Bi227 **Fall 2007**

Instructions for Final Paper: Preparing Figures and Methods Sections for a Journal

Final Assignment Choose one (or several) experiments of Assignments #2-#6 and prepare:

a) 3 figures (figures can be multipart and have multiple images in them)
b) 3 figure legends (maximum half a page each)
c) 1 general, narrated methods section, that should explain your methods for all three figures (max one page)
d) 1 supplementary section containing all the information necessary to reproduce the images in your figures by someone who is familiar with how microscopes and software function.

The final assignments are individual. It is fine to share raw images, renderings, or movies and discuss your assignments with your lab partner, but figures should be assembled and text written individually.

Evaluation We will evaluate your work based on whether it answers the following questions:

- Are the figures engaging, do they tell a visual story that clearly illustrates one of the imaging experiments you did in class?
- Are the images and features in the images clearly identified (arrows, etc.) and described in the legend?
- Have common pitfalls of figure crafting been avoided (insufficient resolution, missing scalebars, other missing imaging parameters that are relevant to the point discussed in the figure, movies or figures in a format that cannot be read on all computers)?
- Does the methods section give a general and succinct overview of the procedures you used?
- Does the supplementary section include sufficient details such that the TA could reproduce the experiment and image exactly (the TA knows how to operate the scope and use the software, but does not know what parameters and settings you used)?

Figures You may choose from one or several assignments. Don't try to be exhaustive, but rather, try to have each figure make one or a few points and tell the reader one little graphical story–think of a comic-strip.

Show us your best images. You may also show us images that are not perfect, just make sure to include an explanation of why things didn't work (imagine you are writing an imaging techniques review paper showcasing artifacts). You can also add a better image next to it and explain what parameters you changed to make the image better. Sometimes it may be good to add a low magnification image or cartoon to locate the region you imaged.

For time-lapses, extract a few frames and make a figure out of them as well as attaching the movie. The legend can discuss the figure and the movie.

Don't discuss a particular region in your image without clearly identifying it first: Use arrows or asterisks to point to the regions you are describing in the legend.

Remember scalebars and timestamps.

Also, make sure your images are legible (by all) (see http://jfly.iam.u-tokyo.ac.jp/color/

You may follow the general guidelines about figures here:
http://www.sciencemag.org/about/authors/prep/prep_revfigs.dtl
or here:
http://www3.interscience.wiley.com/cgi-bin/jabout/38417/ForAuthors.html?CRETRY=1&SRETRY=0

Figure Legends Describe the general topic of your figure and its conclusion in a single sentence at the beginning. Identify the sample (Is it a slide? Is it living?), the fluorophore (autofluorescence, dye, transgenic), the imaging modality (brightfield, phase-contrast, widefield fluorescence, confocal, etc.). Don't

forget to give the size of the scalebar in the legend, time stamps and possibly reference to a supplementary movie. Be succinct and don't add more parameters than what is essential to the flow of your figure. E.g, if your figure is about comparing pinhole sizes, you will obviously want to add the settings that you used in each case.

Example: **FIGURE 1. Photobleaching in living samples. A** Low magnification confocal image of an autofluorescent Fixed Rotiferus pineus slide before photobleaching. **B** The region outlined in A after 2min exposure to 543 nm laser illumination (1% attenuation). Arrowheads show location of photobleached region. All Scalebars are 100µm. The photobleaching process is shown in movie 1.

Methods A short, narrated section that includes how the samples were prepared for imaging, the imaging material and your general imaging parameters. You may break it down by figure. Try to be precise, yet succinct. Things to include here are the brand and name of the microscope and of the objectives. For the software parts, you must include the steps you have taken (merely saying you have used Photoshop or ImageJ is not enough, detail each command you used [e.g. Using ImageJ, we applied a 1.5 pixel-wide Gaussian blur filter to our raw image]). If relevant, you may cite other papers here to avoid reproducing lengthy protocols.

Imagine telling what you did to someone who has taken the course before and only needs a quick reminder to find the details in his/her notebook.

For methods section examples, look at the methods sections of any article containing images published in e.g. *Nature* or *Science.*

Supplementary Material This is the place where you can (and should) put every detail that is not essential to get your point across but that is necessary to **reproduce** your experiments. The format here is up to you and does not require to be narrated. You could give a table that includes, for each figure panel, what imaging parameters you used and what steps (with parameters) you have taken in your imaging software to get to the printed image. Note that this is not the place to put the microscope or software manual. Someone reasonably familiar with the latter should be able, based on this material and given your sample, to reproduce your experiments and figures.

File Formats To process your raw images (adjust brightness, contrast, crop, etc), use ImageJ, Photoshop, or Imaris. Remember, every step that modifies the value of a pixel *must* be documented.

For assembling the figures *per se*, a Vector-based program such as Illustrator (Adobe), FreeHand (Adobe), or Canvas (acdsee) usually works best. Do not add annotations (except scalebars and timestamps for movies) using ImageJ or Photoshop. Text might otherwise appear pixilated in print.

Save the figures as separate PDF files (one figure per page) and keep them separate from the legends and methods text. Please *do not* embed your figures into a Word file.

When you submit your assignment, it should contain:

1. **CD (2 copies) that contain, in a folder bearing your name:**
   - A Word or PDF file with your methods section, figure legends and supplementary data.
   - Individual PDF files of your figures.
   - Movies in Quicktime or AVI format. Make sure that they run both on Windows and Mac OS X (some compression formats are not readable on all platforms).
2. **Paper print-out of your figures and text (1 copy)**

Deadline for turning in the CDs and paper:

Friday, December 14, 4 pm (Michael Liebling's Mailbox (MC 139-74), at SW entrance of BI)