MICRO-OPTICS IS...

Phabulous

# Optimizing display performance with free-form micro-optics

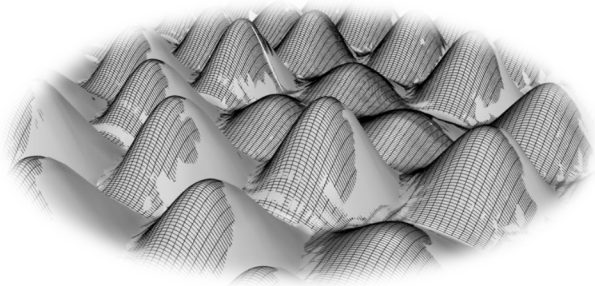
DISPLAY WEEK
SAN JOSE 2025

# Non-profit organization for advanced micro-optics

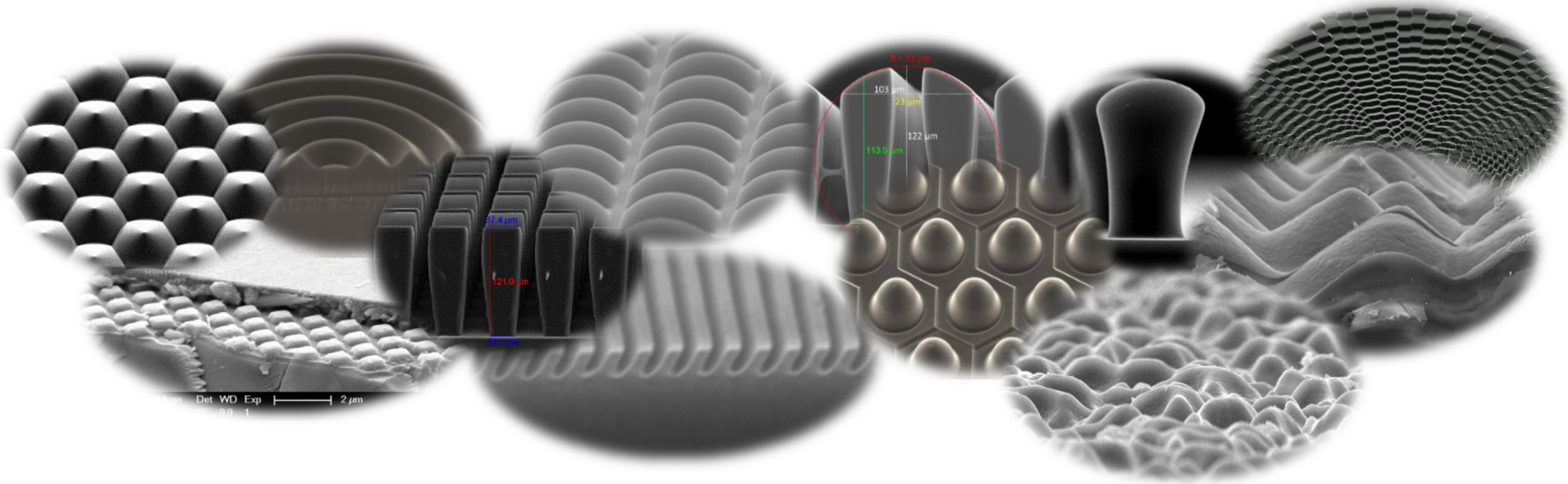
## Our mission is…

- to **facilitate collaboration**
- enable **easy access** to **cutting edge technology**
- to **accelerate innovation**.

