

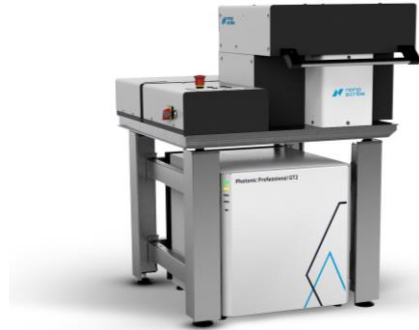


# Freeform optics made by Two-Photon Grayscale Lithography (2GL<sup>®</sup>)

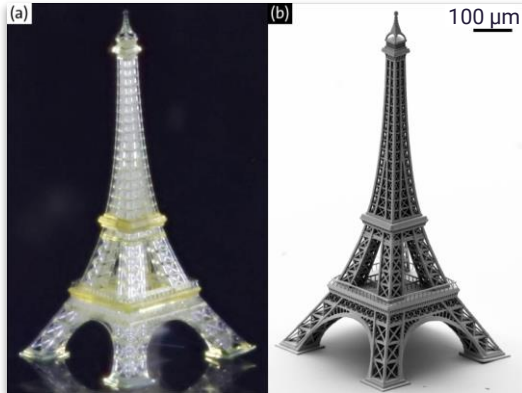
Dr. Jochen Zimmer, Sales Manager

EPIC Online Technology Meeting  
on Freeform Optics for AR/VR

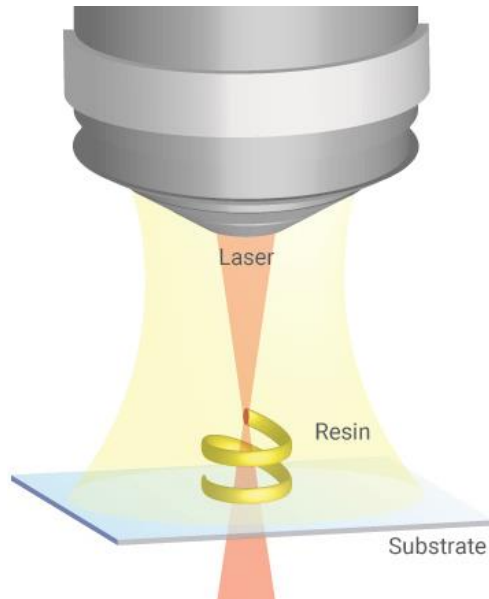
# Nanoscribe – what we do



- ▶ 3D microprinting solutions (sub-micron resolution)



# Nanoscribe – what we do



- ▶ 3D microprinting solutions (sub-micron resolution)
- ▶ Based on Two-Photon Polymerization (2PP)

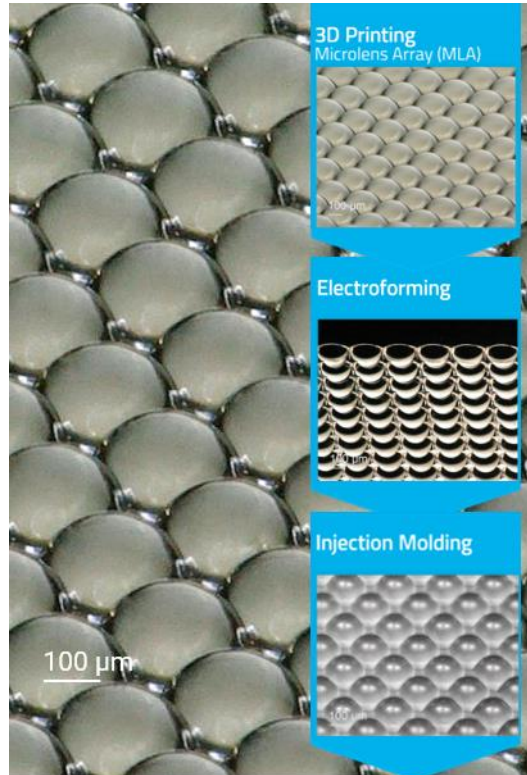
# Nanoscribe – what we do



- ▶ 3D microprinting solutions (sub-micron resolution)
- ▶ Based on Two-Photon Polymerization (2PP)
- ▶ Used by academic and industrial customers

