

蔡司 LSM 980-NLO 显微镜培训大纲

Zeiss LSM 980-NLO Microscope Training Outline

Date	Time	Training Content
April 2	9:00-10:30	<ul style="list-style-type: none"> ➤ LSM 980-NLO 理论培训和答疑 (中英文场) LSM 980-NLO Theoretical Training and Q&A Session;
	10: 45-11: 30	<ul style="list-style-type: none"> ➤ 硬件介绍、开关机和使用注意事项 Hardware Overview, Power On/Off Procedures, and Usage Precautions;
	13: 30-18: 00	<ul style="list-style-type: none"> ➤ ZEN 软件界面概览和电动显微镜控制 ZEN Software Interface Overview and Motorized Microscope Control; ➤ LSM 980 基础功能模块培训 LSM 980 Basic Function Module Training: (Multichannel、Z-stack、Time series、BF/DIC…) ➤ Airyscan 超分辨率成像和数据处理 Airyscan Super-Resolution Imaging and Super-Resolution Data Processing; ➤ 数据的保存、处理和导出 Data saving, processing, and export; ➤ 多维数据的处理 Multidimensional data processing;
April 3	9: 00-11: 30	<ul style="list-style-type: none"> ➤ LSM 980 高阶模块培训 LSM 980 Advanced Function Module Training:(tiles、FRAP、Reflected Bright-Field Imaging and Morphology Analysis of Material Samples…) ➤ 光谱扫描和光谱拆分 Spectral scanning and spectral unmix ; ➤ 共定位分析等 Colocalization analysis, etc.;
	13: 30-18: 00	<ul style="list-style-type: none"> ➤ 三维表面形貌成像和数据分析 (高度测量, 粗糙度分析等等) Surface topography imaging and Data analysis (Height measurement, roughness analysis, etc) ➤ 操作练习 Practice Exercises
第二场 TBD	9:00-11:30	<ul style="list-style-type: none"> ➤ LSM 980-NLO 双光子部分理论培训和答疑 (中英文场) LSM 980-NLO Two-photon Part Theoretical Training and Q&A Session; ➤ 飞秒激光器开关机和维护 Powering on/off and maintenance of femtosecond lasers; ➤ 双光子的使用: 开关机、飞秒激光器维护保养; NLO 光路设置和使用; NLO 滤片更换; 扫描台的调节; Applications of Two-Photon Technology: NLO system startup and shutdown procedures; NLO laser maintenance and servicing; NLO optical path setup and operation; NLO filter replacement; Scanning stage disassembly and reassembly; ➤ 技术答疑 Technical Q&A
	13: 30-18: 00	<ul style="list-style-type: none"> ➤ 双光子活体动物实验手术器材等拓展介绍 Expanded introduction to surgical instruments for two-photon in vivo animal experiments. ➤ 操作练习 Practice Exercises

注意事项:

Important Notes:

1. 本培训大纲主要是帮助技术人员梳理和确认培训内容。

This training outline primarily assists technical personnel in organizing and confirming training content.

2. 为保证培训质量，参加培训人数控制在 6 人以内！并建议用户指定 2-3 名核心成员作为骨干。如果首次培训参与人数过多，需向用户说明，可能将严重影响培训质量。建议通过“蔡司空中教室”小程序观看视频教程，掌握常规操作步骤后，再有本单位核心骨干答疑。

To ensure training quality, participant numbers must be limited to 6 or fewer! It is recommended that users designate 2-3 core members as key personnel. If initial training attendance exceeds this limit, users should be informed that it may significantly compromise training effectiveness. It is recommended to watch video tutorials via the “Zeiss Virtual Classroom” mini-program to master routine operational steps before seeking clarification from the organization's core personnel.

3. 首次培训开始前，技术人员需向老师说明仪器配置，根据实际情况决定培训内容；对于首次不培训的内容，需向老师解释原因。

Before the initial training session begins, technical personnel must inform the instructor of the instrument configuration to determine training content based on actual conditions. For any content not covered during the first training, the reasons must be explained to the instructor.