# Advanced & free-form micro-optics



- Optical components **without symmetry constraints**
- Gaining an **increasing industrial interest** in the last few years




DISPLAY TECHNOLOGY

# Advanced micro- and nano-optics enables

- Glare-Free, High-Contrast Screens
- Brighter, More Efficient Displays
- 3D and Holographic Visuals
- Vivid, Durable Colours
- Display Privacy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UNIVERSE
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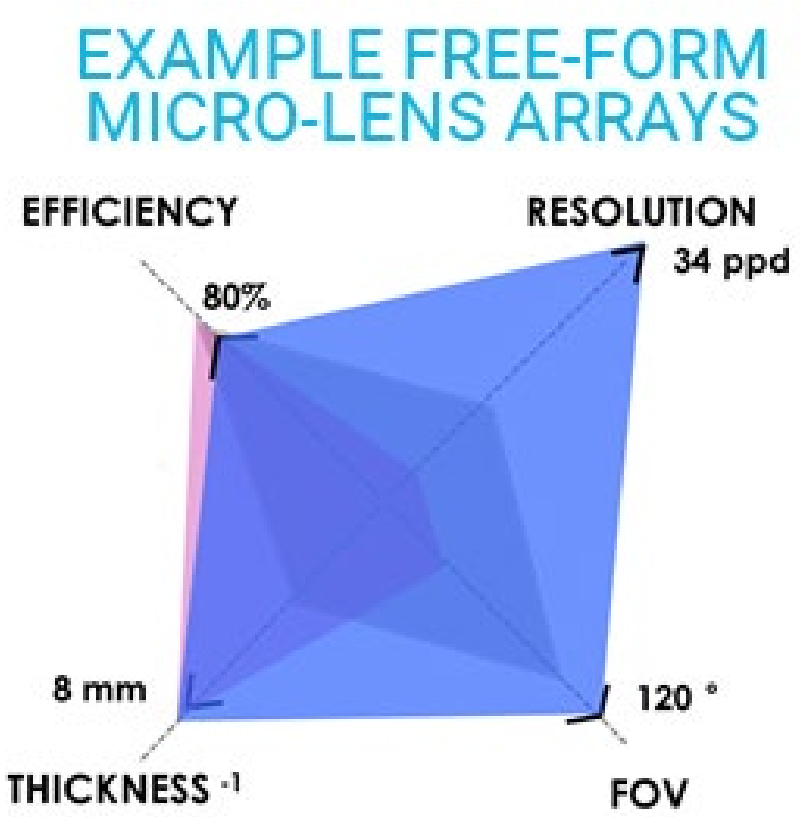
MACHINE

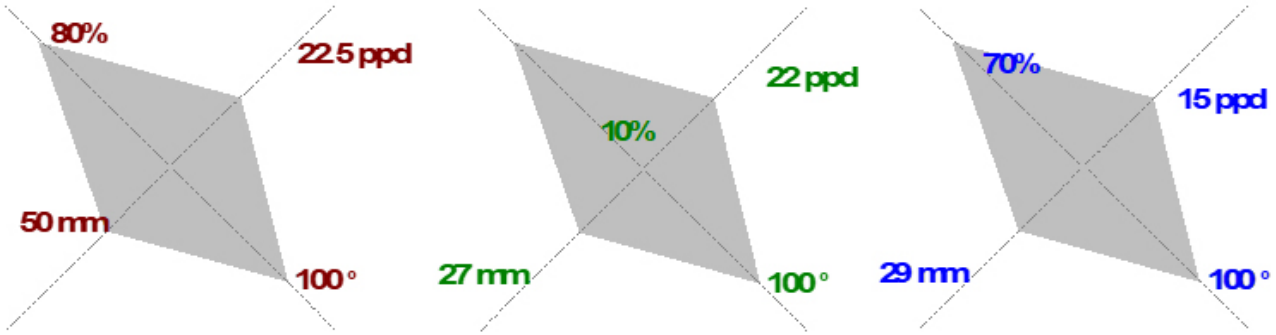
# VR HEADSETS

# Optical system for VR headsets

- Improved performance and reduced volume.
- Thin free-form optical lenses with better image resolution and field of view.

