

*“The i-Med experience of building a fast-lane to the clinic”*



EPIC

EUROPEAN PHOTONICS  
INDUSTRY CONSORTIUM



November 30<sup>th</sup>, 2023

Jaap Heukelom  
(CCO, co-founder)

*Digital Head-mounted Microscope  
3D Imaging Platform*



# What do we do:

*World's First Digital Head-mounted Microscope (DHM), 3D Stereoscopic imaging*

## Wins & USP's:

- +++ Less tissue damages and complications
- +++ Vastly improved ergonomics for surgeon
- +++ Faster and more integrated workflows (patient data)
- +++ More comprehensive surgical review & education

## Specialities who crave a DHM solution

### Surgery

- Plastic surgery
- Cardio vascular
- ENT
- Neuro surgery
- Orthopedics
- Gynaecology
- Anatomy

### Dental

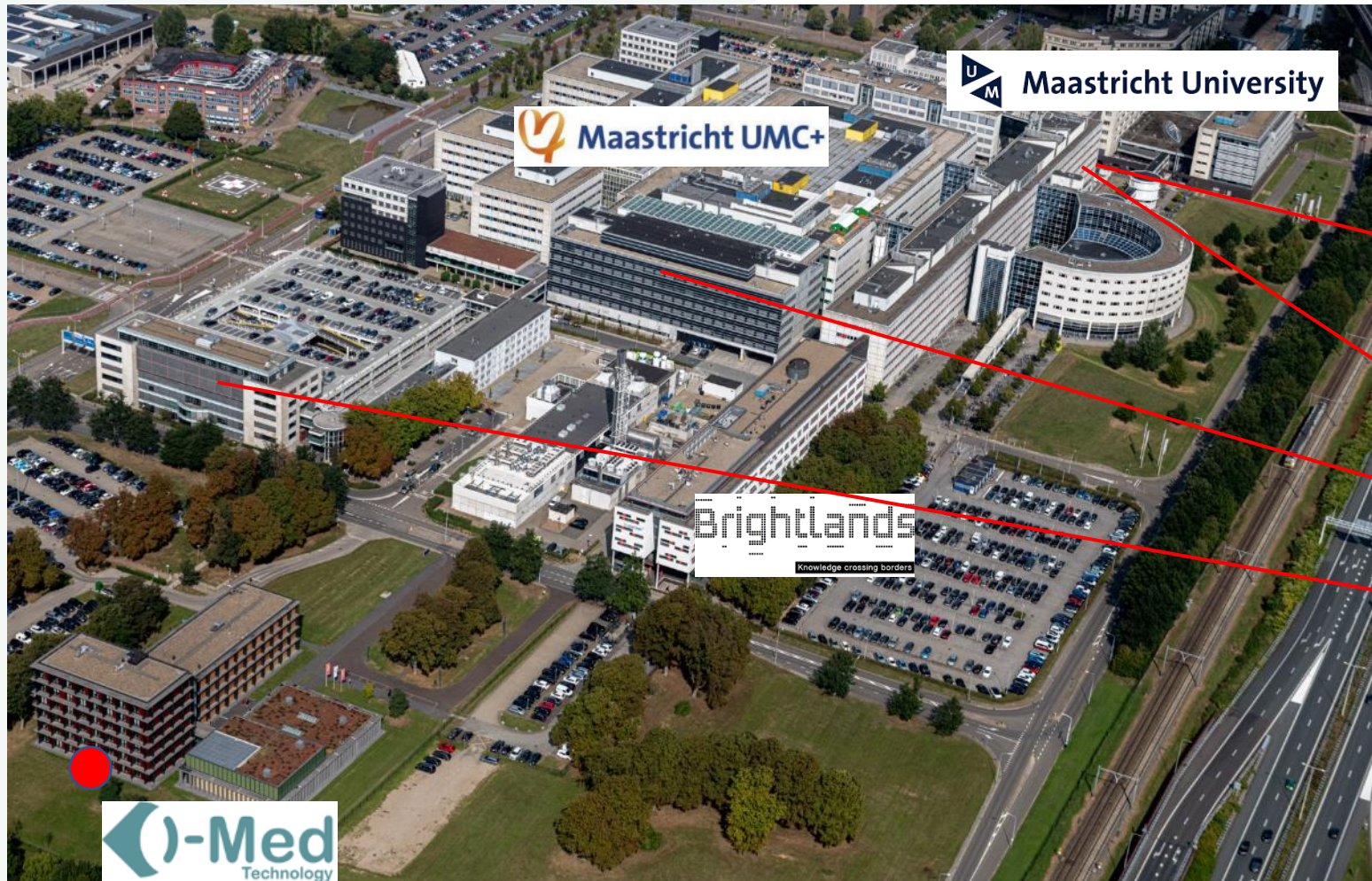
- Endodontology
- Implantology
- Periodontology
- Esthetic Dentistry
- Oral Surgery



