360 Carla
Manufacturing
Industry 4.0

Photonics Career Event
Delft

CARLA 2025

Day 2 – Shaping your Career

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PHOTONICS21
PHOTONICS PUBLIC PRIVATE PARTNERSHIP

This project has received funding from the European Union Horizon Europe research and innovation program under grant agreement No 101135838.

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Photonics Career Event
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Humeyra Caglayan

TU Eindhoven

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My Academic Journey

to Eindhoven University Technology and further…

Humeyra Caglayan

About me…

Biography

- Associate Professor Photonic Integration group, EE (August 2024)
- Associate Professor at Tampere University (Finland) since 2019
- Assistant Professor, Tampere Technical University (2017-2019)
- ERC StG Grantee (2019-2023)

Areas of Expertise

- Optics&Photonics: Metaoptics for image processing
- Photonic Chips: Integrated metaphotonics devices
- Application: Metaoptics for 3D imaging, defect identification, and semicon metrology

Department/Group

EE/Photonic Integration

Relation to Institutes

Centre for Integrated Photonics Eindhoven
Eindhoven Hendrik Casimir Institute

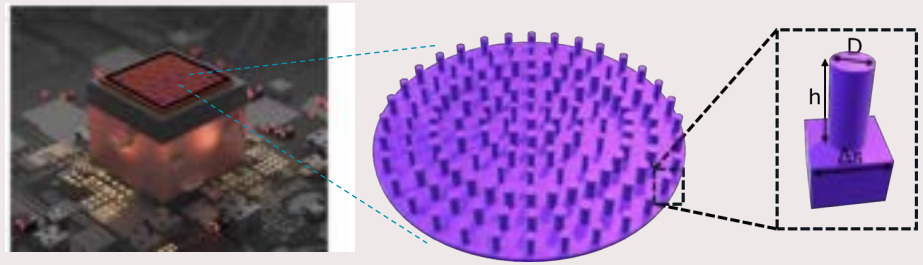
Email:
h.caglayan@tue.nl

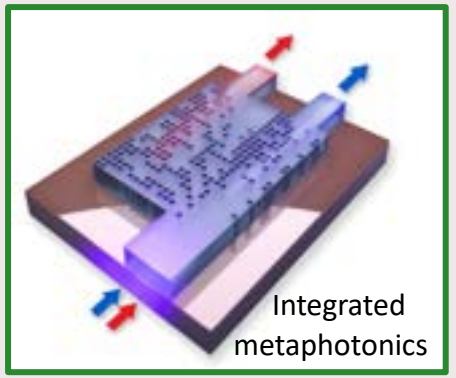
Linkedin:

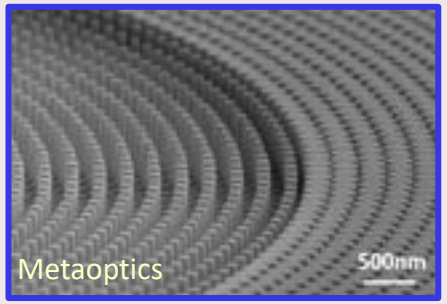
https://www.linkedin.com/in/humeyracaglayan/

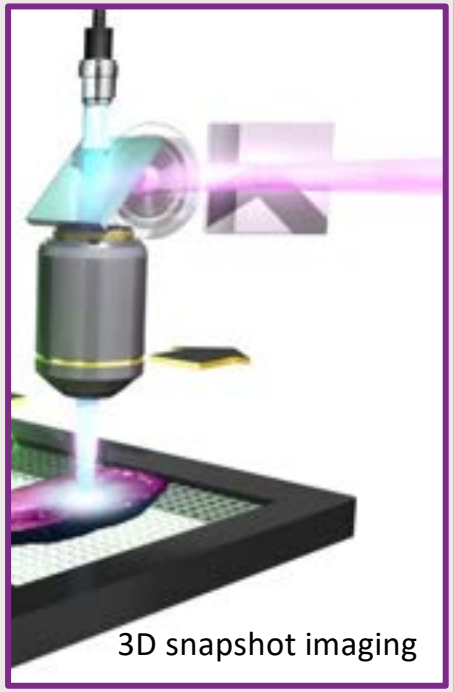
Key research topic for collaboration

- Multifunctional interface between integrated photonic chips and free space optics
- High-performance optical imaging devices, such as 3D snapshot imaging
- Hybrid PIC/metaoptics integration

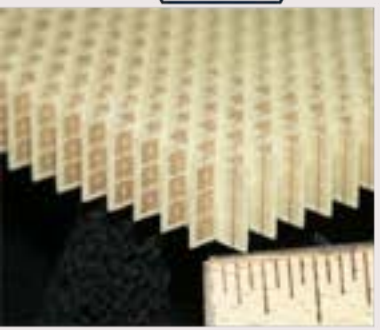


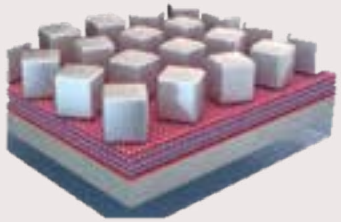

Integrated metaphotonics

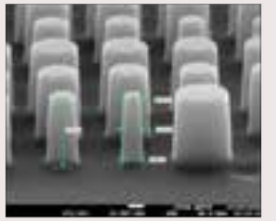


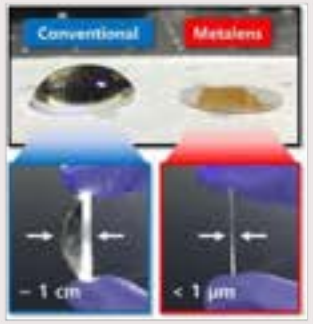

3D snapshot imaging

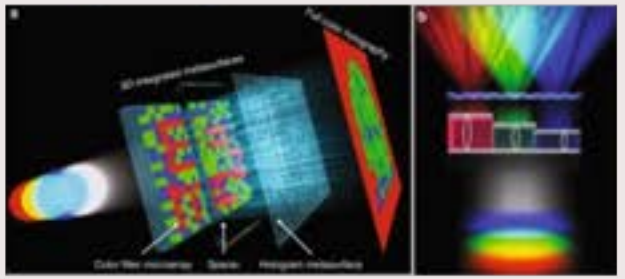
Metamaterials timeline











1968 LEFT-HANDED MATERIALS

1996 NEGATIVE PERMITTIVITY

1999 NEGATIVE PERMITTIVITY AND NEGATIVE PERMEABILITY

2000 PERFECT LENS

2001 NEGATIVE INDEX MATERIALS

2004 PLASMONIC METASURFACE

2006 OPTICAL CLOAKING

2007 SUPERLENS

2011 GENERALIZED SNELL'S LAW

2012 METASURFACE HOLOGRAMS

2013 HYPERSURFACE

2014 DIGITAL METASURFACE

2017 INFORMATION METASURFACE

2018 SPACE-TIME METASURFACES

2019 INTELLIGENT METASURFACE

2023 COMPUTATIONAL METASURFACE

2025 AND BEYOND PROGRAMMABLE INTEGRATED METAPHOTONICS

TU/e

My photonics journey…

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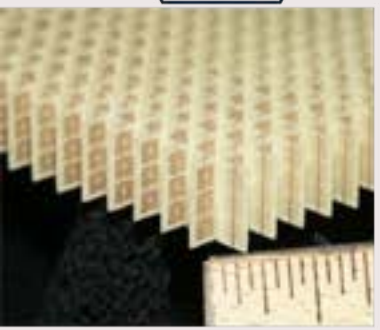

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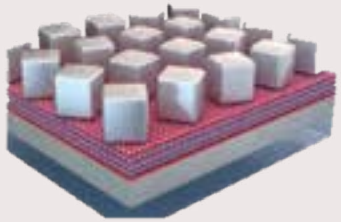

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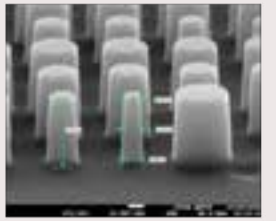

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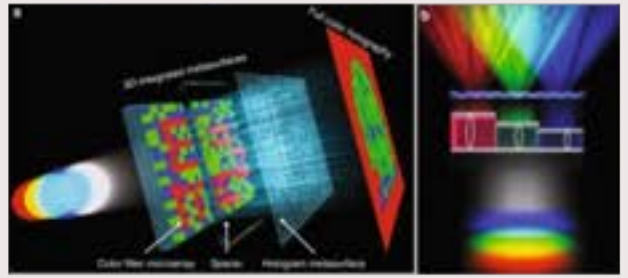

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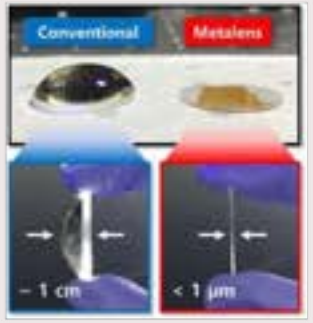