共聚焦培训内容列表

List of Confocal Training Content

培训内容 Training Content	配置与否 Configure or not	培训与否 Training or not	备注 Notes
硬件及基本原理 共聚焦成像原理、应用方向介绍 Hardware and Basic Principles Introduction to the Principles and Applications of Confocal Imaging	●	<input type="checkbox"/>	确保用户对共聚焦硬件有足够的认识。 了解仪器应用方向 Ensure users have sufficient familiarity with confocal hardware. Understand the instrument's application scope.
Airyscan 成像原理、应用方向介绍 Introduction to Airyscan Imaging Principles and Applications	●	<input type="checkbox"/>	确保用户了解 Airyscan 成像原理以及正确应用方向 Ensure users understand the imaging principles of Airyscan and its proper application direction.
硬件各模块介绍 Introduction to Hardware Modules	●	<input type="checkbox"/>	共聚焦各部分硬件功能;掌握开关机顺序,学会如何根据样品选择合适的物镜。了解并熟悉软件界面 Master the hardware functions of each component of the confocal system; understand the proper startup and shutdown sequence, and learn how to select the appropriate objective lens based on the sample. Understand and become familiar with the software interface.
仪器维护与注意事项介绍 Instrument Maintenance and Precautions Guide	●	<input type="checkbox"/>	了解仪器维护方法与使用注意事项;激光安全介绍; Understanding instrument maintenance methods and usage precautions; Laser safety introduction;

<p>图像获取与 处理 Image Acquisition and Processing</p>	<p>ZEN 软件界面介绍 ZEN Software Interface Overview</p>	<p>●</p>	<p>□</p>	<p>熟悉 ZEN 软件界面 Familiar with the ZEN software interface</p>
	<p>Smart Setup 使用方法 Smart Setup User Guide</p>	<p>●</p>	<p>□</p>	<p>掌握如何通过 Smart Setup 自动设置光路/通道方式; 不同模式的区别 Master how to automatically configure light paths/channel modes using Smart Setup; understand the differences between various modes.</p>
	<p>二维图像采集 2D image acquisition</p>	<p>●</p>	<p>□</p>	<p>1) 如何对多通道成像光路优化 How to optimize the light path for Multi-Channel imaging 2) 相关拍摄参数解释与优化方法 Image acquisition parameters explanation and optimization Methods 3) Display 含义解释与优化 Display meaning explanation and optimization</p>
	<p>LSM Plus 使用方法 How to Use LSM Plus</p>	<p>○</p>	<p>□</p>	<p>4) LSM Plus 参数设置与优化 LSM Plus parameter setup and optimization</p>
	<p>三维图像采集 3D Image Acquisition</p>	<p>●</p>	<p>□</p>	<p>1) 如何设置 z stack 以及如何优化相关设置 How to configure the Z-stack and optimize related settings 2) 不同 3D 渲染效果展示 Demonstration of different 3D rendering effects 3) 如何制作 3D 视频 How to create 3D videos</p>
	<p>时间序列图像采集 Time-series image</p>			<p>1) 了解不同的聚焦方法:Autofocus & Definite Focus(如有)之间的差异</p>

<p style="text-align: center;">acquisition</p> <p>a) 时间序列成像基础设置 Time-Series Imaging basic Settings</p> <p>b) 活细胞工作站设置 Live-Cell Workstation setup</p> <p>c) Definite Focus 设置 Definite Focus setup</p> <p>d) 长时程成像聚焦策略 Long-Term Imaging Focusing Strategy</p>	<p style="text-align: center;">●</p> <p style="text-align: center;">○</p> <p style="text-align: center;">○</p> <p style="text-align: center;">●</p>	<p style="text-align: center;">□</p> <p style="text-align: center;">□</p> <p style="text-align: center;">□</p> <p style="text-align: center;">□</p>	<p style="text-align: center;">与适用性</p> <p>Understand different focusing methods: Differences and applicability between Autofocus and Definite Focus (if available)</p> <p>2) 掌握基本的时间序列成像如何设置</p> <p>Master basic time-lapse imaging setup procedures</p> <p>3) 学会如何使用活细胞装置进行活细胞长时间成像</p> <p>Learn how to perform long-term live-cell imaging using live-cell imaging systems</p>
<p style="text-align: center;">拼图与多点成像 Tile and Position Imaging</p>	<p style="text-align: center;">●</p>	<p style="text-align: center;">□</p>	<p>1) 掌握如何设置拼图区域</p> <p>How to set up the puzzle area</p> <p>2) 对于不平整的样品, 如何使用 Focus Map 功能</p> <p>How to use the Focus Map feature for uneven samples</p>
<p style="text-align: center;">图像/视频处理、导出与基础图像分析 Image/Video Processing, Export, and Basic Image Analysis</p>	<p style="text-align: center;">●</p>	<p style="text-align: center;">□</p>	<p>1) Graphics 菜单介绍 (加注释、标尺、截图等)</p> <p>Introduction to the Graphics Menu (add annotations, rulers, screenshots, etc.)</p> <p>2) 图像处理工具使用, 如 Image/Movie Export、Create Image Subset、Add Channels、Denoise、Deblurring、批处理等实用工具</p> <p>Image processing tools, such as Image/Movie Export, Create Image Subset, Add Channels, Denoise, Deblurring, batch processing, and other useful tools</p>