Prof. Wouter Oosterlinck, UZ-Leuven  
Bypass surgery. 20-11-23



# Location @ Maastricht UMC+ Maastricht Brightlands Health Campus



## Brightlands Maastricht Health Campus



120+ Healthcare Companies

Maastricht University MC+

- Surgical & Research training centre
- Anatomy & Embryology
- Operating Rooms 20x
- Training & Neuro surgery



# The i-Med journey, focus on regulatory and IP

- 2017-Oct First demonstration with 15 surgeons at MUMC+  
"the idea was embraced" → Business plan made
- 2018-March Introduction European Vascular Course (1200 people)  
3D Digital Head-mounted Microscope
- 2018-July Founded by Vincent Graham and Jaap Heukelom
- 2018-Q4 Start Regulatory documentation
- 2019-Q3 Patent request filed  
METC MUMC approval for clinical OR trials
- 2020-Q2 Medical CE Certification MDD
- 2023 Start MDR Process Class 2a, passed all EMC and electrical tests
- 2024-Q2 MDR 2a certification



Prof. Jacobs EVC Jan. 2018  
First prototype



8 Grants raised in 4 years: ±€1Mio



4



# Cooperation clinical trials for improved image quality



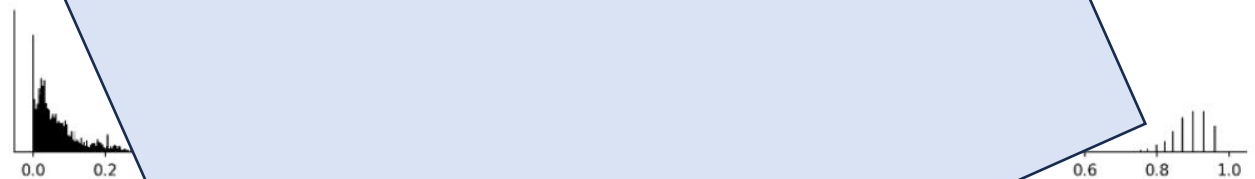
Maastricht University Medical Centre (UMC)  
Thyroid gland surgery, Prof Nicole Bouvy

## Red contrast image enhancement, filter testing



Figure 5: The effect of the p value on the red contrast image enhancement.

The  $p$  value ( $0 \leq p \leq 1$ ) is used to control the red contrast image enhancement. When  $p = 0$ , the colours are unmodified. The following figure shows the effect of the  $p$  value on the red contrast image enhancement. The hue of the red (hue = 0):



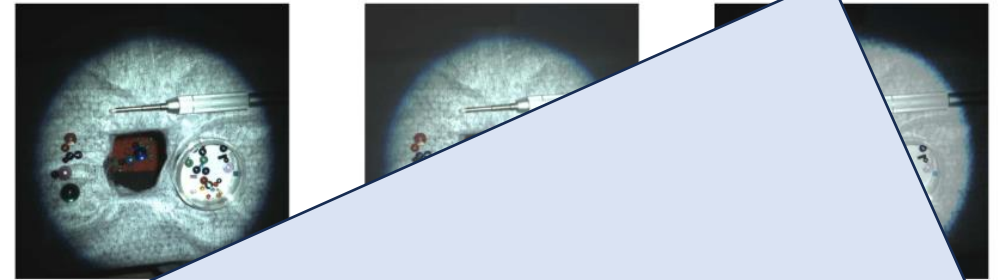
# Cooperation clinical trials for image quality



Zuyderland Hospital, Sittard  
Depuytren hand operation, 28-11-22, Dr Rutger Schols

To prevent over exposure and get more details visible in the darker areas

Raw image      Transformation function      Exposure fusion



gain = 600 and gain = 4000

# Cooperation education: Anatomie spine and ENT



Prof. Henk van Santbrink  
Dr Andreas Herrler  
Anatomy Maastricht UMC+

## Assist and assess surgeons/fellows/trainees during surgeries



Dr. Raymond van der Berg  
ENT surgery Maastricht UMC+



Tonsillectomie

Fellow/Resident

ENT Professor



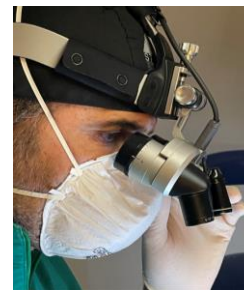




# Cooperation clinical trials for ergonomics, weight reduction



Eye Clinic Maastricht University Medical Centre  
Plastic eye surgery, Dr Asli Ayvaz



Gram 600

550

340

245

180

Year 2017

2018

2020

2022

2023



# Future challenges and focus

- **Forensic research**

- Pathology
- Materials investigation
- Crime scene 3D
- Court 3D Video evidence
- .....



