



WE ARE SHUTE THE POLYMER OPTICAL FIBER SENSOR COMPANY

EPIC ONLINE TECHNOLOGY MEETING ON FIBERS FOR MEDICAL APPLICATIONS, SEPTEMBER 21ST, 2026

CCO KRISTIAN RODE

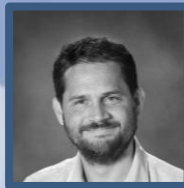


WE ARE SHUTE

History

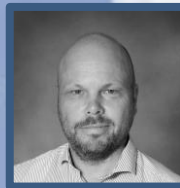
- 2015 SHUTE founded at DTU
- 2018 New CEO & investor
- 2018 First big customer
- 2019 Expand R&D and S&M
- 2020 Full inhouse production
- 2023 Launch of ConcDry®
- 2024 Launch of 1550nm mPOF Humidity Sensor
- 2025 Launch of Chirped FBG Sensor

Management Team



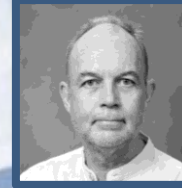
Kristian Nielsen
CEO/CTO & Co-founder

- PhD in Photonics (POF)/DTU
- Dev. Engineer at NKT Photonics
- Researcher at DTU Fotonik



Kristian Rode
CCO

- Commercial Manager Fossil Group
- Sales Director Orkla Foods



Jean Bruland
CPO

- Factory Director at Kaleido Technologies
- Plant Manager at Noliac
- Group QA Manager at ECCO