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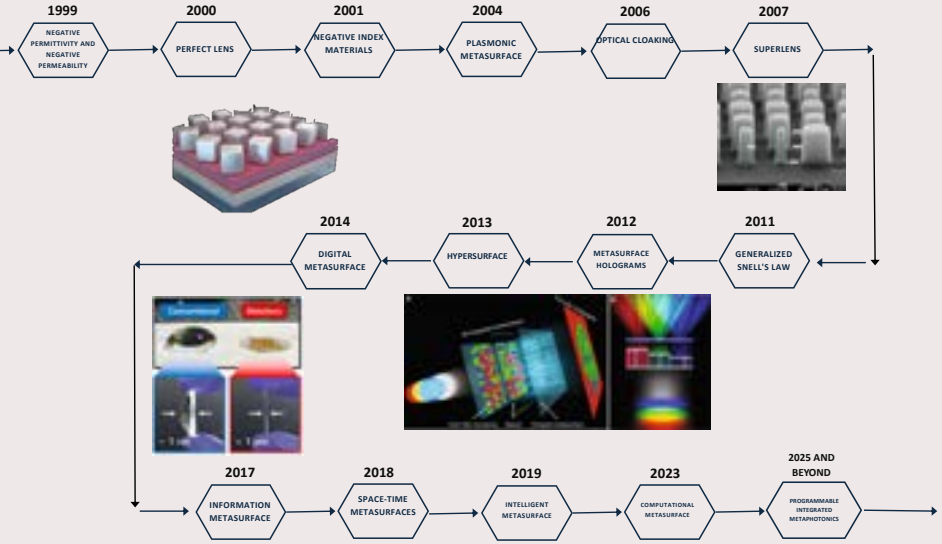
2025 AND BEYOND PROGRAMMABLE INTEGRATED METAPHOTONICS

TU/e

My photonics journey…



Graduation
Physics, Bilkent University
2005

PhD
Physics, Bilkent University

2010

Postdoc
Uni. of Pennsylvania
Prof. Nader Engheta

2014

Senior Researcher
NANOTAM, Bilkent Uni

2017

Assist. Prof
Tampere Uni
Technology, Finland

2019

Assoc. Prof.
Tampere Uni. Physics Department

2024

Assoc. Prof.
TU/e EE
Photonic Integration Group

TU/e

What is really my job?

Navigating Challenges and Embracing Rewards

Science as my playground

- Nature’s beauty and mysteries inspired me
- Optics/photonics → tools to explore & innovate

Multiple roles

- Supervisor, teacher, researcher
- Collaborations worldwide
- Teaching & mentoring students

Main Challenge – Work–Life Balance

- Learned: Be present in the moment
- Focused presence reduces stress & increases joy

Key Lessons Learned

- You cannot be everywhere, but you can be present
- Challenges bring growth & resilience
- Science is about discovery and balance

Message to Young Scientist

- Go for your dreams 🚀
- Don’t give up exploring
- Opportunities appear as you move forward
- Even challenges can be rewarding

“Be present where you are, and enjoy it fully.”

Thank you

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Industry 4.0

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Stefan de Witte

TU Delft

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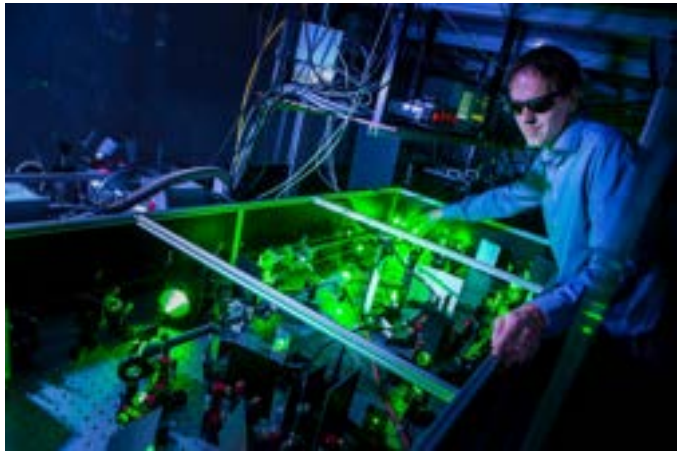
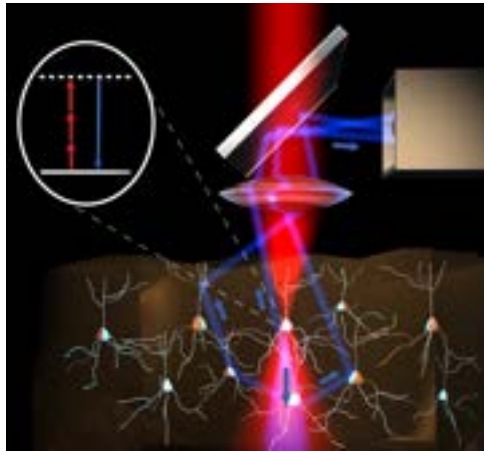
Personal intro

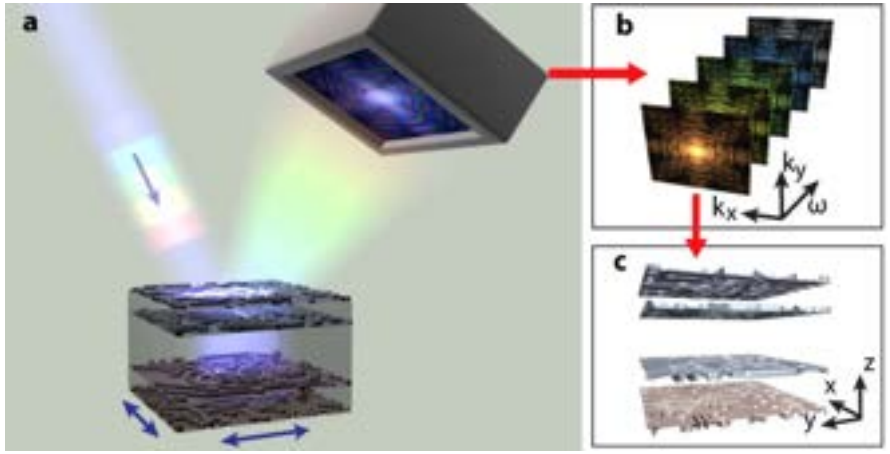
Stefan Witte (Alkmaar, 1979)

PhD 2007, Vrije Universiteit Amsterdam,
Postdoc 2007-2011, VU and University of Colorado
2012-2014 Assistant professor, VU
2014-2024 Group leader, Advanced Research Center for Nanolithography

Since Sep 2024: Professor Optics for Nanoscale Metrology, TU Delft

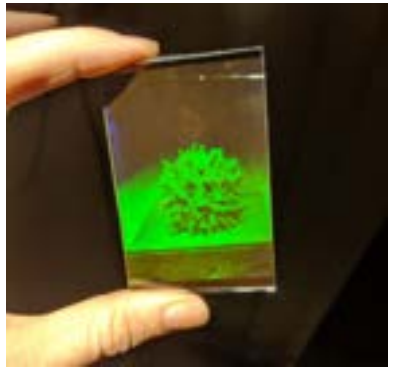




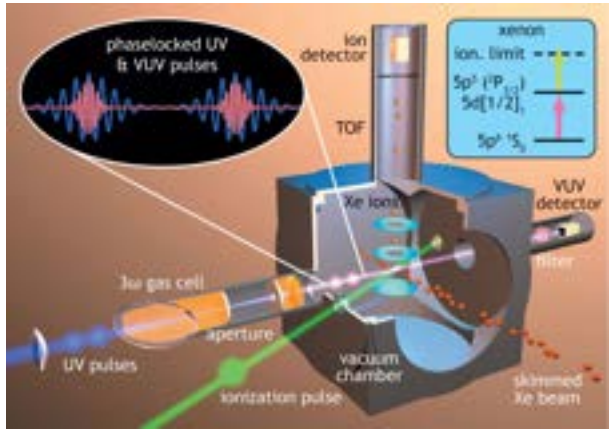


Actual personal intro

I always enjoyed physics,
especially optical phenomena

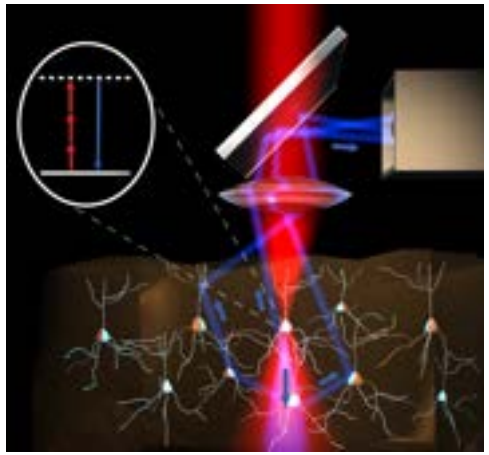


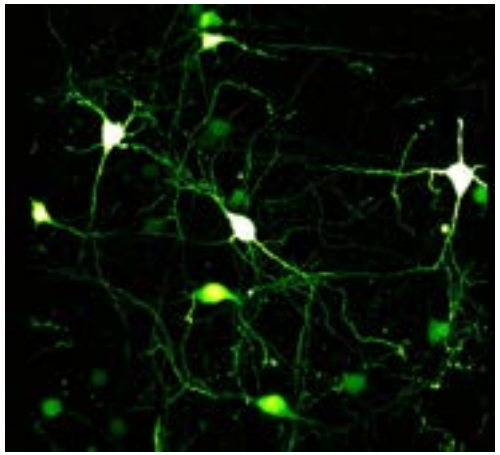
→ Studied physics
→ MSc project in laser spectroscopy
→ PhD in frequency combs and ultrafast laser physics

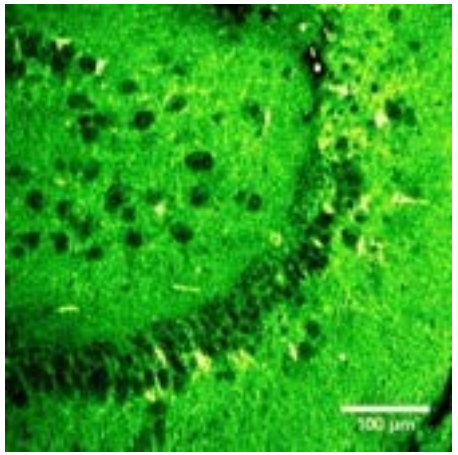


Actual personal intro

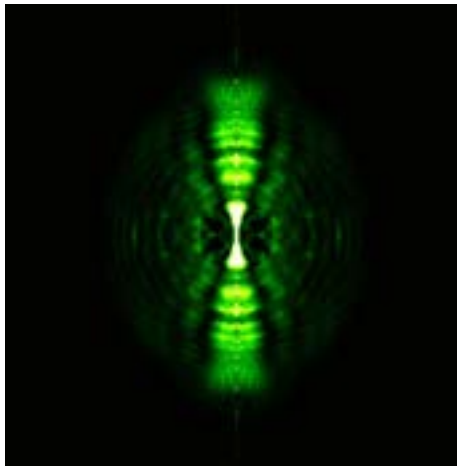
Postdoc in something more applied (but still with lasers): neuro-imaging