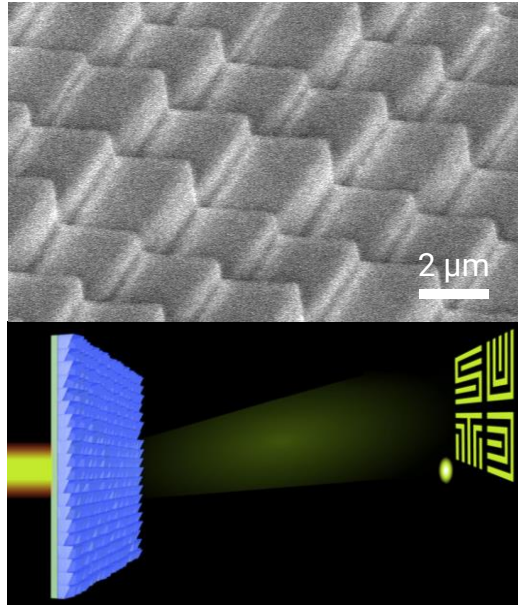


# Nanoscribe – what we do



- ▶ 3D microprinting solutions (sub-micron resolution)
- ▶ Based on Two-Photon Polymerization (2PP)
- ▶ Used by academic and industrial customers
- ▶ For prototyping and mastering micro-optics

# Nanoscribe – what we do

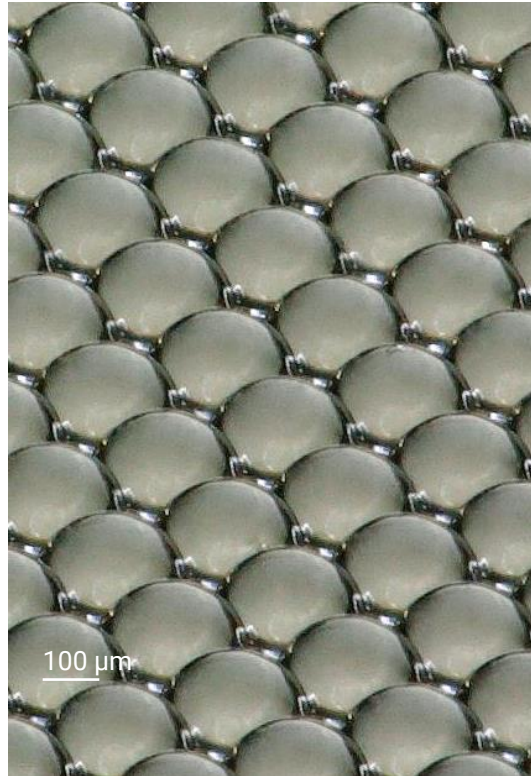


- ▶ 3D microprinting solutions (sub-micron resolution)
- ▶ Based on Two-Photon Polymerization (2PP)
- ▶ Used by academic and industrial customers
- ▶ For prototyping and mastering micro-optics
- ▶ Examples include MLAs, DOEs, angled surfaces

Images: Hao Wang, Singapore University of  
Technology and Design

DOI: [10.1002/adom.201900068](https://doi.org/10.1002/adom.201900068)

## Nanoscribe – what we do



- ▶ 3D microprinting solutions (sub-micron resolution)
- ▶ Based on Two-Photon Polymerization (2PP)
- ▶ Used by academic and industrial customers
- ▶ For prototyping and mastering micro-optics
- ▶ Examples include MLAs, DOEs, angled surfaces
- ▶ Surface roughness < 10 nm (no post-processing)

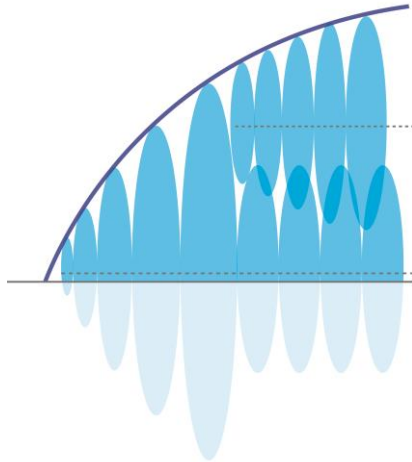
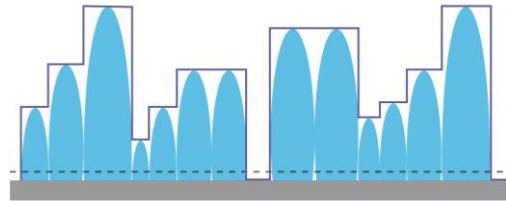
# Nanoscribe – what we do