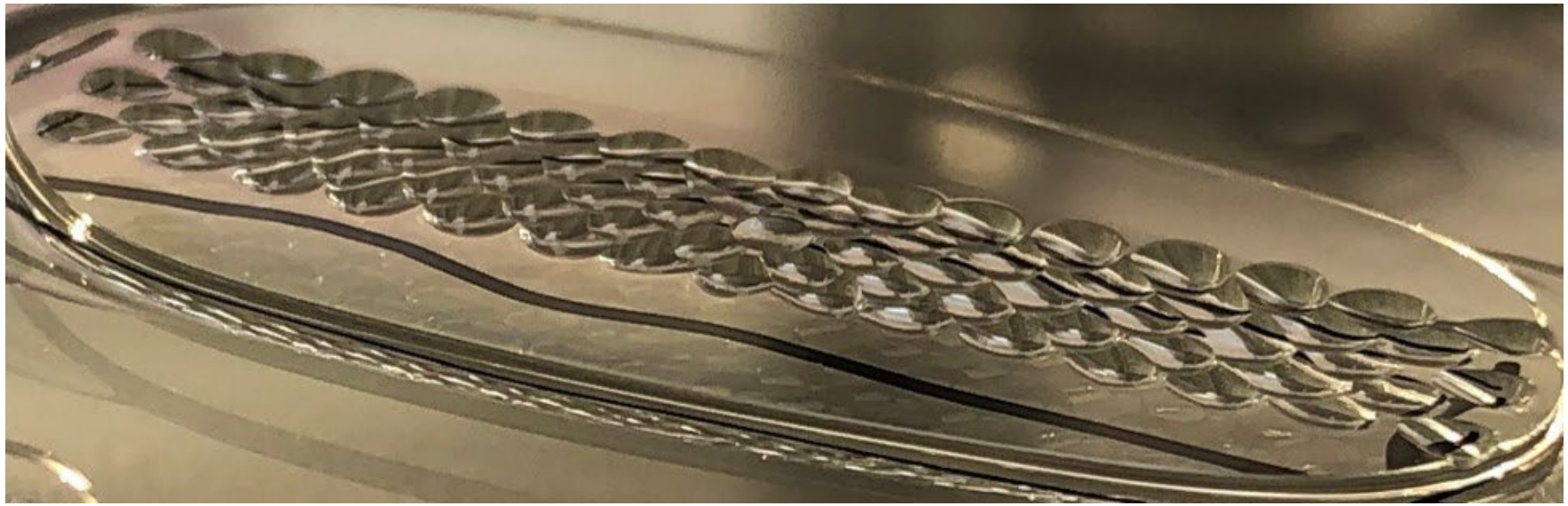
# Optical system for VR headsets



# Optical system for VR headsets

Multi-stack micro-lens array with individual free-form lenses per array accurately aligned to achieve a wide field of view with high resolution



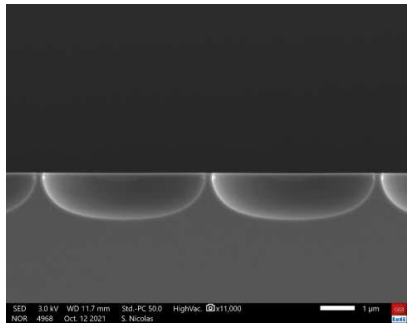
# LIGHT AR

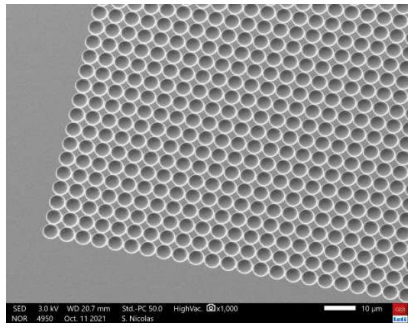
# Light AR

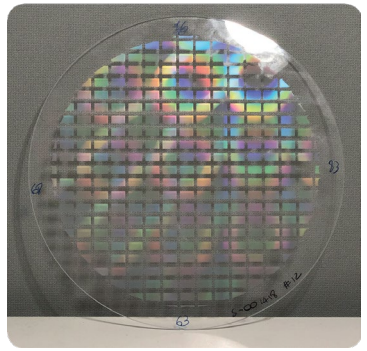
- Control the angular shape of light output
- Enhance brightness of the OLED micro-display components

