

# Practical Workshops in Confocal Microscopy and Stereology

Qualitative and Quantitative Microscopy for Biomedical Research

**March 19 - 23 and August 20 - 24, 2012**  
**Chicago, Illinois, USA**

## **Purpose of the Course**

To provide intensive, hands-on training in the cutting-edge technologies of confocal microscopy and design-based stereology. Evening sessions offer individual training and project consultation.

## **Who Should Attend**

Anyone who could benefit from a rapid and thorough introduction to these technologies. The course is taught at the graduate level and is suitable for advanced technicians and for graduate students through PI's.

## **Workshop Director**

Daniel A. Peterson, Ph.D. maintains an active academic lab focusing on brain repair and neurogenesis and directs a Center for Stem Cell and Regenerative Medicine. He has been teaching international microscopy and stereology courses since 1995.

## **Registration Deadlines**

**Graduate Student Scholarship Applications:**  
Dec. 5, 2011 (March session) April 20 (August session)

**Regular Enrollment On-Line Registration:**  
March 2 (March session) August 3 (August session)

For more information and to register, go to:

**[www.neurorenew.com](http://www.neurorenew.com)**

*Capacity for each course is limited to the first 30 registrants*

# Workshop Announcement

## Practical Workshops in Confocal Microscopy and Stereology

March 19-23, 2012 & August 20-24, 2012

### Short Description

The purpose of this workshop is to provide a comprehensive background in the theory and practice of modern histological preparation and microscopic analysis for researchers in biomedical science. The workshop provides a practical tutorial in all aspects of microscopic analysis including experimental design, specimen preparation, use of fluorescence and confocal microscopes, design-based stereology, and image preparation for scientific publication. A variety of microscopes equipped for stereology are available for use. Participants should bring examples of their material and problems for discussion. In addition to lectures, substantial time is devoted to "hands-on" practical sessions. The instructors draw on their own research material, using imaging and counting of neural stem cells to illustrate the methods. Finally, attendees participate in group discussion, where they can discuss their research applications and consult with the instructors.

### Workshop Design

This workshop provides practical instruction on qualitative and quantitative microscopy that can be applied directly to common research objectives. There is limited opportunity in graduate studies to obtain a comprehensive introduction to the fundamental properties of microscopy and stereology. To address this need, approximately half of each day consists of lectures introducing the essential theoretical foundations of specimen preparation, microscopy, imaging, and obtaining quantitative information from tissue samples using design-based stereology. The afternoons are devoted to tutorials and practical sessions where workshop participants use the instrumentation and gain practical experience. Like learning to drive, you can understand the theory, but you also have to spend time behind the wheel to make the training useful.

This workshop will also be highly interactive, with opportunities for discussion during breaks and continuing into the evening with time for special topics. Space is available with white boards and LCD projectors to facilitate group discussions. Participants should be prepared to present a concise PowerPoint overview of their project and training objectives the first evening. Participants are encouraged to bring samples of their material for use in the individual sessions.

A variety of microscopes, including the latest confocal microscopes and additional computer-assisted stereology workstations, are provided for instruction and participant

use by Olympus America, Inc., Carl Zeiss USA, Inc., and MBF Bioscience, Inc. A Zeiss LSM700 equipped for both confocal microscopy and stereology will be supplied by Carl Zeiss USA, Inc. This equipment will be available throughout the workshop and application specialists from Olympus, Zeiss, and MBF Bioscience will be available for discussion.

### Who should attend?

... anyone who needs to utilize the cutting edge technologies of confocal microscopy and stereology to achieve an adequate level of analysis for their studies. These technologies are complex and often the scientists who need to perform this analysis have never had an opportunity to receive systematic instruction on their correct use. As a result, investigators may fail to obtain the full benefit of these approaches or, in some cases, may obtain incorrect results.

This workshop is designed to provide systematic instruction in microscopy and stereology for scientists who are actively engaged in qualitative and quantitative microscopy or for those who need to introduce these technologies into their work. The workshop is conducted at a graduate level and is suitable for experienced technicians and graduate students through to principal investigators.