- **AI: Artificial Intelligence**

- realtime big data access
- analyses



Xray image real time analyzed by Pearl "second opinion"

- **Image enhancement.... "Making the invisible visible"**



**F**

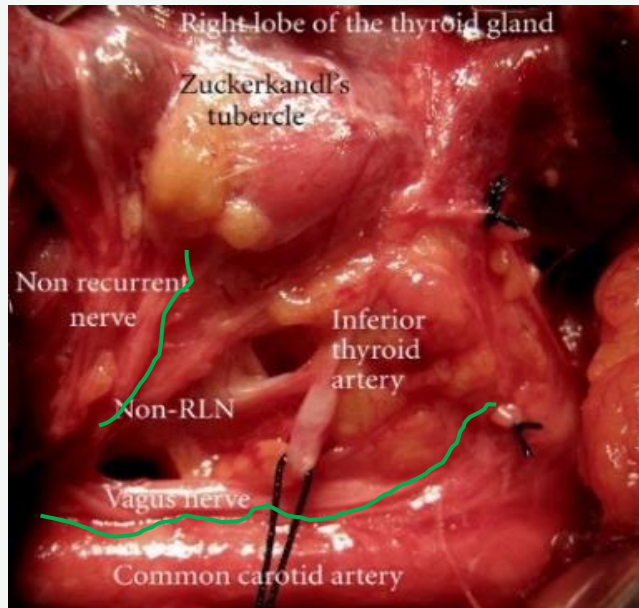
# Cooperation clinical trails innovative projects:

## H3D-VISIONAIR – Head-worn 3D-Visualization of the Invisible for Surgical Intra-Operative Augmented Reality

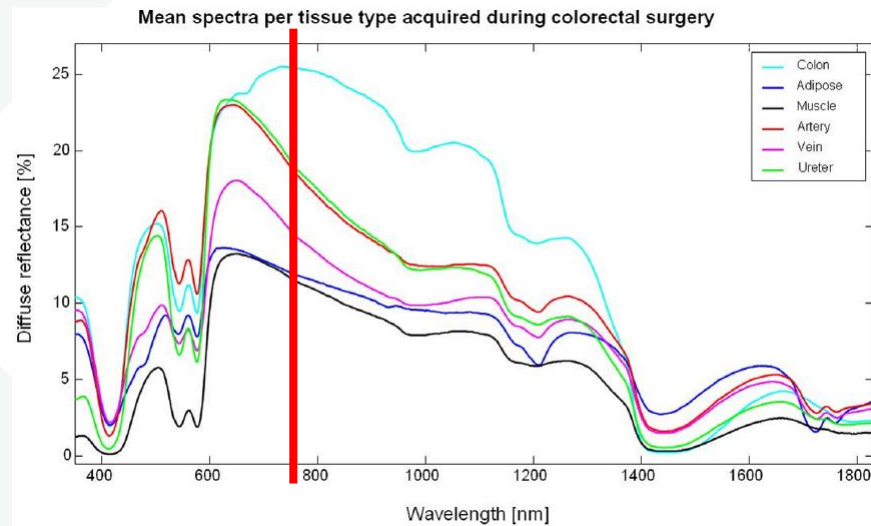
### Principle:

Identifying critical anatomic structures

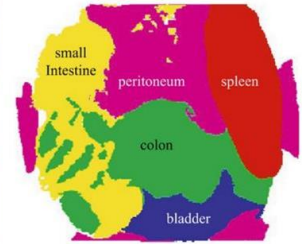
example: NIR identification tissues, AR overlay



Normal sight (< 780 nm): difficult



Normal + NIR sight: easy



# Making the fast lane to the clinic possible

# THANKS



Prof. dr. Dr Nicole Bouvy,  
Professor of Innovative  
Surgical Techniques  
Surgeon at the Maastricht  
UMC +  
Head of innovative surgery.



Prof. dr. Henk van Santbrink  
Spinal Neurosurgery Maastricht  
UMC+  
Faculty FHML Maastricht  
University



Dr. Andreas Herrler  
Ass. Prof., MSc Anatomie &  
Embryology  
FMHL Maastricht University



Prof. dr. Dr. Michael Jacobs,  
cardiovascular surgeon  
Maastricht and Aachen.  
Head of the Heart / Vascular  
Center at Maastricht UMC+  
Head of Vascular Surgery at  
Uniklinik RWTH Aachen



Dr. Peter Bouckaert MD, PhD  
Ret. Gynaecologist surgeon  
i-Med Medical advisory



Dr. Raymond van de Berg,  
ENT-surgeon  
Head of the Vestibular Lab. and  
the Department of Audiology at  
Maastricht UMC+.



Fokko P. Wieringa (PhD) is  
Principal Scientist imec.  
Associate prof. of medical  
technology at Utrecht  
University



Prof. Dr. Rutger Schols  
Plastic surgeon  
Maastricht UMC+  
UZ Brussel, heading Schisis team



Prof. dr. ir. Gabrielle Tuijthof  
Biomedical Device Design &  
Production at University  
Twente





# EPIC

EUROPEAN PHOTONICS  
INDUSTRY CONSORTIUM



i-Med Technology BV  
Oxfordlaan 55  
6229 EV Maastricht  
The Netherlands

Info:

[info@i-medtech.nl](mailto:info@i-medtech.nl)

[www.i-medtech.nl](http://www.i-medtech.nl)

Compliant with following standards:

- 93/42/EEC Medical Device Directive – MDD - as amended with the 2007/47/EEC.
- IEC60601-1 Safety of Medical Electrical Equipment.
- IEC60601-1-2 Electromagnetic Compatibility.