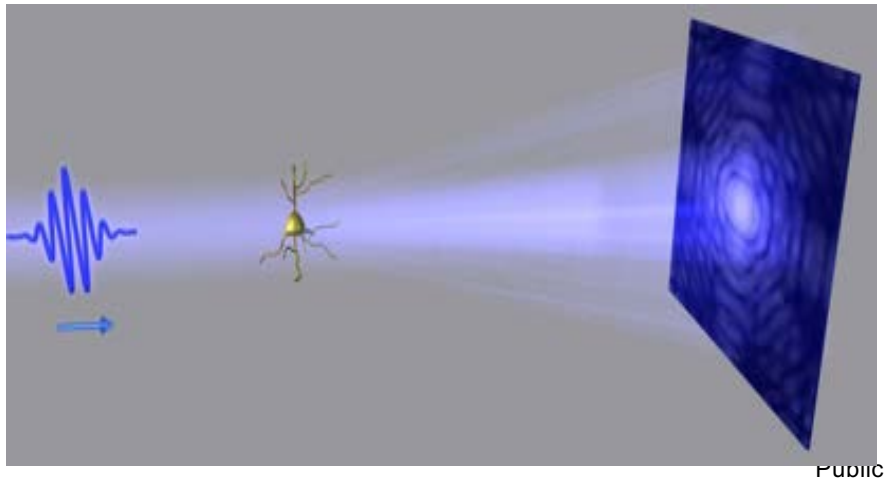






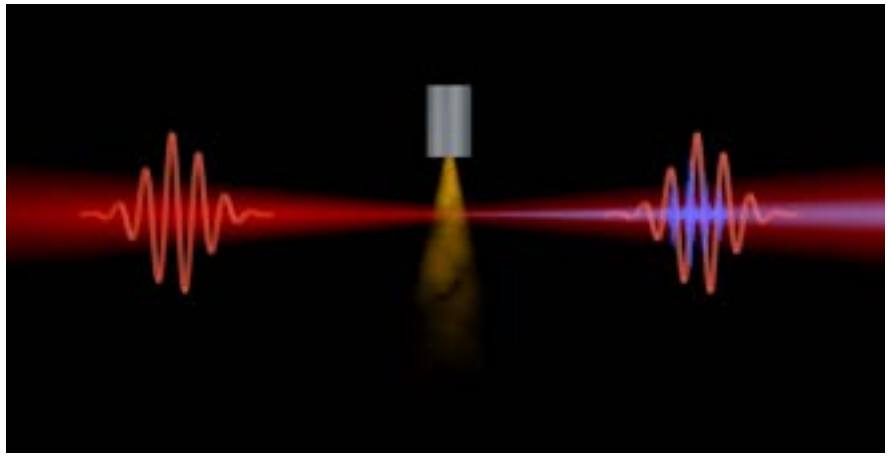
Postdoc in lasers and imaging, but with less brain matter:

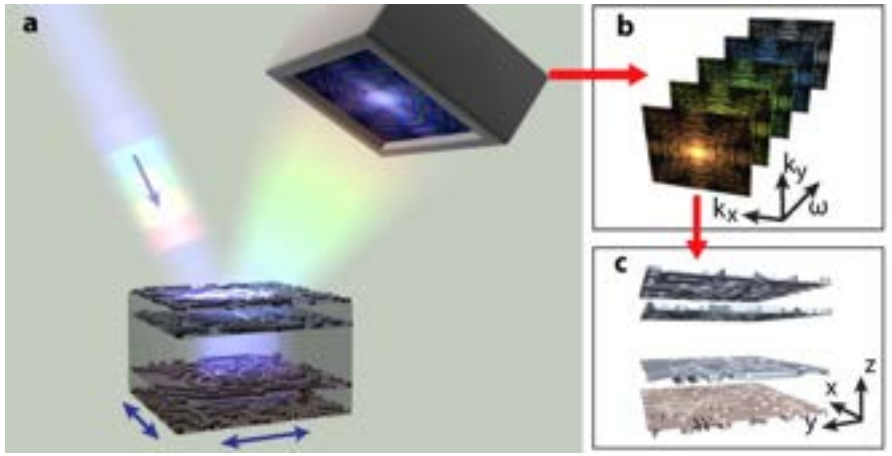




Actual personal intro

Here's my niche: computational imaging!

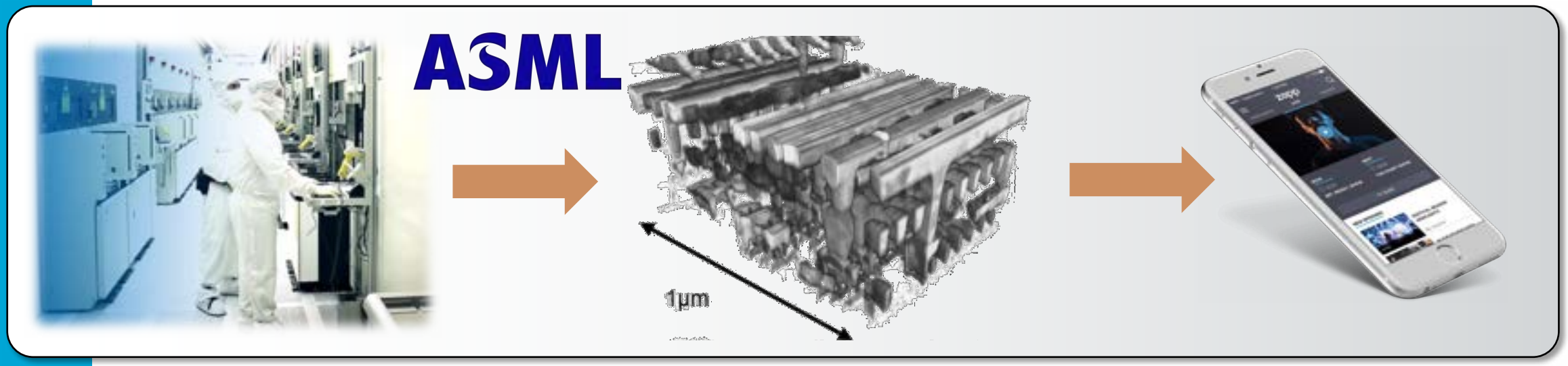




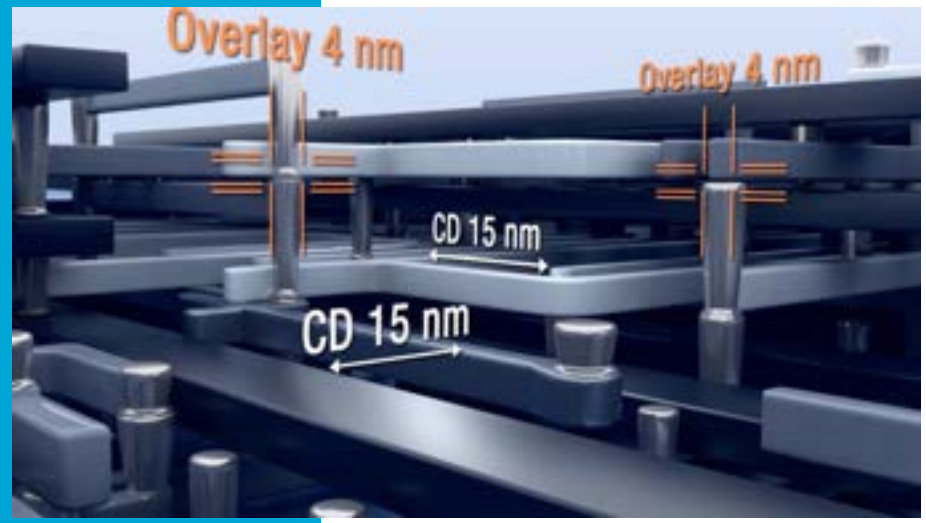
The combination of ultrafast laser physics, imaging, and (coherent) optics

Started writing grants and landed an assistant professor position

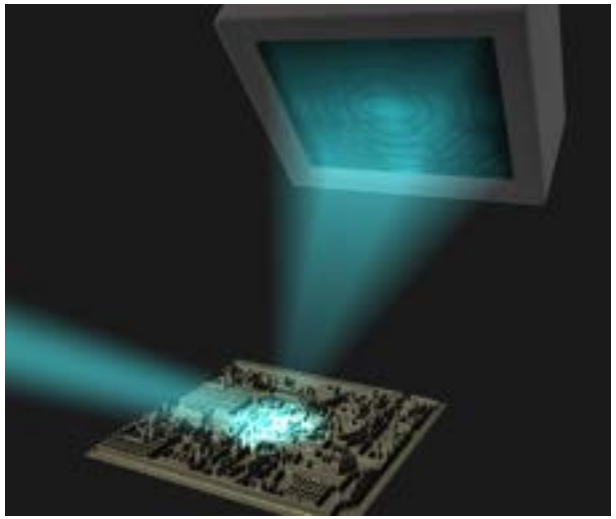
Current focus: Nano-imaging for semiconductor metrology



Fabrication requirements



Optical metrology



Challenge

Optical imaging at shorter wavelengths

- Better resolution
- Penetration depth
- Fast
- Non-invasive

Why do(n't) I like my job?