### Workshop Director

Dr. Daniel A. Peterson, is Director of the Center for Stem Cell and Regenerative Medicine and Associate Professor of Neuroscience at Rosalind Franklin University of Medicine and Science in North Chicago. He received his Ph.D. from the University of Otago (New Zealand), obtained post-doctoral training at the University of California, San Diego, and worked as a Staff Scientist at the Salk Institute before joining the faculty of The Chicago Medical School at Rosalind Franklin University of Medicine and Science. Dr. Peterson maintains an active academic laboratory and his interests include the use of stem cells and gene therapy in brain repair and peripheral wound repair. He had been a regular member of an NIH study section (NCF) since 2003 and recently retired as Chair of that study section. In addition, he serves on the editorial boards of *Neurobiology of Aging*, *Stem Cells and Development*, *Frontiers of Neuroscience*, *Aging and Disease*, and *Recent Patents in Regenerative Medicine*. Dr. Peterson has been using stereology in his own work since 1985 and confocal microscopy since 1991. He has conducted microscopy courses annually in Europe and the US since 1995. Dr. Peterson also has many years of experience as director of core microscopy facilities.

### Workshop Setting

Lectures, practical sessions, and group discussion sessions will be held at the Club Quarters- Central Loop ([www.clubquarters.com/loc\\_chicago.aspx](http://www.clubquarters.com/loc_chicago.aspx)) in downtown Chicago. Located at 111 West Adams Street, the Club Quarters is a Private Hotel conveniently located in Chicago's Loop District near Michigan Avenue, Grant

Park, and Chicago's Museum Campus. It is also near the Library station of the Chicago Transit system ([www.transitchicago.com](http://www.transitchicago.com)), making access convenient from all transit lines in Chicago.

### Graduate Student Scholarships

Two scholarships for half-cost tuition (reduced to \$650.00) are offered on a competitive basis, one provided by MBF Bioscience, Inc. and one by NeuroRenew, Inc. To apply, send a biosketch, a brief statement of research interests, and a short letter of support from your thesis supervisor to [info@neurorenew.com](mailto:info@neurorenew.com) by the deadlines below. Do not register until you receive a notice of award (within a few days of the deadline).

**Deadlines for Scholarship applications are:**

**December 5, 2011 for the March Workshop**

**April 20, 2012 for the August Workshop**

### Workshop Tuition

Regular enrollment for the week-long workshop is:

Graduate Student or Academic Lab Technician	
Early Bird Rate*	\$1,300.00
Regular Registration	\$1,500.00
Post-Doc or Academic Faculty	
Early Bird Rate*	\$1,650.00
Regular Registration	\$1,850.00
Technical or Research Staff from Industry	
Early Bird Rate*	\$2,150.00
Regular Rate	\$2,350.00

\* Early Bird Rates end: January 13, 2012 (March session)  
June 15, 2012 (August session)

A discount of 25% is offered for each registrant when part of a group of four or more registrants

### Registration

Because of the highly interactive nature of this workshop, enrollment will be limited to the first 30 registrants.

**Deadlines for on-line registration are:**

**March 2, 2012 for the March Workshop**

**August 3, 2012 for the August Workshop**

Registration is available on-line at [www.neurorenew.com](http://www.neurorenew.com). We accept Discover, American Express, VISA and MasterCard. To pay by institutional check, please use the form at the end of this document. The registration includes lectures, practical sessions, group discussions, workshop materials, lunches and break refreshments.

*Cancellation Policy:*

- Cancellations two weeks prior to a workshop session will be entitled to a 75% refund.

- Cancellations within two weeks of a workshop session will be entitled to a 50% refund.
- No fee will be charged for cancellations that defer attendance to the next offered workshop session.
- If NeuroRenew, Inc. must cancel the event, participants will have their registration applied to a replacement date within one year of the original session date or the option for a full refund.

Participants are responsible for their own accommodation and for air and ground transport arrangements.

### Travel

Chicago's O'Hare airport, with worldwide airline connections, is located approximately 30 minutes driving time (depending on traffic conditions) from downtown Chicago and Club Quarters, the meeting hotel. Both United Airlines and American Airlines use Chicago as a major connection hub. Budget airlines fly into Chicago's Midway airport. Participants may want to consider arriving the Saturday before or staying overnight the Saturday following the workshop to obtain a better airfare. As the workshop is quite intense with little free time, staying the weekend before or after the workshop would allow for enjoying some of the sights of Chicago. If you book while room blocks are held, enquire about the weekend rates which are often reduced to help you enjoy the weekend.

Ground transport can be arranged through Blue Line Limousine (800-548-7771) or by taking a taxi from the official taxi ranks at the airport. Both O'Hare and Midway airports are connected to the Chicago Transit Authority system with CTA lines that connect directly to downtown and the Harold Washington Library station. For O'Hare Airport, use the Blue line and for Midway airport, the Orange line. See [www.transitchicago.com](http://www.transitchicago.com) for details.

