

TRAVEL

Air: The University campus is a 20-minute taxi ride from Vancouver International Airport.

Bus: For family members wishing to see the many sights, Vancouver has an excellent system of inexpensive and convenient public transportation. A major bus terminal is in easy walking distance of both The Gage Towers and the classrooms.

Tours: Tours of Vancouver and surrounding area can be arranged.

**For more information,
please contact the Course Organizer:**

Prof. James Pawley
250 N. Mills St,
Madison WI, USA, 53706
University of Wisconsin-Madison
Email: jbpawley@wisc.edu.

or check out the Course WWW site at:

<http://www.3dcourse.ubc.ca/index.htm>

Announcing the Thirteenth Annual

**INTERNATIONAL
12-Day Short Course**

on
**3D Microscopy of
Living Cells
June 14 – 26, 2008**

Eleventh, Post-course Workshop on

**3D Image Processing
June 28 - 30, 2008**

Organized by Prof. James Pawley
University of Wisconsin-Madison

in association with the
UBC Brain Research Centre and the
**Departments of Pharmacology
and Physiology**



University of British Columbia
Vancouver, BC, Canada

THE PURPOSE OF THE COURSE

Modern methods of 3D light microscopy promise a revolutionary improvement in our ability to view living cells. To help convert this promise to reality for a wider selection of biological scientists, the organizers have designed an intensive twelve-day residential course concentrating on all aspects of the **3D Microscopy of Living Cells**. Sponsored by the **Brain Research Centre** and the **Departments of Pharmacology and Physiology** at the University of British Columbia, it will be held in June of 2008. The course includes 4 days on 2D techniques, 5 days of 3D techniques and 3 days on 3D measurement and display. It includes everything from basic microscopy to confocal and multiphoton microscopy. A half-day Pre-course is offered for those wishing to brush up on (very!) basic optics.

Topics include:

- Quantitative 2D light microscopy
- 3D Imaging in confocal and widefield
- Fluorescent and backscattered light signals
- Digitization: The Nyquist Criterion
- Poisson noise QE and S/N.
- Lasers and laser tweezers
- Objectives and automatic aberration correction
- Scanning-systems: AODs, mirrors, disks
- Deconvolution of widefield and confocal data
- Detectors: operation and performance
- Optimal pinhole size/photon efficiency
- Dye design, characteristics and use
- How to keep your cells alive
- Multi-photon excitation
- Calcium imaging
- PALM, FRET, FLIM and TIRF
- Display and measurement of 3D data

Morning lecture/demonstrations lead to hands-on laboratory exercises most afternoons utilizing the commercial instruments currently available for 3D microscopic imaging. Students will work in groups of 4 or 5 in laboratory sessions, and many complete a live-cell 3D study on their own specimens. In the first 11 years, over 350 students from 30 countries

have attended. Last year, 12 separate 3D microscopical workstations were each used for over 30 hours of student use under the supervision of an international faculty of 20 who represent the state-of-the-art in live-cell microscopy. Including representatives from manufacturers, the teacher/student ratio will be almost 2:1.

INTERNATIONAL FACULTY

- Holly Aaron University of California-Berkeley, CA
- Stephen Adams University of California-San Diego, CA
- Dan Axelrod University of Michigan, MI
- Mark Cannell University of Auckland, NZ
- Ping Chin Cheng SUNY- Buffalo, NY
- Steve Cody Melbourne, AU
- Anda Cornea Oregon Health Science University, OR
- Turan Erdogan Semrock Inc., Rochester, NY
- Victoria Frohlich U. Texas, HSC. San Antonio, TX
- Hans Gerritsen Utrecht University, NL
- Kurt Haas University of British Columbia, BC
- Stefan Hell Max Planck Institute, Goettingen, DE
- Iain Johnson Molecular Probes, OR
- Andres Kriete Tissue Informatics, Pittsburgh, PA
- Paul Kulesa Stowers Institute, Kansas City, MO
- Jennifer Lippincott-Schwartz NIH, Bethesda, MD
- Glen MacDonald Virginia Bloedel Hearing Inst, WA
- Felix Margadant University of Sydney, AU
- Robert Murphy Carnegie-Mellon U., Pittsburgh, PA
- Tim Murphy University of British Columbia, BC
- Jim Pawley University of Wisconsin-Madison, WI
- Michael Weis Agriculture Canada, BC

