

# International Workshop on Confocal Microscopy & Quantitative Histology

Qualitative and Quantitative Microscopy for Biomedical Research

**August 10 - 14, 2020**  
**Virtual Workshop due to Covid-19**

## **Purpose of the Course**

To provide intensive, practical training in the cutting-edge technologies of confocal microscopy and design-based stereology. Discussions follow each topic and there is individual post-workshop 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**

Prof. Daniel A. Peterson, maintains an active academic lab focusing on brain repair and directs a Center for Stem Cell and Regenerative Medicine. He has been teaching international microscopy and stereology courses since 1995, training more than 500 scientists.

## **Registration Deadlines**

**Graduate Student Scholarship Applications:**  
April 3, 2020

**Early Registration Discount Deadline:**  
June 30, 2020

For more information and to register, go to:

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

## Workshop Announcement

# International 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 practical instruction 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.

### Restructuring Due to the Covid-19 Pandemic

Due to the effects of the Covid-19 pandemic, it is likely not possible, and certainly not advisable, to hold an in-person workshop as planned for August of this year. Therefore, the workshop this year will be offered in two separate components.

### Summary of Restructuring

#### Virtual Workshop, August 10-14, 2020

- Attend on-line half-day webinars
- Participate in Zoom-based Discussion Groups
- Take advantage of subsequent individual consultation sessions on your research needs
- Save the time, expense, and uncertainty of traveling to Chicago
- Remain productive in the lab while participating in the workshop

#### Hands-on Workshop, Dates to-be-determined

- 3-day intensive instruction on various widefield and confocal microscopes
- Instruction on several stereology systems
- Use of high-end workstations for image analysis
- Consultation using participants' own samples
- To be scheduled when travel is again safe

#### Virtual Workshop

The first component will be virtual and consist of live webinars, prerecorded practical demonstrations, and discussion sessions using the original dates (August 10-14, 2020) and schedule of topics as described in the updated syllabus.

This virtual 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, half-day long webinars will introduce the essential theoretical foundations of specimen preparation, microscopy, imaging, and obtaining quantitative information from tissue samples using design-based stereology. Zoom-based discussions will directly follow topics to allow for questions and additional explanation to address participants' research objectives.

The virtual workshop will be followed by scheduled, individual Zoom-based sessions with participants to address their particular research objectives. Other lab members may participate in these post-workshop, scheduled Zoom sessions.

#### Subsequent Hands-On intensive Workshop

Participants that registered and participated in the virtual workshop will have the opportunity to participate in a subsequent practical session that will be held in person. Like learning to drive, you can understand the theory, but you also have to spend time behind the wheel to make the training useful.

The intensive 3-day in-person practical session will be arranged when it is safe again to travel and resume in-person activities. The practical portion will be held in Chicago where there will be a variety of microscopes equipped for confocal microscopy and stereology available for use, along with high-end image analysis workstations.

Structured practical instruction will use provided samples and there will be ample opportunity for individual, assisted use of the various systems. Participants should bring examples of their material and problems for examination and 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. Prof. Peterson maintains an active NIH-funded academic laboratory and his interests include the use of stem cells and gene therapy in brain 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, teaching more than 500 young scientists. Prof. Peterson also has many years of experience as director of core microscopy facilities.

## Graduate Student Scholarships

A limited number of scholarships for half-cost tuition (\$560.00) are offered to qualified graduate students on a competitive basis. 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**

**Deadline for Scholarship applications is: April 3, 2020**

## Virtual Workshop Tuition

Graduate Student or Academic Lab Technician	
Early Bird Rate*	\$1,120.00
Regular Registration	\$1,320.00
Post-Doc or Academic Faculty	
Early Bird Rate*	\$1,330.00
Regular Registration	\$1,530.00
Technical or Research Staff from Industry	
Early Bird Rate*	\$1,855.00
Regular Rate	\$2,055.00

\* *Early Bird Rates end: **June 30, 2020***

**The deadline for Virtual Workshop registration is:**

**August 9, 2020**

## Registration for the Virtual 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 or wire transfer, please request a form from [president@neurorenew.com](mailto:president@neurorenew.com). The registration includes the on-line webinars, group Zoom discussions, and subsequent consultation session to address specific research needs.