Location

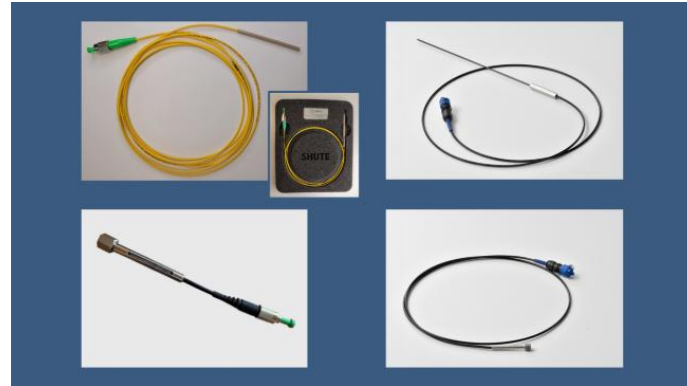


Kvistgaard, North of Copenhagen, Denmark

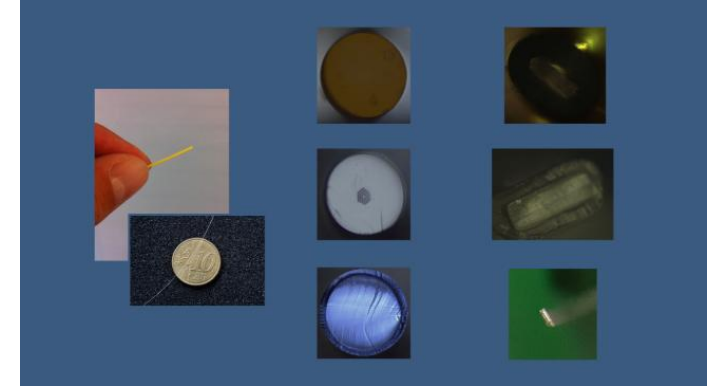
PRODUCTS



Complete sensor solutions including 850nm interrogator, software and sensors



Fiber Sensors,
for 850nm & 1550nm-ranges



Custommade Polymer Fiber

MANUFACTURING

Fiber production

Drawtower

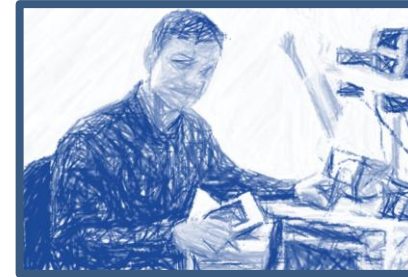


FBG Writing

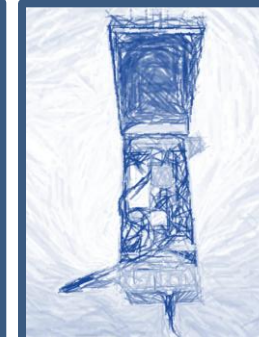
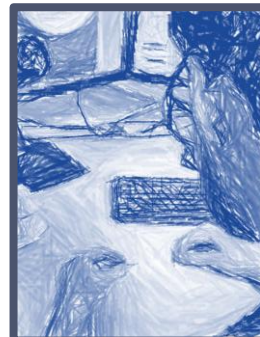
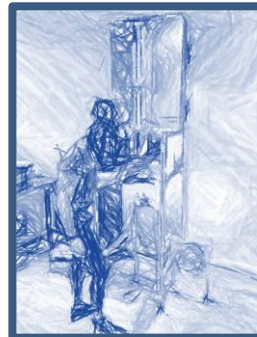
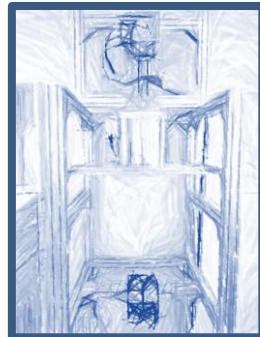
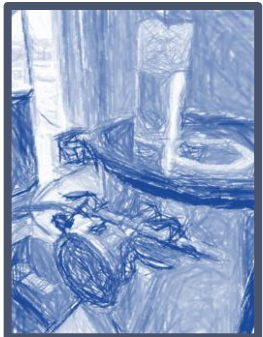
Connector fitting



Hardware production



Software interface



- Since 2020 full inhouse manufacturing facilities, fully scalable
- Can produce both multimode and single mode polymer optical fibers

POLYMER OPTICAL FIBER

In general, SHUTE polymer optical fibers:

- Are light weight, hair thin, noncorrosive, nonelectrical conducting, and durable
- Are flexible; they can be elongated up to 6% vs. silicas' 2%, and POFs have a much lower bending radius.
- Work in highly magnetic environments
- Are biocompatible

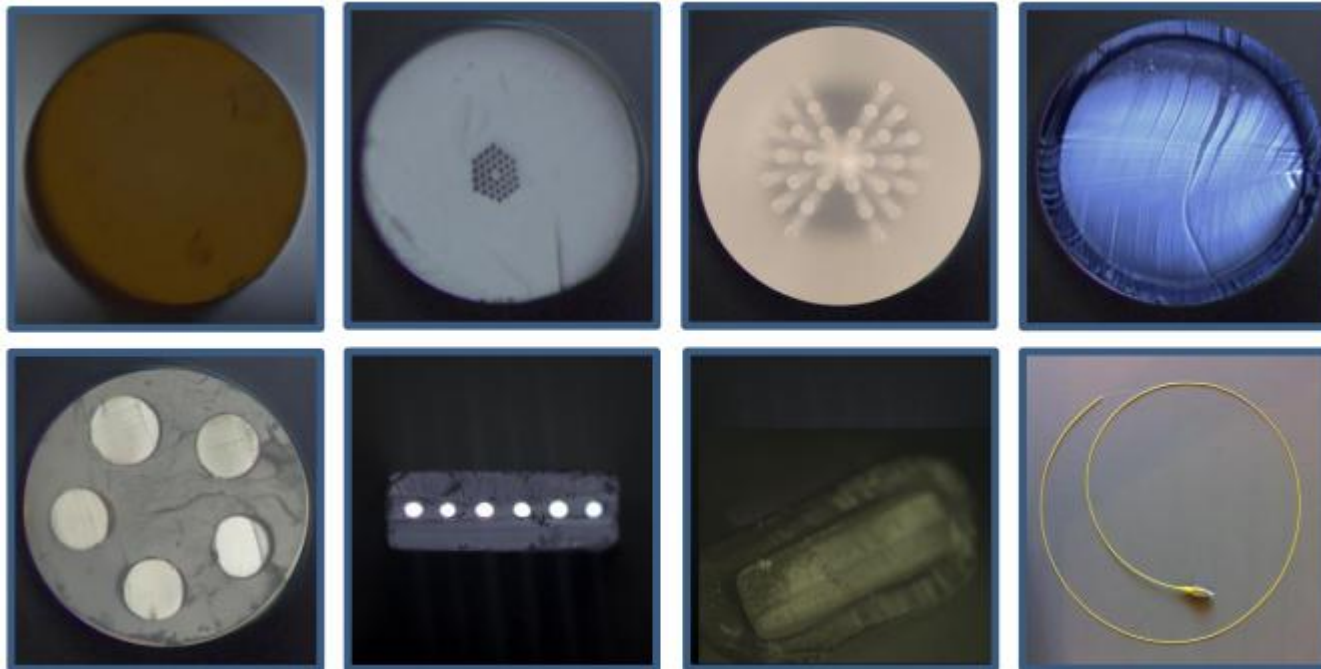


Tested the fiber for months in a moving part, works in 9.4 Tesla MRI scanner environment & has even been exposed to millions of cycles, with no sign of decomposition