### Accommodation and Meals

The Club Quarters- Central Loop is the official hotel for accommodation and out of town participants are expected to stay there during the workshop. Due to the intensive nature of the workshop, most past participants have found it invaluable to stay on-site at Club Quarters Hotel. In fact, almost everyone who made separate hotel arrangements has subsequently told me they regretted not staying at Club Quarters. Staying at Club Quarters is also highly recommended for those living in suburban Chicago as suburban commutes make it very difficult to fully participate in the evening sessions.

The Club Quarters- Central Loop is a private business hotel offering four-star quality rooms for the business traveler at the price of a budget hotel ([www.clubquarters.com/loc\\_chicago.aspx](http://www.clubquarters.com/loc_chicago.aspx)). The rooms at the Chicago Loop property are similar to those of a Hyatt Regency or equivalent hotel and offer a range of amenities including:

- Free high-speed Internet access/wired at desk
- Latest design workstation with task lighting, ergonomic chairs
- 2-line speaker and cordless phone, direct dial number
- Luxury bedding and linens
- Cable/Satellite television with On Demand movies
- Free chilled, purified bottled water
- Room service – 24-hour multi menu delivery
- Shopping services/Refrigerator stocking
- Coffee/Tea maker
- Automated wake-up calls
- Radio/alarm clock
- Smoking and non-smoking rooms
- Free high-speed wireless Internet access throughout the hotel
- Private Club Room with complimentary coffee, tea, newspapers, magazines and games
- Free use of computer/printer
- Fitness Room
- Valet – Self Service Launderette

Club Rooms are suitable for single occupancy and are available at week-day rates that may vary between the March and August sessions. Their rate is better than most budget hotels and the room quality is exceptionally better. You will also be in the same building where the lectures and tutorials will be held. If you would like a larger room for double occupancy (Standard Rooms), these can also be reserved at a favorable rate. Suite and kitchenette units are also available at a higher rate.

As Club Quarters is a business hotel, they typically offer a reduced room rate on weekends before or after the workshop (Friday, Saturday and Sunday nights) for those who would like to stay longer and see more of Chicago. Please ask for and confirm this weekend rate when making your reservations. All rates are subject to availability and may increase closer to arrival, so please reserve early to avoid disappointment.

To reserve your room, please telephone group reservation central services (203-905-2100) and identify yourself as part of the NeuroRenew group or book on-line at [www.clubquarters.com](http://www.clubquarters.com) using the password *neurorenew*. Please be sure to select the Chicago Central Loop property, as the other location in Chicago (at Wacker) is a taxi-ride away. Please be prepared to provide a credit card number to hold the reservation.

Morning and afternoon refreshment breaks and a full, catered lunch are provided as part of the workshop. Evening meals are on your own. Chicago has a great diversity of outstanding restaurants in all price ranges that should be experienced during your visit.

## Sponsorship

### ***NeuroRenew, Inc.***

Business arrangements are handled by NeuroRenew, Inc. NeuroRenew, Inc. can be contacted at [info@neurorenew.com](mailto:info@neurorenew.com) or by mail at 207 Berkshire Dr. Lake Villa, IL 60046  
Phone: 847-414-8730  
Fax: 847-245-8599  
[www.neurorenew.com](http://www.neurorenew.com)

### ***MBF Bioscience, Inc.***

Equipment and sponsorship are provided by MBF Bioscience, Inc., suppliers of microscopy, imaging, and stereology equipment.  
[www.mbfbioscience.com](http://www.mbfbioscience.com)

### ***Olympus America, Inc.***

Equipment and sponsorship are provided by Olympus America, Inc., suppliers of microscope and imaging systems, including confocal microscopy systems.  
[www.olympusamerica.com](http://www.olympusamerica.com)

### ***Carl Zeiss USA, Inc.***

Equipment and sponsorship are provided by Carl Zeiss USA, Inc., suppliers of microscope and imaging systems, including confocal microscopy systems.  
<http://www.zeiss.com/microscopy>