- ▶ 3D microprinting solutions (sub-micron resolution)
- ▶ Based on Two-Photon Polymerization (2PP)
- ▶ Used by academic and industrial customers
- ▶ For prototyping and mastering micro-optics
- ▶ Examples include MLAs, DOEs, angled surfaces
- ▶ Surface roughness < 10 nm (no post-processing)
- ▶ Recently released: Quantum X

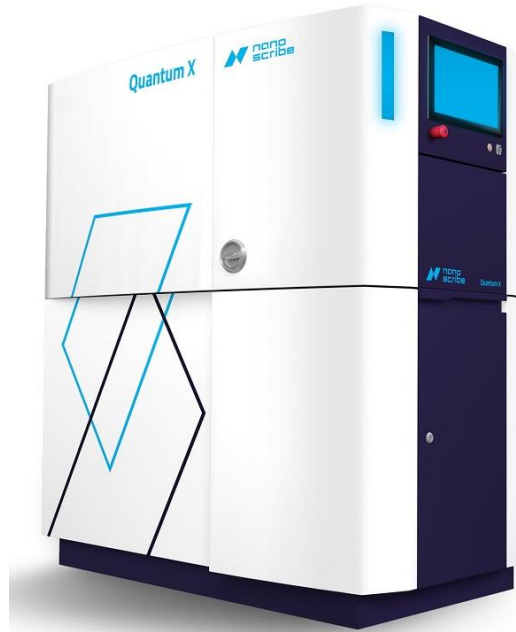


# Nanoscribe – what we do



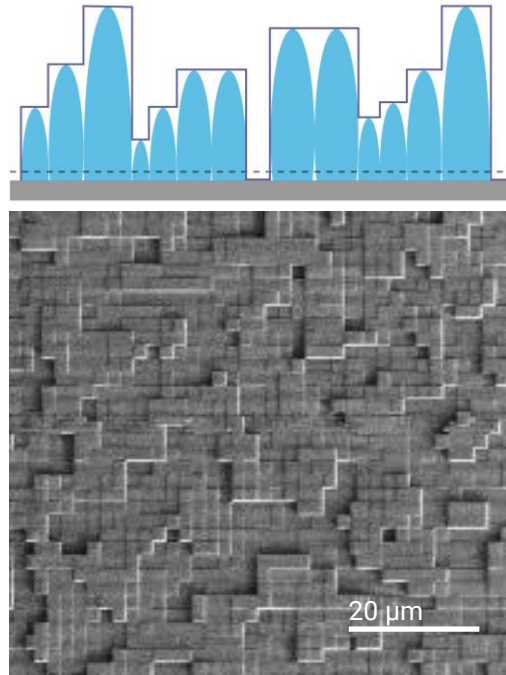
- ▶ 3D microprinting solutions (sub-micron resolution)
- ▶ Based on Two-Photon Polymerization (2PP)
- ▶ Used by academic and industrial customers
- ▶ For prototyping and mastering micro-optics
- ▶ Examples include MLAs, DOEs, angled surfaces
- ▶ Surface roughness < 10 nm (no post-processing)
- ▶ Recently released: Quantum X
- ▶ Implementing Two-Photon Grayscale Lithography (2GL ®)