POLYMER OPTICAL FIBER

We can offer customized polymer fibers in terms of length, diameter, claddings, core structures, geometry, polymers, etc.

Can post-production be cut, polished, connectorized, and quality inspected.



SHUTE customized Polymer Optical Fibers:

- Polymers, e.g.: PMMA, Zeonex, PC, PS, PSU, PES
- Possible to combine different polymers, e.g, Zeonex core, PMMA cladding
- Multiple claddings and protective jackets
- Offer POFs with an outer diameter of 50 microns including a cladding
- Different hole structures, have demonstrated hole structure down to $\varnothing$: 1 micron
- Bio-compatible and are currently involved in clinical trials in the EU
- Can be connectorized, e.g.: FC/APC or E2000 optical fiber connector

POLYMER OPTICAL FIBER

One of SHUTE's longest running customers Synergia Medical has reached an incredible milestone: Now performing clinical tests on five human patients.

SHUTE has since 2018 been working closely with Synergia Medical on the development of high-tech polymer fibers for inner body usage. Fibers that are now patented.

Synergia Medical has developed NAO.VNS (Vagus Nerve Stimulation), the first non-metal optoelectronic neurostimulator for the treatment of drug-resistant epilepsy.

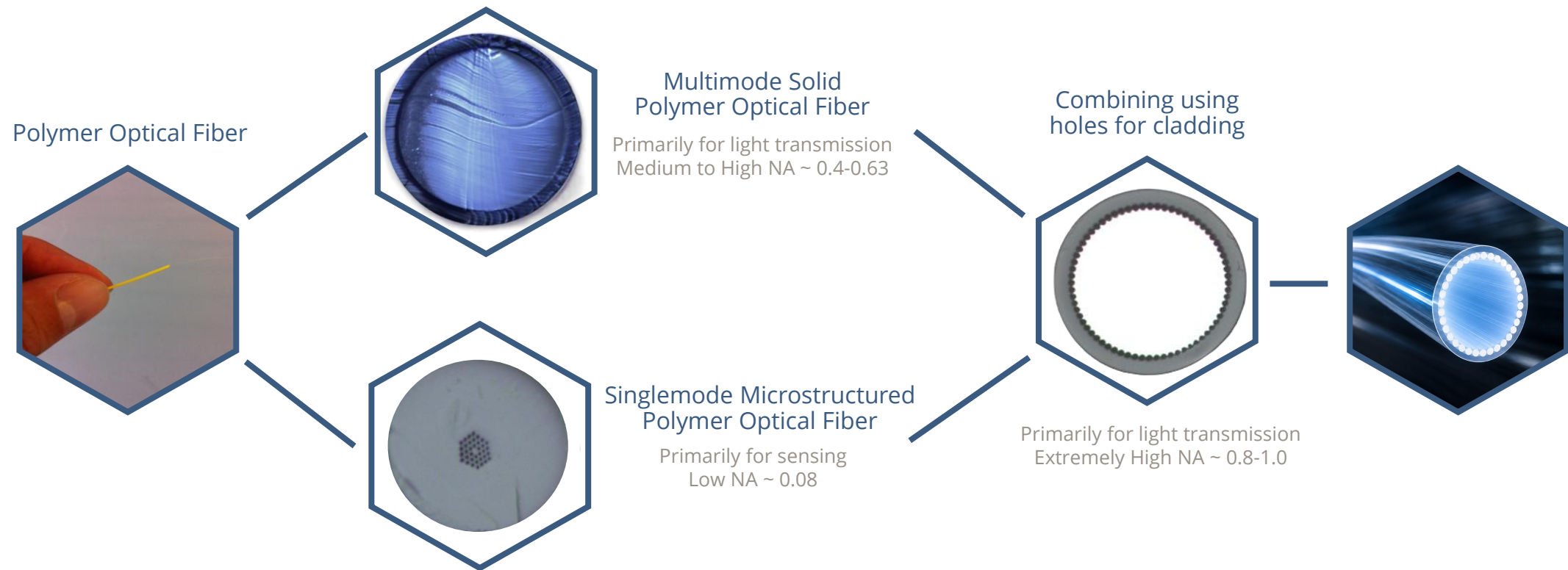


"SHUTE polymer optical fibres were used in the lead of Synergia Medical's NAO.VNS optoelectronic neurostimulation system during its first-in-human phase.

(investigational device, not approved for sale). Image courtesy of Synergia Medical."

HIGH NA POF

Apart from flexibility and bending radius, POFs in general have a higher Numerical Aperture (NA), than silica fibers. The typical high NA POF has an NA of 0.5, where silica fibers generally deliver much less, typically 0.22-0.37.

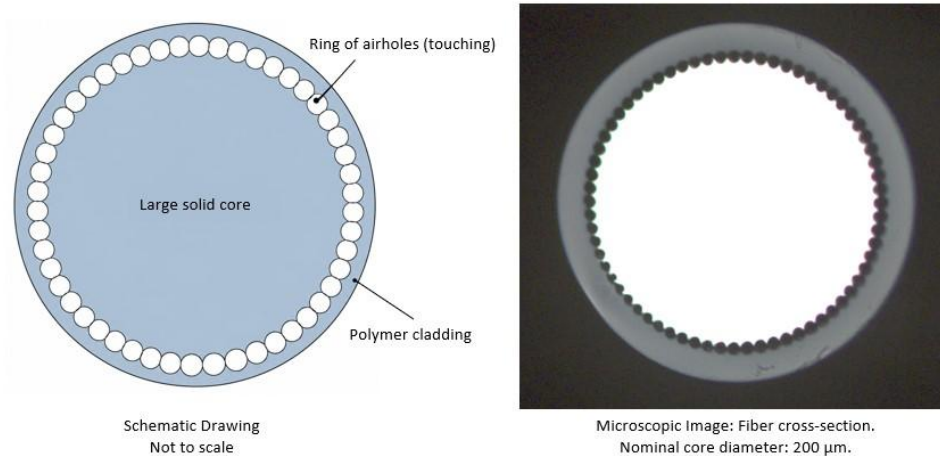


By combining our know-how of microstructured POFs with traditional multi-layer POFs, we are now introducing the BLACKHOLE High NA 1.0, with an NA close to one (~1).

HIGH NA POF

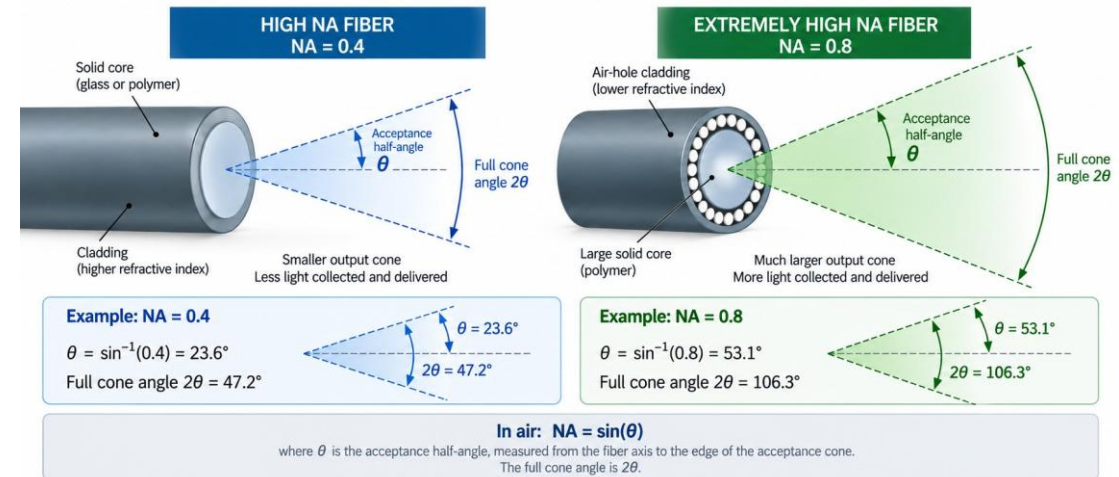
SHUTE introduces extremely High NA PMMA Optical Fibers

A fiber with NA of 0.8 will theoretically deliver 156% more light than a similar size fiber with NA of 0.50. Using the SHUTE signature holes as a cladding it allows us to produce a High NA POF from PMMA only, hence avoiding Fluoropolymer materials for cladding.