- I get to work on interesting challenges, what I do matters
- Teaching is rewarding
- My work fits my skill set (including the grant writing, presentations, etc)

But:

- Academic work features multiple incompatible timescales
- Large turnover of group members
- Dependence on external funding makes long-term planning challenging

My advice for a career in photonics

- Find your strengths in research (ideally not identical to your supervisor's)
- Find what motivates you
- Learn by example (grant writing, interviews, presentations, teaching)
- Don't be afraid to fail
- Don't listen to the old guys too much ☺

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Wilbert IJzerman

TU Eindhoven

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My Career and Optics

Prof. dr. ir. ir. W.L. (Wilbert) IJzerman mba

Head of Sector Lighting Technology, Signify Research &

Professor Illumination Optics, Department of Mathematics & Computer Sciences, Technical University Eindhoven.

My (Optics) career

- 1984-1990 Secondary School (VWO)
  - optics as a special topic for physics
- 1990-1996 MsC Mathematics & Physics, UTwente
  - all courses on optics at UTwente
- 1996-2000 PhD Mathematics
  - no optics at all ☹
- 2000-2005 Electron Optics for televisions
- 2005-2009 LED Optics
- 2009-2011 International MBA Erasmus
- 2012-today Prof. Computational illumination optics
- 2022-today Head of sector Lighting Technology, Signify

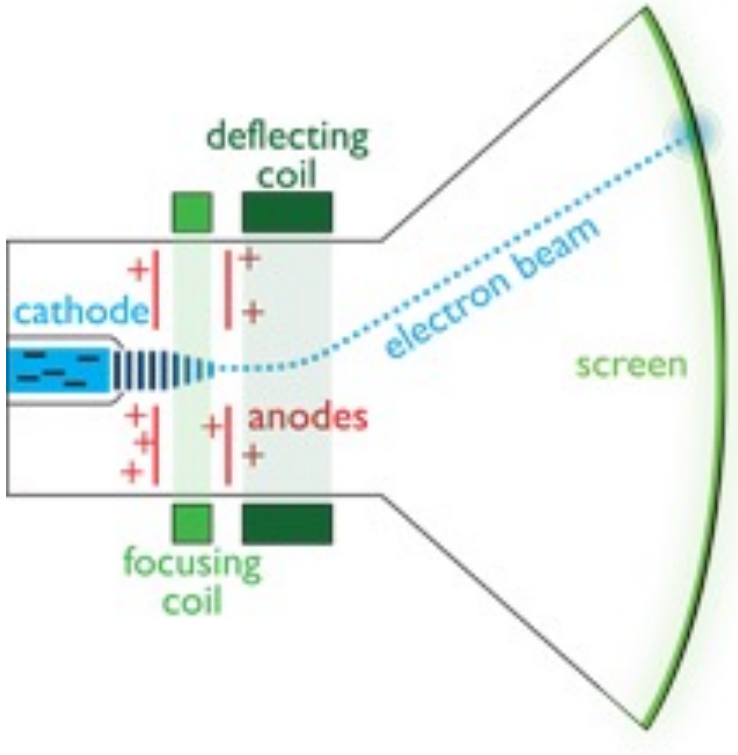




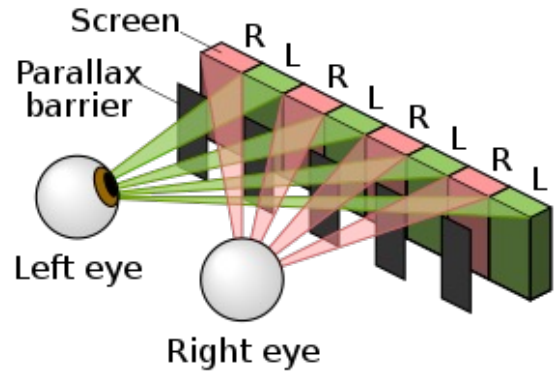


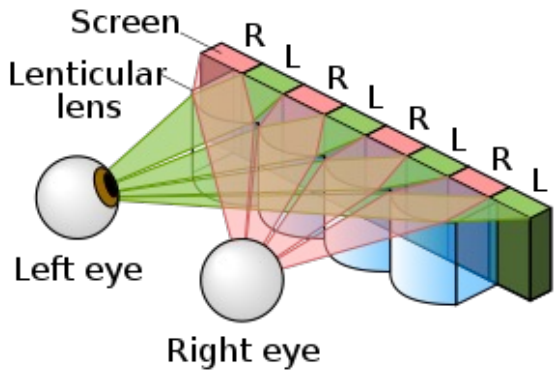


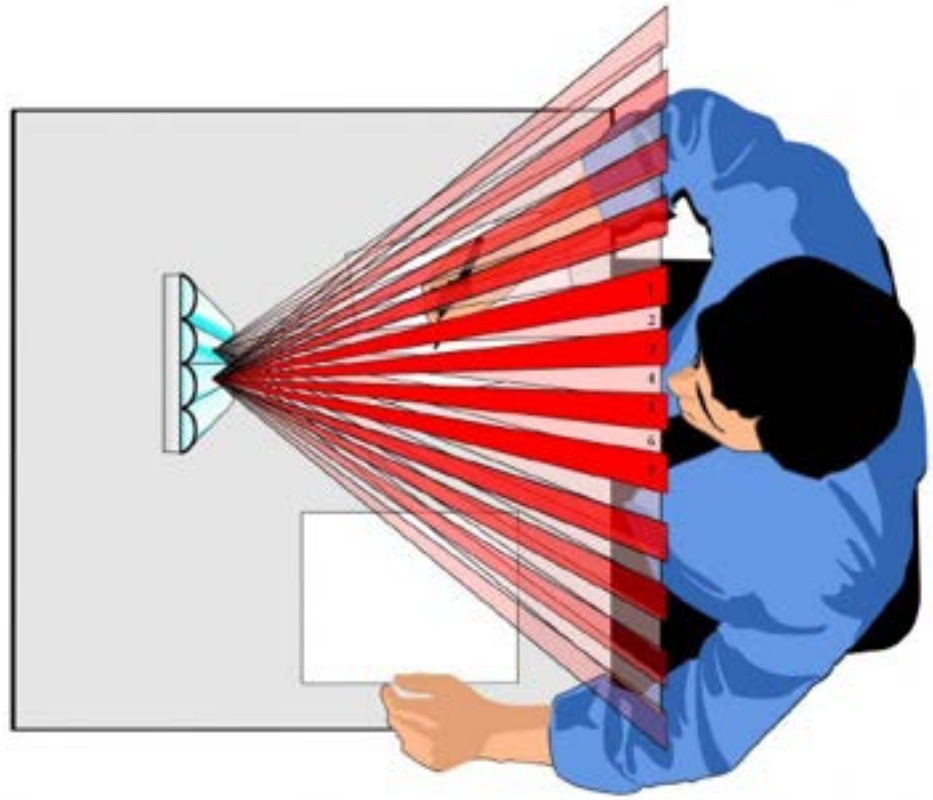

Cathode Ray Tube (CRT)



3D TV


Screen
Parallax barrier
R
L
R
L
R
L
R
L
Left eye
Right eye


Screen
Lenticular lens
R
L
R
L
R
L
R
L
Left eye
Right eye




signify

Signify brand architecture

Signify

Global brands	PHILIPS, PHILIPS hue, WiZ, PHILIPS dynalite, interact by Signify, COLOR KINETICS, Telensa
Technology brands	trulifi by Signify, Signify myCreation, Signify NatureConnect, BrightSites by Signify
Specialty brands	MODULAR LIGHTING INSTRUMENTS, VARI*LITE, bodine, once by Signify, fuhp by Signify, FLUENCE
Regional set-up and brands	GENLYTE SOLUTIONS (Indoor: LIGHTOLIER, LEDALITE, CHLORIDE, ALKCO, Day-Brite, CFI; Outdoor: LUMEC, GARDCO, HADCO, COLOR KINETICS, Stonco, KEENE; Connected Lighting Systems & Controls: interact, PHILIPS dynalite, BrightSites; LED Lamps & Electronics: PHILIPS, ADVANCE); COOPER Lighting Solutions (Metalux, neoray, HALO, LUMARK, ephesus, McGraw-Edison, FAIL-SAFE, Streetworks, WaveLinx, Trellix, Portfolio, Shaper, Corelite, intelligent, iLIGHT); nardeen; PIERLITE
Value brands	MAZDA, ECOLINK, ATTRALUX, LiteMagic 磊明

Signify is the world leader in lighting

We provide high-quality energy efficient lighting products, systems and services

Light sources

No. 1

Connected, LED,
Conventional

Luminaires

€6.1bn

sales in 2024

Systems and Services

29,000

people in over
70 countries

4.3%

sales reinvested in R&D in 2024

90%

LED sales in Q4 2024

20,250

Patents in 2024

28%

women in leadership in Q4 2024

156M

connected light points in Q2 2025

35%

circular revenues in Q4 2024

33%

Brighter Lives revenues in Q4 2024

40%

On track to reduce Green House Gas emissions by 2025

Philips SunStay

- The all-in-one streetlight that harnesses the power of sunlight.

Philips horticultural lighting

- Light recipes to improve the quality, consistency, and yield of various crops.

Power of light to disinfect

- UV-C air disinfection to stop viruses spreading.