TUITION

Course tuition is \$2,850 US and includes lunches and generous morning and afternoon snacks. On receipt of 50% deposit, all students will receive preliminary group assignments and a copy of the textbook, *Handbook of Biological Confocal Microscopy*, (Plenum, 2006). The tuition fee includes the Welcome Reception, the Manufacturers' Reception, and the Beach Party, and a handout binder/ DVD-ROM. Accommodations and other meals are not included. The Pre-course tuition is \$150 US.

APPLICATIONS

Applicants must submit an on-line application to allow us to assess knowledge level and field of interest. Enrollment is limited to 28 - 36 participants, depending on equipment availability. Selection is made on the basis of background and perceived need. Those with little previous LM experience will be provided with basic texts to read before the course begins, and should take the Pre-course.

Application forms and other course information from this and past years can be downloaded from the WWW site at

<http://www.3dcourse.ubc.ca/application.htm>

or obtained from:

Prof. James Pawley,
Zoology Department,
250 N. Mills St,
Madison, WI, 53706
Phone: 608-263-3147
Fax. 608-265-5315
Email: jbpawley@wisc.edu

Application forms are due March 15, 2008!

Successful applicants will be notified soon after April 1, and a deposit of 50% must be received by May 1, 2008 to reserve your position. Refunds of the deposit are possible only if your position can be filled from the waiting list. This is usually possible. The remainder of the fees is due **before** registration June 14, 2008.

IMPORTANT DATES

Applications must be received by	March 15, 2008
Deposit due	May 1, 2008
Pre-course Noon - 5:00 PM	Saturday, June 14, 2008
Registration 5:00 - 6:00 PM	Saturday, June 14, 2008
Intro. Lecture 7:00 PM,	Saturday, June 14, 2008
Last class ends with lunch,	Thursday, June 26, 2008
3D Image Proc. begins 8:30 am	Saturday, June 28, 2008
3D Image Proc. ends 6:00 pm	Monday, June 30, 2008

WHO SHOULD ATTEND?

The course is designed for biological research scientists and advanced graduate students who use, or plan to apply, modern 3D microscopy in studies involving living cells. No previous experience in advanced light microscopy is required but applicants will be asked how they plan to use 3D microscopy and to describe a short research project involving living cells. Students with other interests in 3D light microscopy will be welcomed if space permits.

Classes meet from 8:30-12:00, 1:00 – 6:00 and 7:00 – 9:30 with lecture-demonstrations usually in the morning and laboratory sessions in the afternoon and evening.

There will be enough 3D microscopy setups to permit groups of 4-5 students to "learn-by-doing," often on their own specimens, during afternoon laboratory sessions. There are 14 2-hour lab periods during the 3D section of the course and 6-8 of these are devoted to set projects involving living cells.

TEACHING PHILOSOPHY

As befits teaching in an area at the boundary of "what is now known," lecturers have been chosen based on their expertise as scientists working in the field rather than because they all agree. They are encouraged more to be provocative than to be prosaic. Students should expect discussion in areas where differences of opinion exist. Some lectures will be delivered by video links.

Prior to the course, students will be organized into 8 groups plus a faculty advisor and encouraged to communicate by email/phone, about the "Living-cell" group projects that they will pursue during the course and that will be presented to the class on the last day. It has been found that group interactions make best use of all students' prior experience and can be very effective in teaching the practical skills covered in a hands-on course of this type.