NUMERICAL APERTURE (NA) COMPARISON

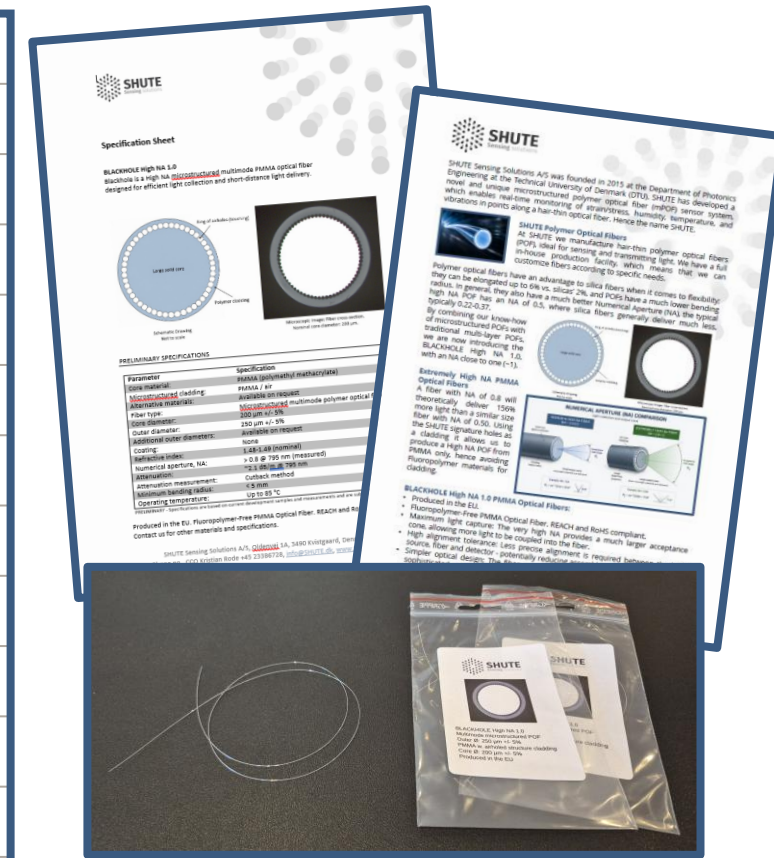
Light collection and output cone (in air)



- **Maximum light capture:** The very high NA provides a much larger acceptance cone, allowing more light to be coupled into the fiber.
- **High alignment tolerance:** Less precise alignment is required between the light source, fiber and detector - potentially reducing assembly complexity and cost.
- **Simpler optical design:** The fiber can reduce the need for precision optics and sophisticated coupling arrangements, particularly in compact sensor and instrumentation systems.

HIGH NA POF – PRILIMINARY SPECIFICATIONS

Core material:	PMMA (polymethyl methacrylate)
Microstructured cladding:	PMMA / air
Alternative materials:	Available on request
Fiber type:	Microstructured multimode polymer optical fiber
Core diameter:	200 μm +/- 5%
Outer diameter:	250 μm +/- 5%
Additional outer diameters:	Available on request
Coating:	None
Refractive index:	1.48-1.49 (nominal)
Numerical aperture, NA:	> 0.8 @ 795 nm (measured)
Attenuation:	~2.1 dB/m @ 795 nm
Attenuation measurement:	Cutback method
Minimum bending radius:	< 5 mm



COOPERATION & CONTACT

- What SHUTE can do for you? Offer new fiber possibilities
- What you can do for SHUTE? Become a trusted partner

Contact details for further discussions:

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SHUTE Sensing Solutions A/S, Oldenvej 1A, 3490 Kvistgaard, Denmark

Meet us at:



Nürnberg



Düsseldorf, Germany
16–19 Nov. 2026

Düsseldorf



San Francisco

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THANK YOU



QUESTIONS, PLEASE SHUTE