3D Printing

Remarkable Lighting
Sustainably Printed

Amazing designs & unique textures created by the latest 3D technology

Low carbon footprint and increased use of recycled materials

Customized or tailored to your brand & concept

Instant development, fast delivery, global coverage

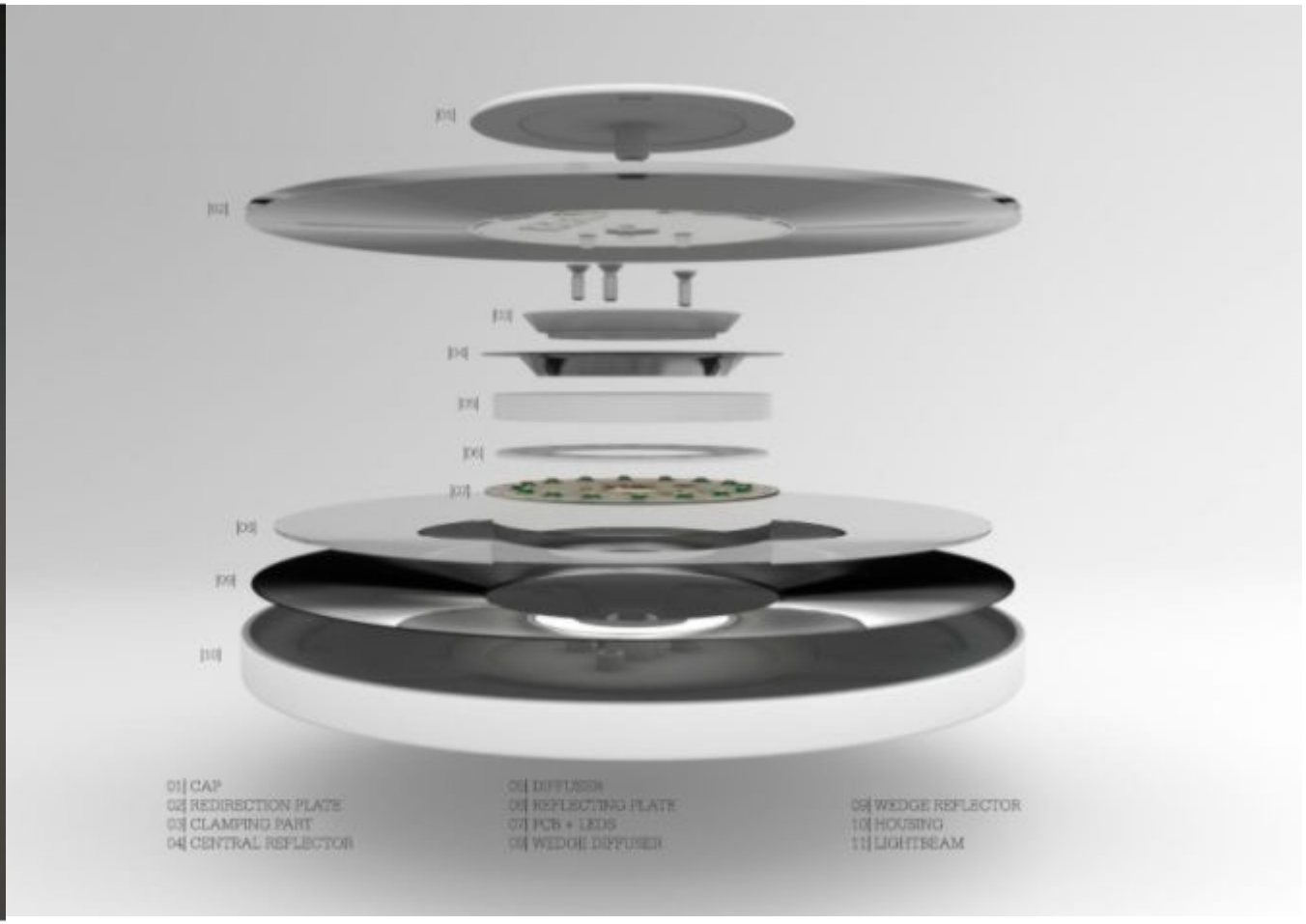
NatureConnect

- Mimics natural daylight with a view to the sky to help people stay energized.
- Turning dark areas into productive, profitable and engaging areas.

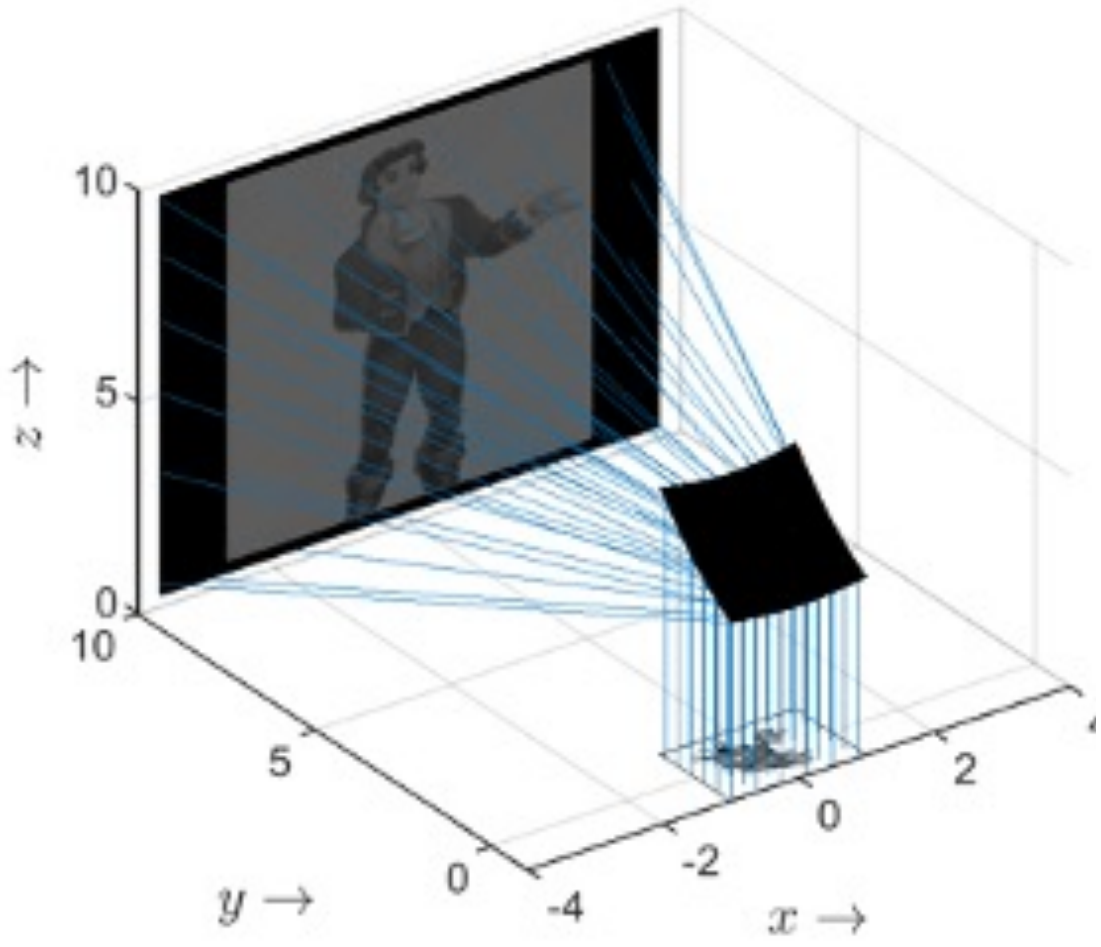
Philips Hue

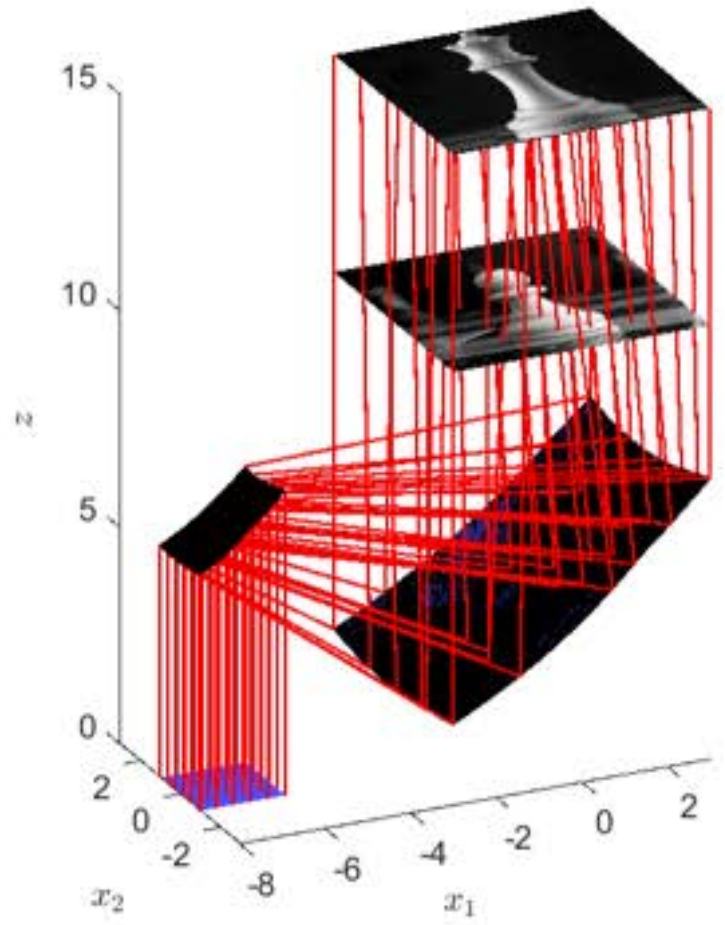
#1 smart home lighting system to light your home and garden smarter, in over 150 countries and five continents.