# Practical Workshop in Confocal Microscopy and Stereology

## Program and Syllabus

March 19 – 23, 2012

### Arrival

5:00-6:00 PM  
6:00-8:00

### Sunday, March 18, 2012

Registration and Welcoming Reception  
Project Presentations by Participants

### Day One

9:00-10:15  
10:15-10:30  
10:30-12:00

### Monday, March 19, 2012

Welcome and Overview of Workshop  
*Break*  
Systematic Sampling in Experimental Design  
*Lunch*  
1:00-2:30 Specimen Preparation  
2:30-2:45 *Break*  
2:45-4:00 Staining of Tissue for Multiple Label Detection  
4:00-5:00 Practicum in Specimen Preparation and Vendor Demos\*  
5:00-7:00 *Dinner*  
7:00-10:00 Evaluation of Participant's Specimens, Vendor Demos with Free Access to Equipment \*

### Day Two

9:00-10:15  
10:15-10:30  
10:30-12:00  
12:00-1:00  
1:00-2:30  
2:30-2:45  
2:45-4:00  
4:00-5:00  
5:00-7:00  
7:00-10:00

### Tuesday, March 20, 2012

Optical Design and Microscopic Resolution  
*Break*  
Digital Imaging and Image Analysis  
*Lunch*  
1:00-2:30 Tutorial in Photoshop for Scientific Presentation #  
*Break*  
2:45-4:00 Tutorial in Photoshop for Scientific Presentation continued #  
4:00-5:00 Practicum on Microscope Alignment and Digital Camera Settings  
5:00-7:00 *Dinner*  
7:00-10:00 Tutorials on Microscopy and Digital Imaging, Group Discussion, and Vendor Demos with Free Access to Equipment \*

- Participants should bring their own material to examine during the group discussion and equipment access times.

# If possible, participants should bring their own laptop computer loaded with Photoshop CS3 or higher for the Photoshop tutorial.

### Day Three

9:00-10:15  
10:15-10:30  
10:30-12:00  
12:00-1:00  
1:00-2:30  
2:30-2:45  
2:45-5:00  
5:00-7:00  
7:00-10:00

### Wednesday, March 21, 2012

Principles of Fluorescence Microscopy  
*Break*  
Confocal Microscopy  
*Lunch*  
Image Acquisition on the Confocal Microscope  
*Break*  
Practicum on the Confocal Microscopes and Vendor Demonstrations\*  
*Dinner*  
Tutorials on Confocal Microscopy  
Group Discussion and Vendor Demos with Free Access to Equipment \*

### Day Four

9:00-10:15  
10:15-10:30  
10:30-12:00  
12:00-1:00  
1:00-2:30  
2:30-2:45  
2:45-4:00  
4:00-5:00  
5:00-7:00  
7:00-10:00

### Thursday, March 22, 2012

Introduction to Design-Based Stereology  
*Break*  
Estimation of Cell Number  
*Lunch*  
Estimation of Volume and Length  
*Break*  
Sampling, Efficiency, Variation, and Pitfalls  
Practicum on the Optical Fractionator and Vendor Demonstrations\*  
*Dinner*  
Tutorials on Stereology  
Group Discussion and Vendor Demos with Free Access to Equipment \*

### Day Five

9:00-10:15  
10:15-10:30  
10:30-12:00  
12:00-1:00  
1:00-2:30  
2:30-2:45  
2:45-5:00  
5:00-8:00

### Friday, March 23, 2012

Designing a Stereological Study  
*Break*  
Computer-Assisted Stereology  
*Lunch*  
Confocal Stereology  
*Break*  
Practical Issues in Confocal Stereology  
Farewell Dinner Provided by NeuroRenew

### Departure

### Saturday, March 24, 2012

*Break refreshments and lunch supported by the generous sponsorship of MBF Bioscience and Olympus America.*

# Practical Workshop in Confocal Microscopy and Stereology

## Program and Syllabus

August 20 - 24, 2012

### Arrival

5:00-6:00 PM  
6:00-8:00

### Sunday, August 19, 2012

Registration and Welcoming Reception  
Project Presentations by Participants

### Day One

9:00-10:15  
10:15-10:30  
10:30-12:00

### Monday, August 20, 2012

Welcome and Overview of Workshop  
*Break*  
Systematic Sampling in Experimental Design  
*Lunch*  
1:00-2:30 Specimen Preparation  
2:30-2:45 *Break*  
2:45-4:00 Staining of Tissue for Multiple Label Detection  
4:00-5:00 Practicum in Specimen Preparation and Vendor Demos\*  
5:00-7:00 *Dinner*  
7:00-10:00 Evaluation of Participant's Specimens, Vendor Demos with Free Access to Equipment \*

### Day Two

9:00-10:15  
10:15-10:30  
10:30-12:00  
12:00-1:00  
1:00-2:30  
2:30-2:45  
2:45-4:00  
4:00-5:00  
5:00-7:00  
7:00-10:00