## Cancellation Policy

- Cancellations up to one week prior to a workshop session will be entitled to a complete refund less a \$100 processing fee.
- Cancellations within one week prior to a workshop session will be entitled to an 80% refund.
- If NeuroRenew, Inc. must cancel the event, participants will have their registration refunded

## Hands-On Workshop Registration

There will be a separate registration for the subsequent in-person Hands-On Workshop. Details will be announced once it is safe to schedule in-person events.

## 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.**

Suppliers of microscopy, imaging, and stereology equipment and software.  
[www.mbfbioscience.com](http://www.mbfbioscience.com)

### **Nikon Instruments Inc.**

Suppliers of microscope and imaging systems, including confocal microscopy systems.  
<http://www.nikoninstruments.com>

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

Suppliers of microscope and imaging systems, including confocal microscopy systems.  
<http://www.zeiss.com/microscopy>

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

Suppliers of microscope and imaging systems, including confocal microscopy systems.  
<https://www.leica-microsystems.com>

# International Workshop in Confocal Microscopy and Stereology

## Virtual Program and Syllabus

## August 10 - 14, 2020

On-Line Webinar sessions will be presented every day from 11:00 AM to 3:30 PM (11:00-15:30) Chicago time. Each topic will be followed by an interactive discussion session.

Please see the table below for conversion to your local time. If there are a sufficient number of participants, an alternative presentation will be given for Asia-Oceania as shown below.

<b>Day One</b>	<b>Monday, August 10, 2020</b>
Topic 1	Systematic Sampling in Experimental Design
Topic 2	Rigor and Reproducibility in Research
Topic 3	Specimen Preparation
Topic 4	Staining of Tissue for Multiple Label Detection
<b>Day Two</b>	<b>Tuesday, August 11, 2020</b>
Topic 5	Optical Design and Microscopic Resolution
Topic 6	Digital Imaging and Image Analysis
Topic 7	Control of Image Data Channels
Topic 8	Composition of the Publication-Quality Scientific Image
<b>Day Three</b>	<b>Wednesday, August 12, 2020</b>
Topic 9	Principles of Fluorescence Microscopy
Topic 10	Confocal Microscopy: Evolution of Design
Topic 11	Parameters and Limitations for Image Acquisition
Topic 12	Practicum on the Confocal Microscope Image Acquisition

<b>Day Four</b>	<b>Thursday, August 13, 2020</b>
Topic 13	Introduction to Design-Based Stereology
Topic 14	Estimation of Cell Number
Topic 15	Estimation of Volume and Length
Topic 16	Sampling, Efficiency, Variation, and Pitfalls in Histological Quantitation

<b>Day Five</b>	<b>Friday, August 14, 2020</b>
Topic 17	Designing a Stereological Study
Topic 18	Computer-Assisted Stereology
Topic 19	Confocal Stereology and Large Image Data Sets
Topic 20	Artificial Intelligence for Unbiased Quantitation

**Post-Workshop Individual Consultation Sessions**  
To be scheduled with each participant

### Presentation Time Conversion Tables

#### Europe-Americas Times for the Workshop

USA- Pacific Time	09:00-13:30
USA- Mountain Time	10:00-14:30
USA- Central Time (Chicago)	11:00-15:30
USA- Eastern Time	12:00-16:30
São Paulo/Buenos Aires	13:00-17:30
London	17:00-21:30
Central European Time	18:00-22:30
Moscow	20:00-00:30

#### Potential Alternate Asia-Oceania Times (TBD)

New Delhi	06:00-10:30
Shanghai	09:00-13:30
Seoul/Tokyo	10:00-14:30
Sydney	11:00-15:30
Auckland	13:00-17:30