LED Lighting: Modular Spock



Computational Illumination Optics





Advice

Successful career=Talent x Investment in time x Luck

Talent:

- What is your talent?
  - What are your strengths and weaknesses

Investment in time:

- What gives you most energy?
  - To be good in something you need to practice 10khours!

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Nandini Bhattacharya

TU Delft

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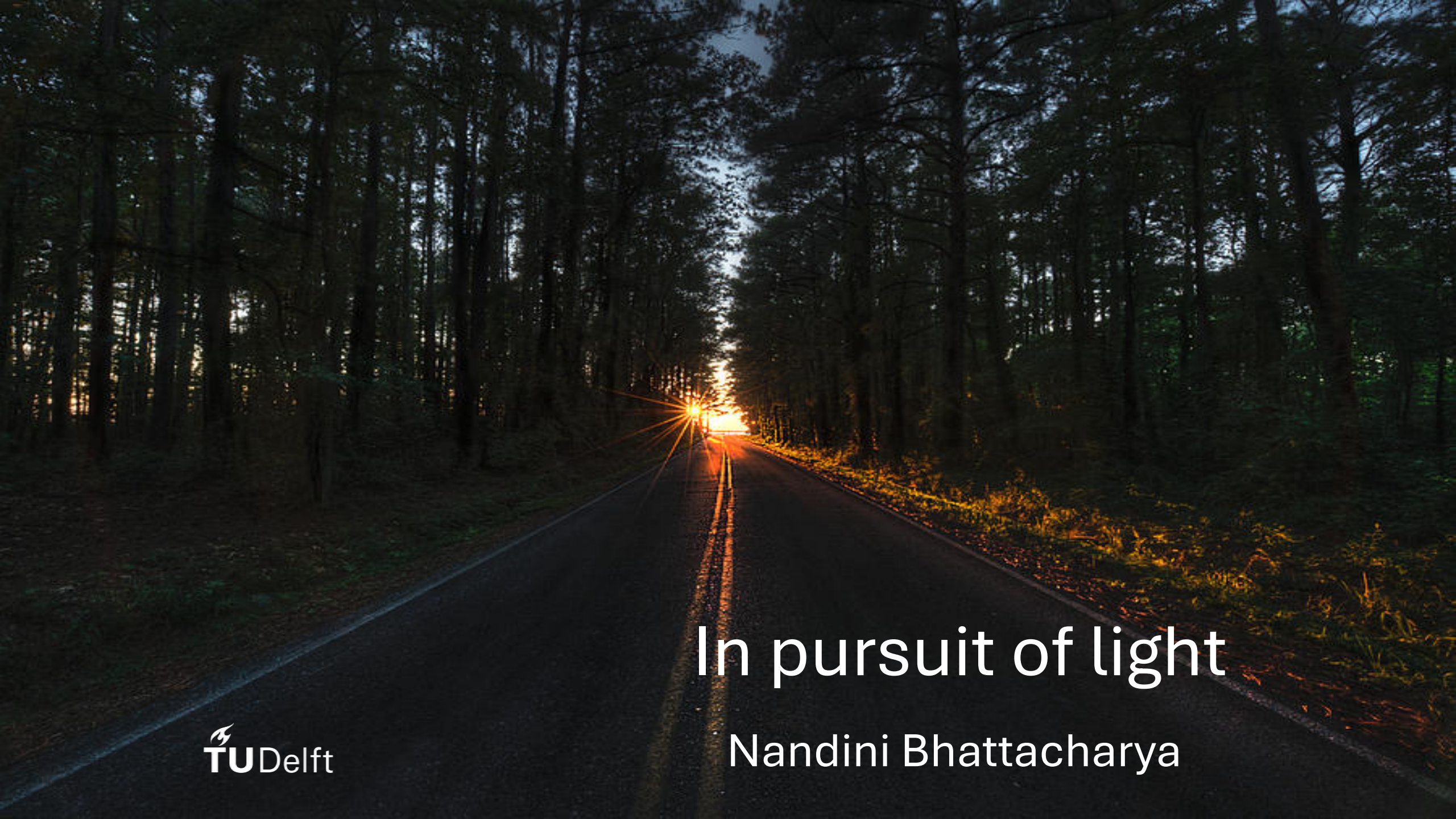


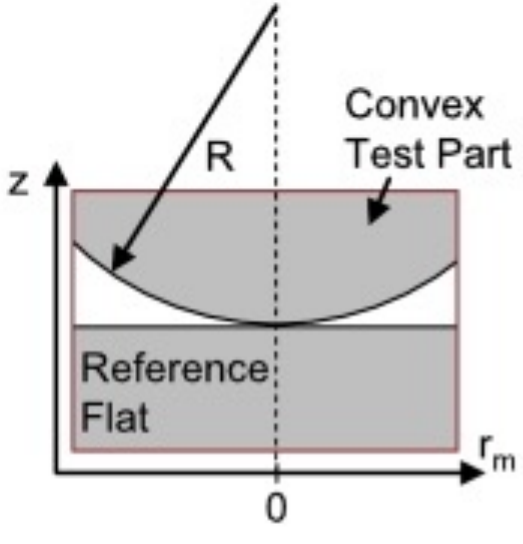
In pursuit of light

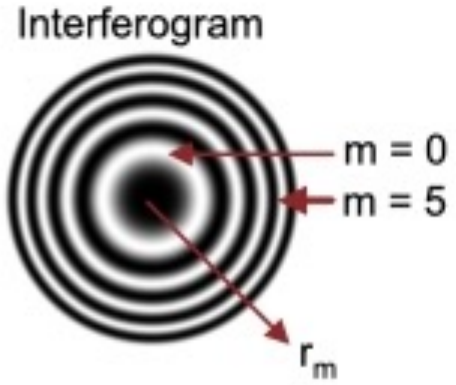
Nandini Bhattacharya

TU Delft

Why Photonics

Newton's rings in Delhi

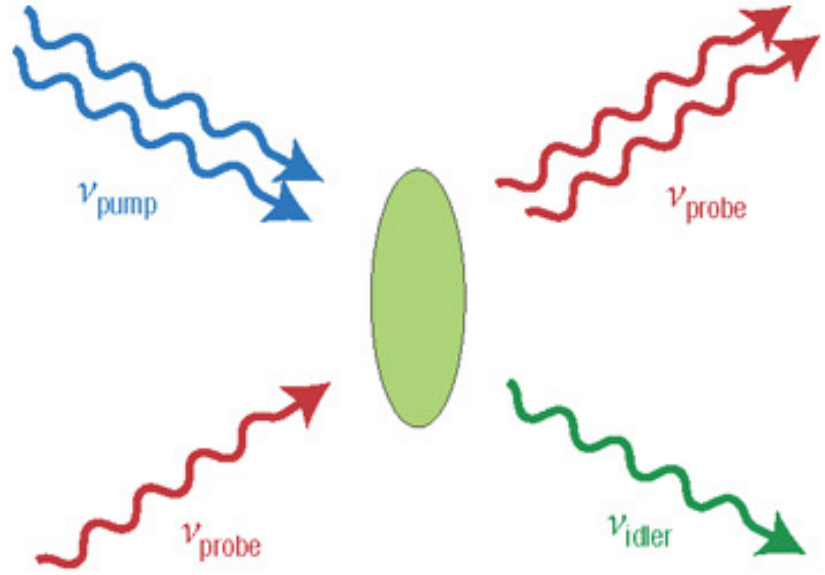




$$R = \frac{r_m^2}{\lambda\left(m + \frac{1}{2}\right)}$$

https://spie.org/publications/spie-publication-resources/optipedia-free-optics-information/fg10_p11_newtons_rings

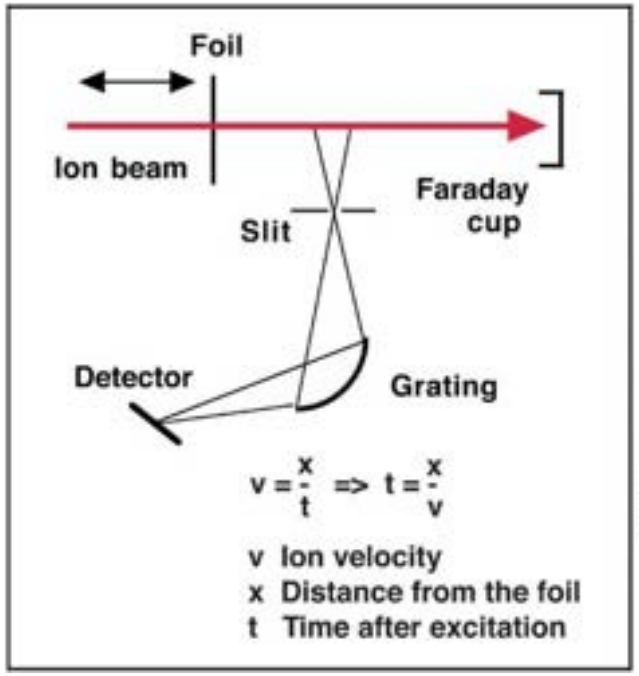
Non – linear Optics Four wave mixing in **Chennai** (formerly Madras)

