

# Practical Workshop in Confocal Microscopy & Quantitative Histology

Qualitative and Quantitative Microscopy for Biomedical Research

**August 10 - 14, 2020  
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:  
April 3, 2020**

**Early Registration Discount Deadline:  
May 25, 2020**

**For more information and to register, go to:**

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

*Capacity is limited to the first 30 registrants*



## Workshop Announcement

# Practical Workshop in Confocal Microscopy & Quantitative Histology

August 10-14, 2020

### 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, quantitative histology using design-based stereology, and image preparation for scientific publication. Sessions on Rigor and Reproducibility have been added in response to the recent NIH criteria for grant funding. Other new sessions address tissue clearing, light sheet microscopy, handling of large image data sets, and use of artificial intelligence.

A variety of microscopes equipped for confocal microscopy and 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 to facilitate group discussions. Participants should be prepared to present a concise PowerPoint overview of their project and training objectives in the opening session. 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 Nikon USA, Inc., Carl Zeiss USA, Inc., Leica Microsystems, Inc., and MBF Bioscience, Inc. This equipment will be available throughout the workshop and application specialists from the companies 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

Prof. Daniel A. Peterson is Professor and Vice-Chairman of Neuroscience and Director of the Center for Stem Cell and Regenerative Medicine at The Chicago Medical School 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. He is also a Guest Professor at the University of Bonn, Germany. Prof. Peterson maintains an active NIH-funded academic laboratory and his interests include the use of stem cells and gene therapy in brain repair and peripheral wound repair. He had served as Chairman of a standing NIH study section (NCF) and chaired numerous Special Emphasis Panels. In addition, he serves on various editorial boards including *Neurobiology of Aging*, *Stem Cells and Development*, and *Frontiers of Neuroscience*. Prof. 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. Prof. 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 \$800.00) are offered on a competitive basis, one provided by MBF Bioscience, Inc. and one by NeuroRenew, Inc. To apply, send a biosketch (short CV), a brief statement of research interests (maximum one page), and a short letter of support from your thesis supervisor to [president@neurorenew.com](mailto:president@neurorenew.com) by the deadlines below. **Do not register until you receive a notice of award** (within a few days of the deadline).

**Deadline for Scholarship applications is:**

**April 3, 2020**

### Workshop Tuition

Regular enrollment for the week-long workshop is:

Graduate Student or Academic Lab Technician	
Early Bird Rate*	\$1,600.00
Regular Registration	\$1,950.00
Post-Doc or Academic Faculty	
Early Bird Rate*	\$1,900.00
Regular Registration	\$2,250.00
Technical or Research Staff from Industry	
Early Bird Rate*	\$2,650.00
Regular Rate	\$3,000.00

\* *Early Bird Rates end: May 25, 2020*

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

### Registration

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

**Deadline for on-line registration is:**

**August 6, 2020**

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 or wire transfer, please request a form from [president@neurorenew.com](mailto:president@neurorenew.com). 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. Enquire about the weekend rates at Club Quarters, 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. 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 on-line, please go to <https://clubquartershotels.com/neurorenew-inc> or by calling Member Services at +1.203.905.2100 or +44 (0)20 7451 5800 (identify yourself as booking with NeuroRenew). Please be sure to select the Chicago Central Loop property, as the other location in Chicago (at Wacker) is a 15 minute walk or 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 300 North State Street, Suite 3831 Chicago, IL 60654  
Phone: 847-414-8730  
[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 and software.  
[www.mbfbioscience.com](http://www.mbfbioscience.com)

### ***Nikon Instruments Inc.***

Equipment is provided by Nikon Instruments Inc., suppliers of microscope and imaging systems, including confocal microscopy systems.  
<http://www.nikoninstruments.com>

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

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

### ***Leica Microsystems, Inc.***

Equipment is provided by Leica Microsystems, Inc., suppliers of microscope and imaging systems, including confocal microscopy systems.  
<https://www.leica-microsystems.com>

# Practical Workshop in Confocal Microscopy and Stereology

## Program and Syllabus

August 10 - 14, 2020

<b>Arrival</b> 6:00-9:00 PM	<b>Sunday, August 9, 2020</b> Welcoming Reception 300 North State Street, Apt. 3831
<b>Day One</b> 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	<b>Monday, August 10, 2020</b> Welcome and Overview of Workshop <i>Break</i> Systematic Sampling in Experimental Design <i>Lunch</i> Specimen Preparation <i>Break</i> Staining of Tissue for Multiple Label Detection  Rigor and Reproducibility in Research <i>Dinner</i> Evaluation of Participant's Specimens, Vendor Demos with Free Access to Equipment *
<b>Day Two</b> 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	<b>Tuesday, August 11, 2020</b> Optical Design and Microscopic Resolution <i>Break</i> Digital Imaging and Image Analysis <i>Lunch</i> Tutorial in Image Composition for Scientific Presentation # <i>Break</i> Tutorial in Image Composition for Scientific Presentation continued# Practicum on Microscope Alignment and Digital Camera Settings <i>Dinner</i> 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 loaded with Photoshop CS3 or higher or GIMP for the tutorial on scientific image composition.

<b>Day Three</b> 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	<b>Wednesday, August 12, 2020</b> Principles of Fluorescence Microscopy <i>Break</i> Confocal Microscopy <i>Lunch</i> Image Acquisition on the Confocal Microscope <i>Break</i> Practicum on the Confocal Microscopes and Vendor Demonstrations* <i>Dinner</i> Tutorials on Confocal Microscopy Group Discussion and Vendor Demos with Free Access to Equipment *
<b>Day Four</b> 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	<b>Thursday, August 13, 2020</b> Introduction to Design-Based Stereology <i>Break</i> Estimation of Cell Number <i>Lunch</i> Estimation of Volume and Length <i>Break</i> Sampling, Efficiency, Variation, and Pitfalls Practicum on the Optical Fractionator and Vendor Demonstrations* <i>Dinner</i> Tutorials on Stereology Group Discussion and Vendor Demos with Free Access to Equipment *
<b>Day Five</b> 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 6:00-9:00	<b>Friday, August 14, 2020</b> Designing a Stereological Study <i>Break</i> Computer-Assisted Stereology <i>Lunch</i> Confocal Stereology <i>Break</i> Practical Issues in Confocal Stereology Farewell Dinner Provided by NeuroRenew

**Departure Saturday, August 15, 2020**

*Break refreshments and lunch supported by NeuroRenew and by the generous sponsorship of MBF Bioscience, Inc.*