### Tuesday, August 21, 2012

Optical Design and Microscopic Resolution  
*Break*  
Digital Imaging and Image Analysis  
*Lunch*  
1:00-2:30 Tutorial in Photoshop for Scientific Presentation #  
*Break*  
2:45-4:00 Tutorial in Photoshop for Scientific Presentation continued #  
4:00-5:00 Practicum on Microscope Alignment and Digital Camera Settings  
*Dinner*  
7:00-10:00 Tutorials on Microscopy and Digital Imaging, Group Discussion, and Vendor Demos with Free Access to Equipment \*

- Participants should bring their own material to examine during the group discussion and equipment access times.

# If possible, participants should bring their own laptop computer loaded with Photoshop CS3 or higher for the Photoshop tutorial.

### Day Three

9:00-10:15  
10:15-10:30  
10:30-12:00  
12:00-1:00  
1:00-2:30  
2:30-2:45  
2:45-5:00  
5:00-7:00  
7:00-10:00

### Wednesday, August 22, 2012

Principles of Fluorescence Microscopy  
*Break*  
Confocal Microscopy  
*Lunch*  
Image Acquisition on the Confocal Microscope  
*Break*  
Practicum on the Confocal Microscopes and Vendor Demonstrations\*  
*Dinner*  
Tutorials on Confocal Microscopy  
Group Discussion and Vendor Demos with Free Access to Equipment \*

### Day Four

9:00-10:15  
10:15-10:30  
10:30-12:00  
12:00-1:00  
1:00-2:30  
2:30-2:45  
2:45-4:00  
4:00-5:00  
5:00-7:00  
7:00-10:00

### Thursday, August 23, 2012

Introduction to Design-Based Stereology  
*Break*  
Estimation of Cell Number  
*Lunch*  
Estimation of Volume and Length  
*Break*  
Sampling, Efficiency, Variation, and Pitfalls  
Practicum on the Optical Fractionator and Vendor Demonstrations\*  
*Dinner*  
Tutorials on Stereology  
Group Discussion and Vendor Demos with Free Access to Equipment \*

### Day Five

9:00-10:15  
10:15-10:30  
10:30-12:00  
12:00-1:00  
1:00-2:30  
2:30-2:45  
2:45-5:00  
5:00-8:00

### Friday, August 24, 2012

Designing a Stereological Study  
*Break*  
Computer-Assisted Stereology  
*Lunch*  
Confocal Stereology  
*Break*  
Practical Issues in Confocal Stereology  
Farewell Dinner Provided by NeuroRenew

### Departure

### Saturday, August 25, 2012

*Break refreshments and lunch supported by the generous sponsorship of MBF Bioscience and Olympus America*



Consulting and Training Services  
for Biomedical Research

**NeuroRenew, Inc.**  
**207 Berkshire Dr.**  
**Lake Villa, IL 60046**  
**USA**

847-414-8730  
info@neurorenew.com  
www.neurorenew.com  
Federal Tax ID: 20-0029302

**Practical Workshop in Confocal Microscopy and Stereology**

**Workshop Registration by Institutional Check**

Register by credit card at [www.neurorenew.com](http://www.neurorenew.com)

**Please Supply the Following Information:**

Registrant First Name: \_\_\_\_\_

Registrant Last Name: \_\_\_\_\_

Email: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Institution: \_\_\_\_\_

Department/Division: \_\_\_\_\_

For Graduate Students-

Name of PI: \_\_\_\_\_

PI's Email: \_\_\_\_\_

**Registration is for (select one):**

\_\_\_ March Workshop (March 19-23, 2012)  
*must be received by February 27*

\_\_\_ August Workshop (Aug. 20-24, 2012)  
*must be received by August 1*

**Registrant is (select one):**

\_\_\_ \$1,300.00 (\$1,500.00 after Jan. 13 or June 15)  
Graduate Student or Academic Technical Staff

\_\_\_ \$1,650.00 (\$1,850.00 after Jan. 13 or June 15)  
Post-Doctoral Fellow or Academic Faculty

\_\_\_ \$2,150.00 (\$2,350.00 after Jan. 13 or June 15)  
Technical or Scientific Staff from Industry

*Early-Bird Discount Ends:*

*January 13 (March Session)*

*June 15 (August Session)*

**Please Remit Check to:**

NeuroRenew, Inc.  
207 Berkshire Dr.  
Lake Villa, IL 60046