TRANSPORT OF BIOLOGICAL MATERIAL

Students must contact Dr. James Pawley to make necessary arrangements for the transport and maintenance of cell lines etc. needed for their projects. Organisms linked in any way with human

or animal disease are not permitted because of safety considerations. Transport and customs arrangements for living specimens are entirely the responsibility of the student. Students also attending the 3D Image Processing Workshop may be able to analyze, process and display some of the 3D data they have collected from their own specimens.

ACCOMMODATION

On-campus accommodation is available at The Gage Towers and West Coast Suites, which are one block from the lecture-lab facilities and the Student Union Building (SUB). The SUB also contains a large cafeteria, several other food outlets, sushi bar, coffee shop, pub, cinema etc. Many rooms at The Gage Towers (premium single rooms) have breathtaking views of the mountains of West Vancouver, or Vancouver Island. A variety of accommodation types are available:

	\$Cdn	(\$US)
Standard single , washroom shared between 6 guests	\$33	(30)
Premium single , w/telephone, washroom and TV shared between 4 guests, upper flr.	\$46	(41)
Single Studio Suite , one twin bed*	\$72	(65)
Double Studio Suite , one double bed*	\$82	(74)
1-Bedroom Suite , one queen bed *	\$92	(83)
West Coast Suite , one king bed in the bedroom, double pull-out sofa in the living room (price based on double occupancy)*	\$139	(126)

*Includes TV, telephone, kitchenette, private bathroom (All fees are per night. Add 6% GST and 8% PHT.

US figures approximate and depend on exchange rate.) More info at: www.ubcconferences.com
Room reservations should be completed before May 8, 2008.

Students are encouraged to bring friends or family members to enjoy the beauty of the Vancouver area and the miles of lovely beaches and forested hiking trails surrounding the campus.

MEALS

Lunches and generous morning and afternoon snacks are provided. Other meals can be purchased in the SUB Cafeteria or in any of a number of nearby restaurants, but many students survive on our "snacks." The Opening Reception and the Beach Party and the Manufacturers' Reception are included in the tuition fee. Additional tickets can be purchased for accompanying persons.

3D Image Processing Workshop

The 3D IP Workshop will cover 3D image processing for measurement and display. It follows the Live-cell Course after a one-day break. Enrollment is limited to those attending the 3D Microscopy course.

Tuition: \$1,250 US (Incl. lunches, snacks & Farewell Dinner)

WHO SHOULD ATTEND?

The course is designed for biologists working with multi-dimensional and possibly multicolor microscopical data sets. Getting the data is only half of the battle. Image data in 3, 4 or even 5 dimensions may be difficult to store let alone analyze, display, publish, store and share. This workshop is to help students understand the hardware and software aspects of these problems and give them access to the techniques they need to make the best use of their data.

Starting on Friday morning, the workshop runs over 3 days and is taught on Macintosh and Windows computers. A wide variety of software designed for 3D microscopy will be described, demonstrated and used in laboratory sessions, including novel programs for deconvolution and volume rendering as well as **3D image analysis and measurement** designed by members of the faculty.

WORKSHOP ORGANIZERS

- **Felix Margadant** University of Sydney, AU
- **Andres Kriete** Tissue Informatics, Pittsburgh, PA

Faculty

- **Ping Chin Cheng** State U. of New York, Buffalo
- **Steven Cody** Melbourne, AU
- **Glen MacDonald**, University of Washington, Seattle
- **Robert Murphy**, Carnegie-Mellon, Pittsburgh, PA
- **Justin Newberg**, Carnegie-Mellon, Pittsburgh, PA
- **Badri Roysam**, Rensselaer Polytechnic Institute, NY

PLAN OF INSTRUCTION

Classes will meet from 8:30-12:00 and 1:00-6:00 with lecture-demonstrations followed immediately by hands-on laboratory sessions using workstations. Additional information at: www.3dcourse.ubc.ca/3dipoverview.htm

Students will "learn-by-doing" with two to a machine. Lab handouts will describe specific exercises, initially performed on "canned" data sets, but later on their own data. Facilities and supervision are available until 23:00.