# Nanoscribe – what we offer



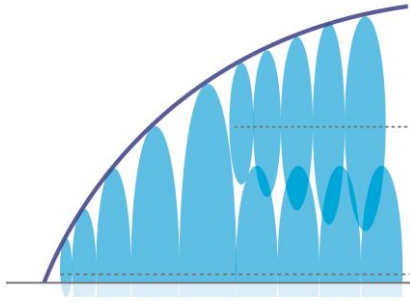
- ▶ The Quantum X with 2GL®

# Nanoscribe – what we offer

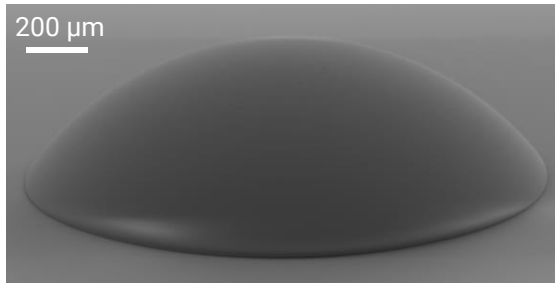


- ▶ The Quantum X with 2GL®
- ▶ > 4000 levels in a single layer

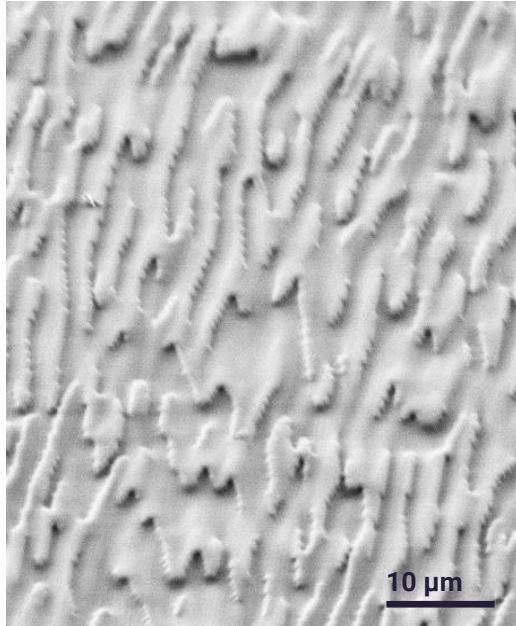
# Nanoscribe – what we offer



- ▶ The Quantum X with 2GL®
- ▶ > 4000 levels in a single layer
- ▶ Multi-layer exposure for higher structures

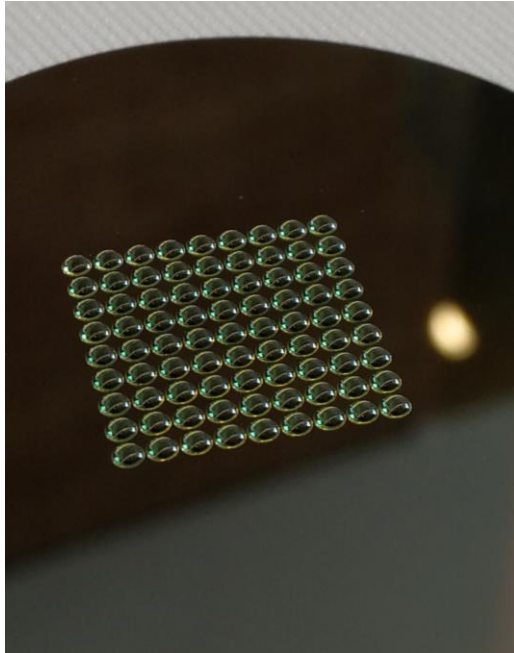


# Nanoscribe – what we offer



- ▶ The Quantum X with 2GL®
- ▶ > 4000 levels in a single layer
- ▶ Multi-layer exposure for higher structures
- ▶ Examples: continuous DOEs, structural AR coating, hybrid diffractive / refractive optics

# Nanoscribe – what we offer



## The Quantum X with 2GL®

- ▶ > 4000 levels in a single layer
- ▶ Multi-layer exposure for higher structures
- ▶ Examples: continuous DOEs, structural AR coating, hybrid diffractive / refractive optics
- ▶ Create large area DOE or freeform structures as prototypes or master within short time

# Nanoscribe – what we look for



- ▶ Quantum X benchmarks & customers
  - Interested in purchasing?
- ▶ What design do you want to manufacture, that is (too) challenging to manufacture conventionally? We offer paid feasibility studies to demonstrate the utility for your application.
- ▶ **Contact us:**

[sales@nanoscribe.com](mailto:sales@nanoscribe.com)

[j.zimmer@nanoscribe.com](mailto:j.zimmer@nanoscribe.com)