**BME 42-731 / ECE 18-795 Reading Assignment #2**

# Contrast Generation in Light Microscopy

Assigned on Feb-03-2011
***Due on Feb-21-2011 in class or by 5PM at instructor's office***

## A. Overview

This reading assignment is intended to serve two purposes

- To review contrast generation methods in light microscopy.
- To review basic concepts and principles of fluorescence microscopy

## B. Instructions

### B. 1 Report instructions

**Part I:** Write a report (NO more than 2 pages) that briefly summarizes the basic concepts and principles of the following contrast generation methods, as introduced in lecture 2.

- Transmitted light vs reflected light
- Bright-field vs dark-field
- Phase contrast and DIC

Be sure to briefly discuss their advantages and disadvantages, including when compared to fluorescence microscopy. It is highly recommended that you use the online references listed in B.2.

**Part II:** Write a report (NO more than 2 pages) that briefly summarizes the basic concepts and principles of fluorescence microscopy, as introduced in lectures 4&5. You may find references listed in B.3 useful.

### B.2 Online references

The following websites provide very good introduction to different contrast generation approaches (NOTE: There is substantial amount of duplicated information from these website. So you only need to look at one that is most useful to you.)

1. http://micro.magnet.fsu.edu/index.html
2. http://www.olympusmicro.com/
3. http://www.microscopyu.com/

Tip: Search by keywords such as DIC. This often points you to the right information quickly.

**B.3 Reference articles**

1. Lichtman JW & Conchello JA, Fluorescence microscopy, *Nature Methods* 2005, 2:910-919.

2. Stephens DJ & Allan VJ, Light microscopy techniques for live cell imaging, *Science*, 2003, 300:100-102.

3. http://www.microscopyu.com/articles/fluorescence/fluorescenceintro.html

**B.4 Reference books (NOT required; listed for your reference)**

Related chapters in
- Herman, *Fluorescence microscopy*, 2nd ed., Taylor & Francis, 1998.
- Inoue & Spring, *Video microscopy*, 2nd ed., Plenum Press, 1997.

Also, feel free to use any additional references you find useful. Be sure to cite properly.

## C. Report format

The report, including references, must not be more than 2 pages. Reports longer than 2 pages can not be accepted.

Page size: letter
Line space: single
Page margins: no less than 1 inch
Font size: 12 points for the main text; 10 points for listed references

## D. Some general guidelines on preparing a reading report

1. The single most important guideline regarding preparing a report is to think independently and use your own words. Avoid literal duplication of words from the references since otherwise it could run the risk of unintentional plagiarism http://www.studentaffairs.cmu.edu/acad_integ/acad_integ_text.html. If you must cite the original text, clearly mark your citation using quotation marks.

2. Organize your report into sections and use section titles. This often substantially improves readability.

3. Avoid long paragraphs. Instead, try to break them up into logically coherent short paragraphs.

4. Pay attention to details. Be sure to cite your references properly. If you are not sure how to make citations, follow the format from a journal you are familiar with. Or you can ask the instructor for further assistance.