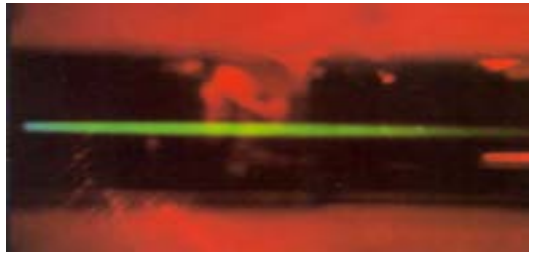


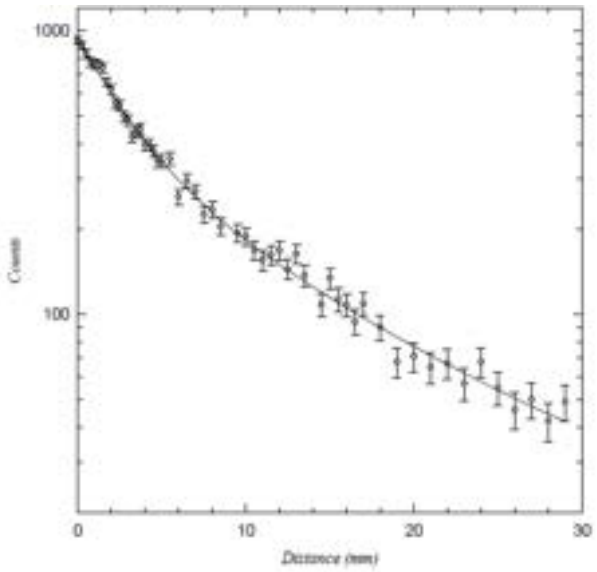
$$|\nu_{pump} - \nu_{probe}| = |\nu_{idler} - \nu_{pump}|$$

Why Photonics

Beam Foil Spectroscopy in Mumbai



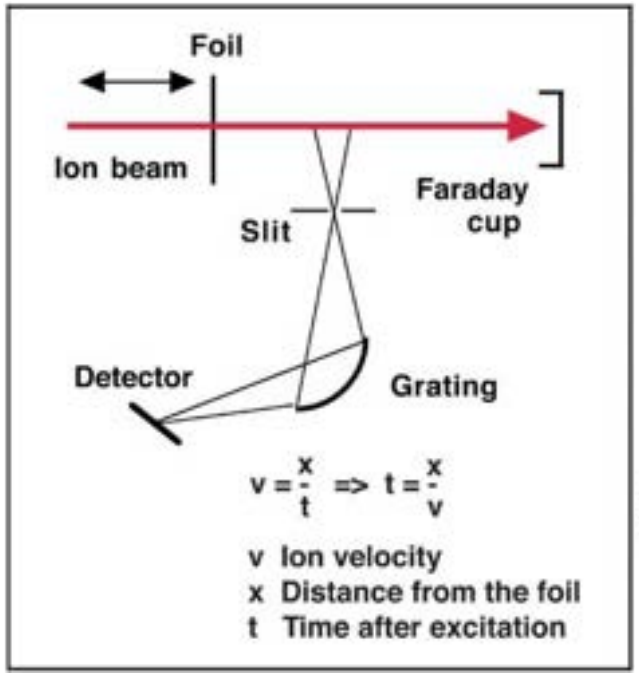


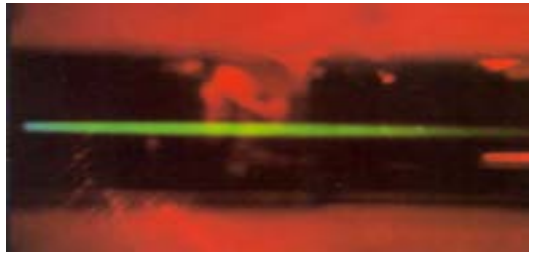


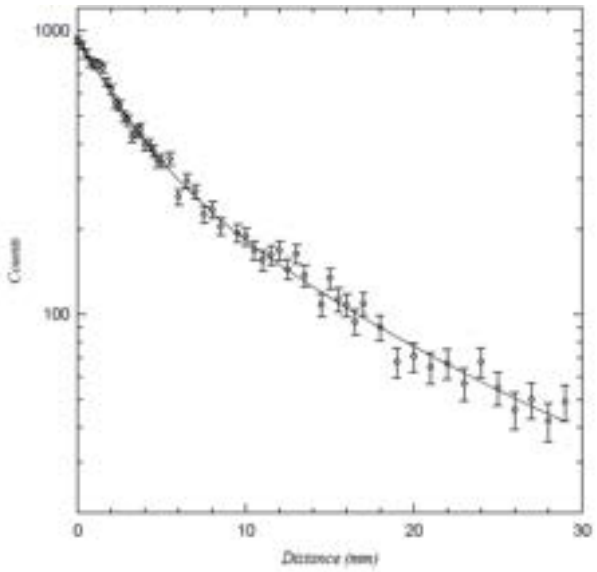
tifr

Why Photonics

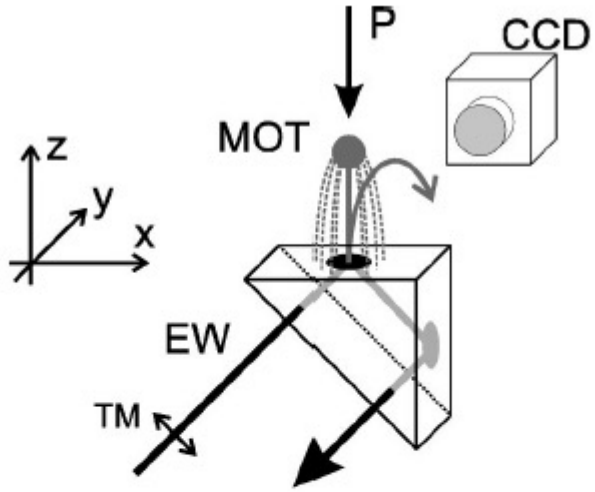
Beam Foil Spectroscopy in Mumbai







Bouncing cold atoms in Amsterdam



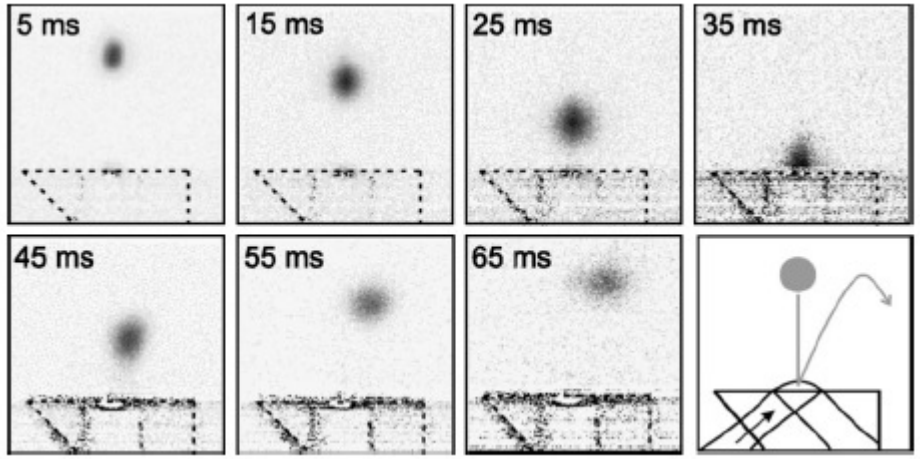
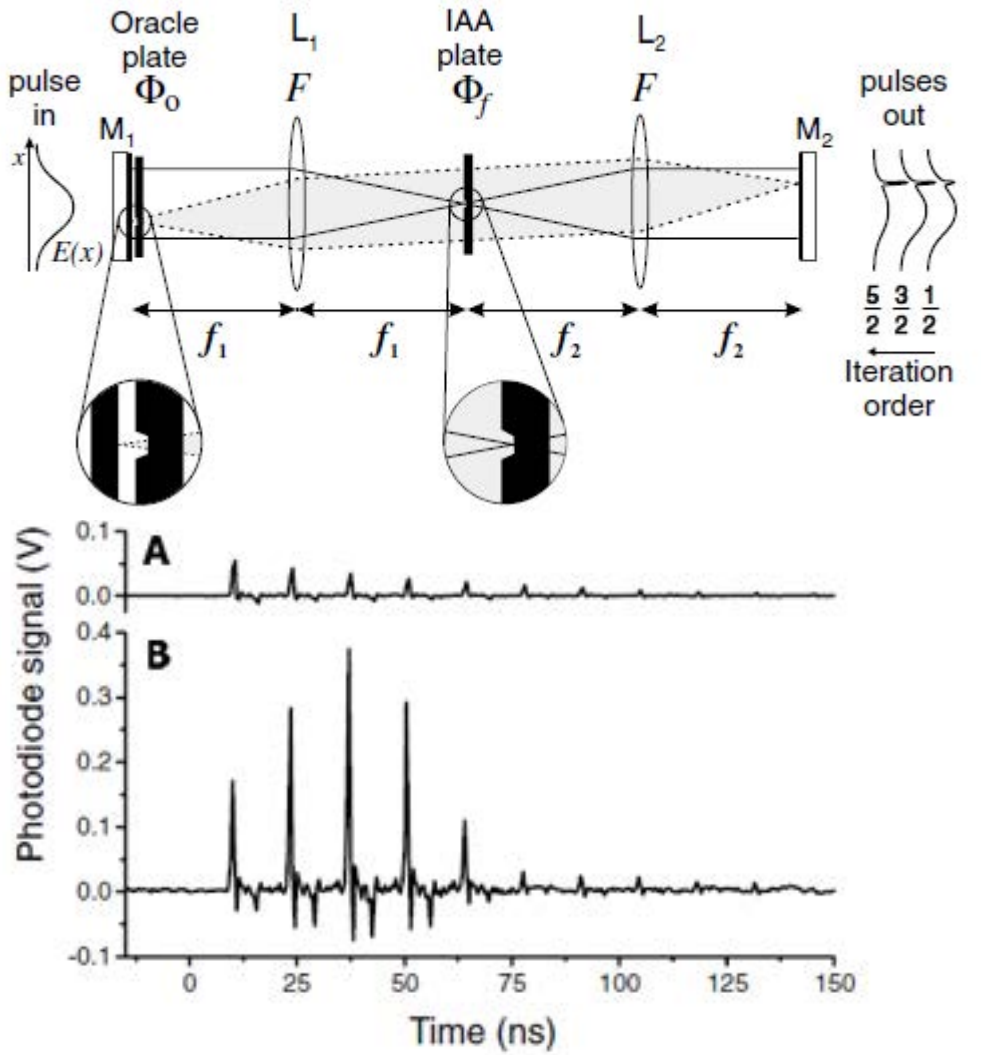