			<p>3) 掌握基本的荧光强度定量方法, 如 Profile、Histo 工具的使用</p> <p>Master basic methods for quantifying fluorescence intensity, such as using the Profile and Histo tools.</p>
<p>Airyscan 图像获取 Airyscan Image Acquisition</p>	●	□	<p>1) 基本使用方法和校准 Basic usage and calibration</p> <p>2) 参数设置优化技巧 Tips for optimizing parameter settings</p> <p>3) Multiplex 使用方法 How to use Airyscan Multiplex mode</p> <p>4) 数据处理与优化 Data processing and optimization</p>
<p>Airyscan jDCV 使用方法 How to Use Airyscan jDCV</p>	●	□	<p>1) Airyscan jDCV 参数设置与优化 Airyscan jDCV parameter settings and optimization</p>
<p>自动处理 Direct Processing</p>	●	□	<p>1) 学习如何设置和使用 Direct processing 进行自动处理 Learn how to set up and use Direct Processing for automated processing</p>
<p>透射光图像获取 Transmitted light imaging</p>	●	□	<p>1) DIC 的使用方法与调节技巧 How to use and adjust DIC mode</p> <p>2) 科勒照明如何调节 How to adjust Kohler illumination</p>
<p>Lambda 光谱成像 Lambda Spectral Imaging</p>	●	□	<p>1) 光谱成像与线性拆分原理 Principles of Spectral Imaging and Linear unmixing</p> <p>2) 光谱成像光路设置 Optical path setup for Spectral Imaging</p> <p>3) 光谱模式/通道模式线性拆分使用</p>



			<p>技巧和应用场景</p> <p>Tips and applications for Linear unmixing in Spectral Mode/Channel Mode</p>	
	<p>反射光模式图像采集</p> <p>Image Acquisition in Reflected Light Mode</p>	●	□	<p>该成像方式可用于样品表面形貌分析</p> <p>This imaging method can be used for analyzing the surface topography of samples</p>
<p>高级图像采集与数据分析模块使用 (按需培训)</p> <p>Advanced Image Acquisition and Data Analysis Module Training (On-Demand)</p>	<p>共定位分析</p> <p>Colocalization analysis</p>	●	□	<p>1) 掌握共定位分析设置方法</p> <p>Master how to set up Colocalization analysis</p> <p>2) 熟练解读共定位分析结果</p> <p>Be able to interpret Colocalization analysis results</p>
	<p>FRET 模块</p> <p>FRET module</p>	●	□	<p>包括比值法、Acceptor bleaching、Sensitized emission 三种方法</p> <p>Include the ratio method, acceptor bleaching, and sensitized emission</p>
	<p>FRAP 模块</p> <p>FRAP Module</p>	●	□	<p>适用于膜的流动性以及分析扩散研究</p> <p>Suitable for studying membrane fluidity and analyzing diffusion processes</p>
	<p>实验设计器</p> <p>Experiment Designer</p>	○	□	<p>设置不均匀的多维图像采集策略</p> <p>Setting a non-uniform multi-dimensional image acquisition strategy</p>
	<p>向导式采集</p> <p>Guided Acquisition</p>	○	□	<p>向导式采集模块，以自动化的工作流程有针对性的获取感兴趣的图像</p> <p>Guided acquisition module that uses automated workflows to selectively capture images of interest</p>
	<p>自动光操作</p> <p>Automated</p>	○	□	<p>自动光操作，用于多个位置的自动光活化与漂白</p>



Photomanipulation			Automated Photomanipulation for automatic photoactivation and bleaching at multiple locations
图像自动分析 Image Analysis	●	<input type="checkbox"/>	强大的图像分析工具，可用于细胞计数、荧光强度统计、ZOI 分析、3D 提取等 Powerful image analysis tools for cell counting, fluorescence intensity analysis, ZOI analysis, 3D analysis, and more
关联显微成像 ZEN Connect	●	<input type="checkbox"/>	该模块可实现同一样品、不同显微镜采集的图像对齐，实现光-光/光-电关联 The alignment of images captured of the same sample using different microscopes, facilitating light-to-light and light-to-electronic correlation.

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