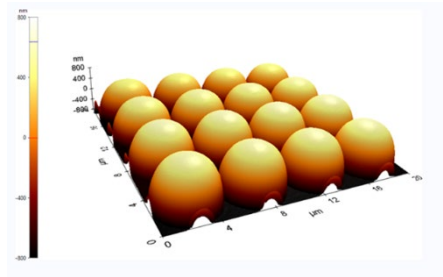
# Steps

- Design -  small pitch together with a high aspect ratio.
- Origination – Silicon etch technologies as well as laser grayscale lithography.
- Production - On a 200mm glass wafer
- Integration - Assembly to the micro-display chips.



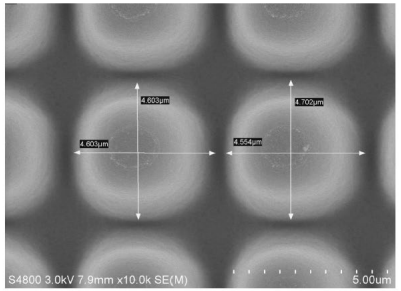


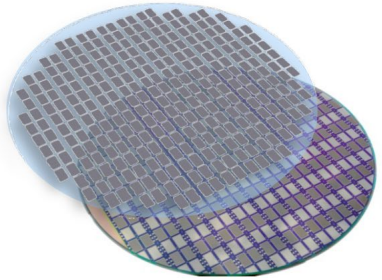


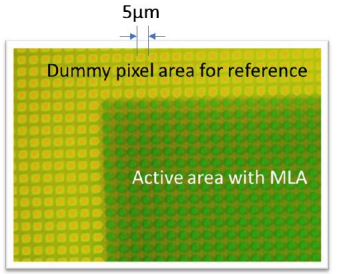


# Results

- 30% gain in efficiency with respect to reference with glass cap
- Almost no change in emission spectrum



# Our partners

csem

JOANNEUM RESEARCH

Fraunhofer FEP

leti ceatech

PowerPhotonic

Wielandts upmt

LASEA

FOCUSLIGHT
Never stop exploring

morphotonics

NANOCOMP

**Booth 1436**

**Booth 545**

ECOSYSTEM FOR Micro-optics

# Organisation registry

csem
BLOSCH high-end coating solutions
LASEA
SYGLASS
temicon micronano solutions
3D:AG
FEMTOPRINT
ATLANT 3D
Wielandts upmt
microrelleus
PlanOpSim Enlightened Planar Optics
STENSBORG
HETEROMERGE
NANOCOMP
PROFACTOR
Standex
LUXIMPRINT
PHASICS the phase control company
MORPHOTONICS
MICRO OPTICS EUROPE A Healthcare Components Group Company
Fraunhofer IOF Fraunhofer Institute for Applied Optics and Precision Engineering IOF
photonics precision engineering
imagine optic
nano scribe
TOPPAN TOPPAN PHOTOMASK
alfamation an inTEST Company
EPIC EUROPEAN PHOTONICS INDUSTRY CONSORTIUM
FOCUSLIGHT Never stop exploring
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Phabulous
JOY TEAM Optical Systems Design
YALOSYS LASER MICROPROCESSING SOLUTIONS
PowerPhotonic Enhancing Beam Performance
VTT
Fraunhofer FEP
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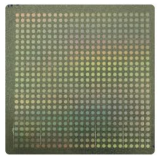
JOANNEUM RESEARCH
MATHYM INNOVATIVE NANOMATERIALS
FORVIA HELLA
EQUIPMENT · SOFTWARE · PROCESSES esp-engineering
XRnanotech

