

## Biolmaging North America Metrology Suitcase Pilot Program

V.L. Orr<sup>1</sup>, N. Bialy<sup>1</sup>, C. Strambio De Castillia<sup>2</sup>, A.J. North<sup>3</sup>, C.M. Brown<sup>4,5</sup>, K.W. Eliceiri<sup>1,6,7,8,9</sup>

<sup>1</sup> Morgridge Institute for Research, Madison, Wisconsin, USA; <sup>2</sup> Program in Molecular Medicine, University of Massachusetts Medical School, Worcester, MA, USA; <sup>3</sup> The Rockefeller University, New York, New York, USA; <sup>4</sup> Department of Physiology, McGill University, Montreal, Quebec, Canada; <sup>5</sup> Advanced Biolmaging Facility, McGill University, Montreal, Quebec, Canada; <sup>6</sup> Laboratory for Optical and Computational Instrumentation (LOCI), Center for Quantitative Cell Imaging, University of Wisconsin at Madison, Madison, Wisconsin, USA; <sup>7</sup> Department of Biomedical Engineering, University of Wisconsin at Madison, Madison, Wisconsin, USA; <sup>8</sup> Carbone Cancer Center, University of Wisconsin at Madison, Madison, Wisconsin, USA; <sup>9</sup> Department of Medical Physics, University of Wisconsin at Madison, Madison, Wisconsin, USA.

### Abstract

Many recent articles, including a Focus issue of *Nature Methods*,<sup>1</sup> have highlighted the importance of “Reporting and Reproducibility in Microscopy”. In order to ensure reproducible results, proper quality control procedures for the instruments acquiring data must be performed. Based on the Metrology Suitcase program organized by the French microscopy technological network (RTmfm),<sup>2,3</sup> Biolmaging North America (BINA), an international network of bioimaging scientists, has developed a metrology suitcase program,<sup>4</sup> currently with four cases being distributed throughout North America. These small, highly portable cases contain equipment for two quality control tests for confocal microscopes: 1) point spread function resolution measurements, and 2) light source stability and power for quantitative reproducible fluorescence intensity measurements. This poster presents the equipment and protocols included in the BINA metrology cases, information on logistics of shipping and sharing the cases, and an update on progress of the pilot phase of the program. Data collected from this case will contribute to the quality control data collection efforts by Quality Assessment and Reproducibility for Instruments & Images in Light Microscopy (QUAREP-LiMi) WG1: Illumination Power and WG5: Lateral and Axial Resolution.<sup>5</sup>



Photo of the interior of the BINA Metrology Suitcase containing (1) a Microscope Slide Power Sensor, 350 – 1100 nm, 150 mW (ThorLabs S170C), (2) a PSF Check slide (PSF Check), (3) a TetraSpeck Fluorescent Microspheres Size Kit/slide (ThermoFisher T14792), (4) a Power meter (ThorLabs PM100D), and (5) relevant power cables.

### References

1. Reporting and Reproducibility in Microscopy, *Nature Methods*, 18, 1411-1498, (2021). <https://www.nature.com/collections/djciihhj>
2. Faklaris, O., Bancel-Vallée, L., Dauphin, A., et al. *J. Cell Biol.* (2022) 221 (11): e202107093.
3. RTmfm Metrology Suitcase webpage: <https://rtmfm.cnrs.fr/en/gt/gt-3m/valise-metrologie/> (accessed 2023)
4. BINA Metrology Suitcase webpage: <https://www.biolmagingnorthamerica.org/metrology-suitcase/> (2022).
5. Boehm, U., Nelson, G., Brown, C.M. et al. QUAREP-LiMi: a community endeavor to advance quality assessment and reproducibility in light microscopy. *Nat Methods* 18, 1423–1426 (2021). <https://doi.org/10.1038/s41592-021-01162-y>