.slu.se
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Tianqing Zhu	Dept of Plant Biology & Forest Genetics	Tianqing.Zhu@vbsg.slu.se

SLU Graduate School Organism Biology



Certificate

This is to certify that

has participated in and passed the course

Light and confocal microscopy, 3HEC/ECTS

The course took place in Uppsala 19th of October – 17th of November.

After the course the student should have a basic knowledge of optical theory as well as the theoretical knowledge needed to perform microscopical analysis of biological specimens with conventional light, fluorescence and confocal microscopy. The student has received practical knowledge needed to perform microscopical analysis of biological specimens with conventional light and fluorescence microscopy. In addition, the student should also be able to use digital image processing and analysis on the image acquired in the microscopes.

Cajsa Lithell, course administrator

Appendix 4.

Schedule *Light and confocal microscopy*, 3HEC, starting 19 October 2010

This course is given as a postgraduate course within the SLU Graduate School in Organism Biology and has been developed together with Stefan Gunnarsson, Uppsala University. The maximum number of students is 20 (giving 10 groups for the microscopy exercise).

The course is divided into three blocks, starting with a block of lectures describing light microscopy and confocal microscopy. The second block is a practical block, where each student should get hands-on experience on light microscopes (including dark field, phase contrast, interference phase contrast and fluorescence). The third and final block includes presentations of the experiences from block two, and one lecture/demonstration about confocal microscopy as well as a researcher presenting how she uses light and confocal microscopy in her research.

Contact information:

Cajsa Lithell, Dept. of Forest Mycology and Pathology, Cajsa.Lithell@mykopat.slu.se

Stefan Gunnarsson, UU, Stefan.Gunnarsson@ebc.uu.se

The web-page of SLU Graduate School in Organism Biology:

<http://www.slu.se/sv/forskarskolor/organismbiologi/>

Send your application (dead-line 13/10 2008) to Cajsa Lithell, Cajsa.Lithell@mykopat.slu.se, 018-672720

BLOCK 1, LECTURES 19-21 October

Day	Time			Room
19 October				
Tuesday	8.30-9.00	Welcome	Cajsa Lithell	Lecture hall, Mykopat
	9.00-12.00	Lecture 1	Stefan Gunnarsson	Lecture hall, Mykopat
20 October				
Wednesday	9.00-12.00	Lecture 2	Stefan Gunnarsson	Lecture hall, Mykopat
21 October				
Thursday	9.00-12.00	Lecture 3	Stefan Gunnarsson	Lecture hall, Mykopat

Some keywords:

Lecture 1: light, electromagnetic radiation, waves, photons, lenses, resolution, contrast, images

Lecture 2: microscope, objectives, lenses, chromatic aberrations, astigmatism, coma, Köhler illumination, refractive index, phase contrast, DIC, dark field

Lecture 3: confocal microscopy, laser, specimen, staining, imaging

More information:

<http://micro.magnet.fsu.edu/primer/>

Cajsa Lithell, Dept. of Forest Mycology and Pathology, will supervise during block 2. The practical will mainly be held at the Department of Forest Mycology and Pathology.

Each of you should book ONE morning or afternoon together with Cajsa and the light microscopes (choose a date from the schedule below). You should work in pairs. Please, book a date as soon as possible, so that I could book the microscopes.

One morning or afternoon is of course not enough to learn to handle a microscope. Practice at your home department or book extra time at the microscopes available at the Department of Forest Mycology and Pathology or the Department of Plant Biology and Forest Genetics. If you need, you can book extra time with Cajsa.

There are course-samples that you will use, but you can also bring your own ones.

BLOCK 2, LIGHT MICROSCOPY PRACTICAL

Dates and times available for booking during the period 25 October - 10 November

Date	Time
25 October	9-12 or 13-16
26 October	9-12 or 13-16
27 October	9-12 or 13-16
28 October	9-12 or 13-16
29 October	9-12 or 13-16
1 November	9-12 or 13-16
2 November	9-12 or 13-16
3 November	9-12
5 November	9-12
8 November	9-12 or 13-16
9 November	9-12

BLOCK 3, GROUP PRESENTATIONS, EXAMINATION 10 & 17 November

Day	Time	Room
10 November		Ångström laboratory
	9.00-12.00	Half class. Confocal microscope, demonstrations.
	13.00-16.00	Half class. Confocal microscope, demonstrations.
17 November		Lecture hall, Mykopat
	9.00-10.00	Practical applications, Bettina Ryll (EBC)
	10.00-14.00	Presentations, Stefan Gunnarsson and Cajsa Lithell. Present your results from the microscopy exercise. Pitfalls and observations. Describe your research/ field of research ca. 10-15 minutes.