ECOSYSTEM FOR Micro-optics

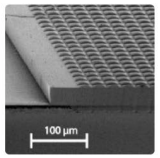
# Technical Marketplace



Tooling (step and repeat) Member

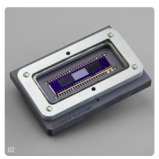
Tooling (electro-forming) Member

Replication by R2P Member

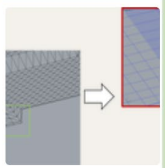



Replication at Wafer-scale Member

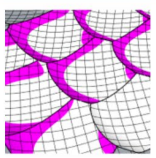
Origination Member



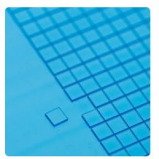
Micro-lenses And Micro-lens Arrays Member



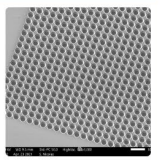
Characterization And Quality control Member



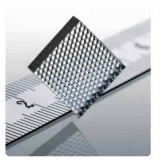
Design And Design for Manufacturing Member



Laser Dicing of glass based wafer level manufactured products



Origination – MicroLens Array Member

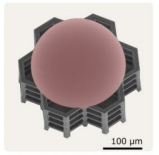


Microimprint on Wafer Level Member

Large area vacuum coating via sheet-to-sheet processes Member

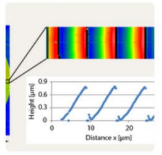
Advanced Laser Ablation Member

Step and Repeat Member




High-resolution multi-material micro-optics

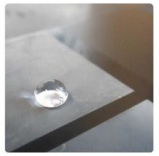
Headlamps with Micro-optics User



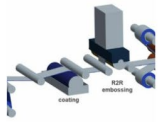

Micro Fresnel lenslets

R2R assembly pilot line

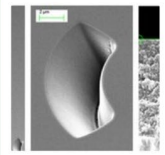
Roller-based NanoImprinter



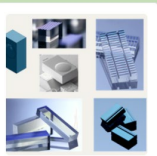
Micro- and Nano Laser structuring



Roll-to-Roll UV Imprint Replication Member

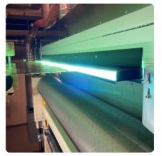


Origination – Grayscale Direct Write Laser Lithography Member



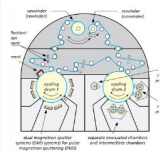
Aspherical microlens and MLA on silicon and glass wafer

R2R pilot converting line

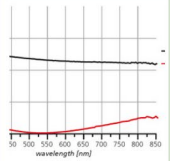


R2R UV-Imprint Manufacturing

Optical grade polymers on wafer-level

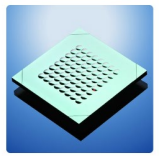


Vacuum Roll-to-roll Coating Member

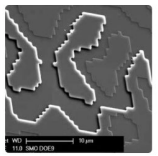



Nanostructuring via plasma processes Member

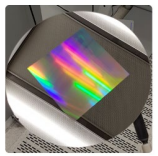
Material Characterization Member



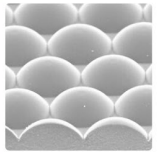
Etched Microlenses Member



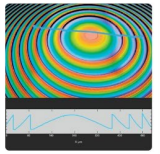
Diffractive Optics (DOEs) Member



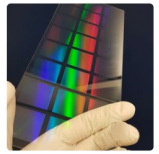
NanoImprint at wafer-scale Member



Microlens Array Films Member



Fresnel Lens Films Member



Nanoimprint (replication of nano/micron textures) Member

FEMTOSECOND LASER MICROSTRUCTURING SERVICES IN 5 AXIS

View All

# Upcoming event

- PHABULOuS Webinar on Micro-Optics in Display Technology
- 2 October 2025 from 13:00 to 15:00 CET (Online)

# MICRO-OPTICS IS...

# Phabulous

Schedule a 30-minute introduction meeting

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