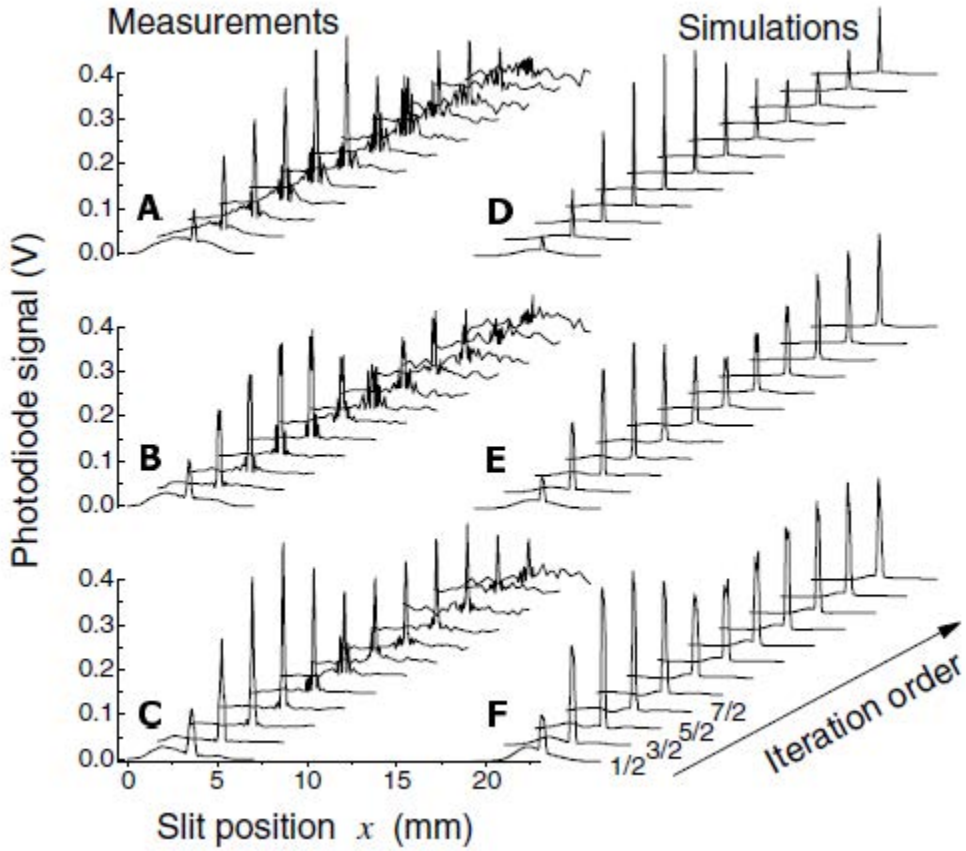
FIG. 2. Fluorescence images of a bouncing atom cloud. The first image was taken 5 ms after releasing the atoms from the MOT. The configuration of prism and evanescent wave is illustrated by the schematic (field of view: 10.2×10.2 mm^2).

Why Photonics



Fun with Quantum Information

A phone book with *N* entries
phone number → Name
Classically *N* consultations of phone book.
Grover's algorithm only $\sqrt{N}$ consultations,
using quantum mechanics.



UNIVERSITEIT VAN AMSTERDAM

It is Photonics

Cold Atoms
Quantum Information
(UVA)

to

Classical Optics
(Delft)

But also

to

TU Delft

It is Photonics

Fun with Students

Need new skills !!

Teaching

How to become a good teacher ?

How to keep their interest in class?

How to teach quantum optics in an exciting way?

It is Photonics

Holographic Particle image Velocimetry

With 3ME

Wouter Koek

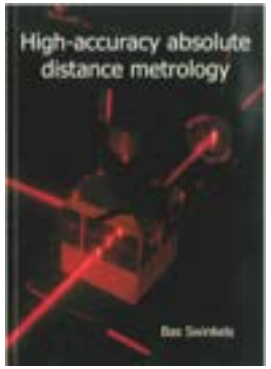
February 2006

High-accuracy absolute distance metrology

With TNO

Bas Swinkels

September 2006

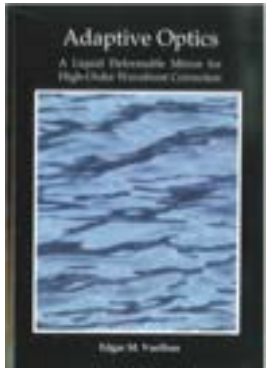


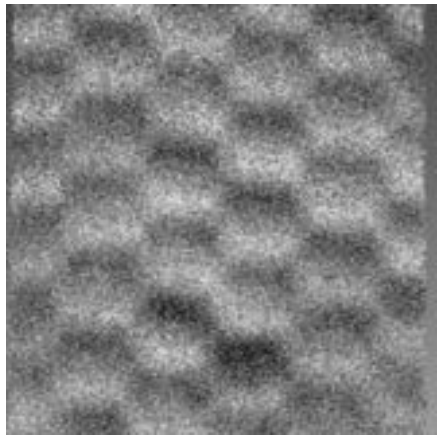
Adaptive Optics Liquid deformable mirror

With TNO

Edgar Vuelban

December 2006





Peter Somers
Postdoc

Speckle Interferometry for non-destructive testing

Need new skills !!

Leading research teams

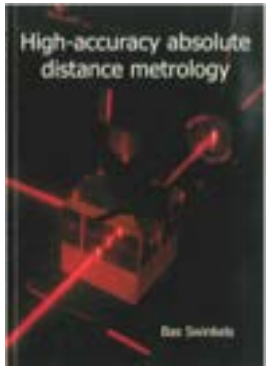
Collaborating with industry

TU Delft

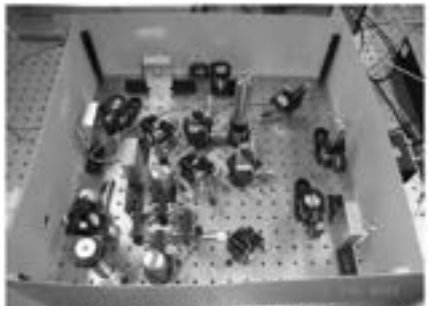
It is Photonics

Photonics is every where

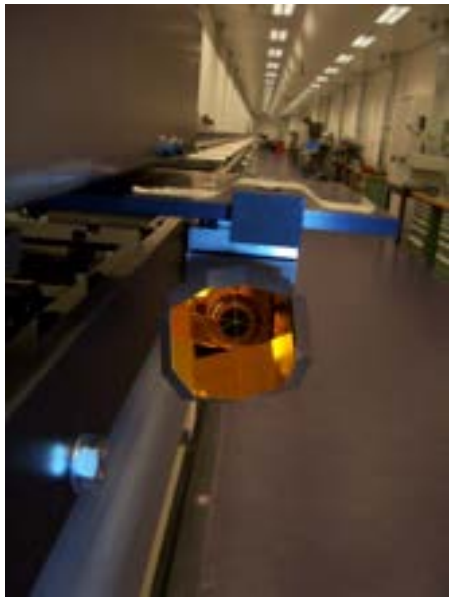
More challenging Projects

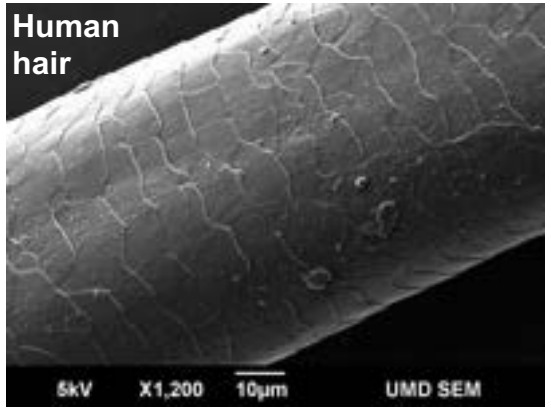


Bas Swinkels

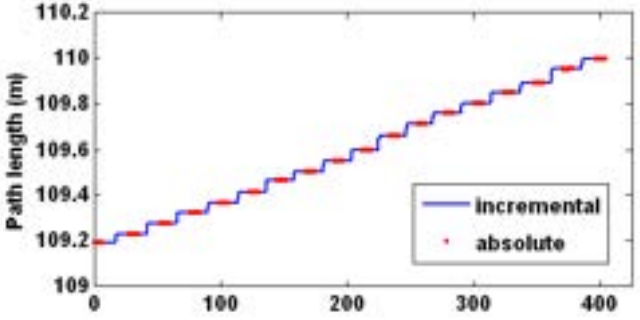


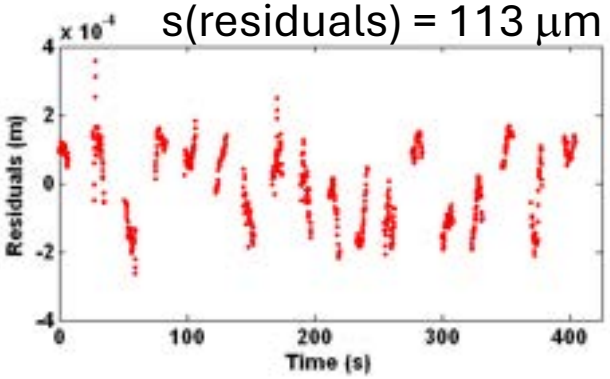
Distance metrology



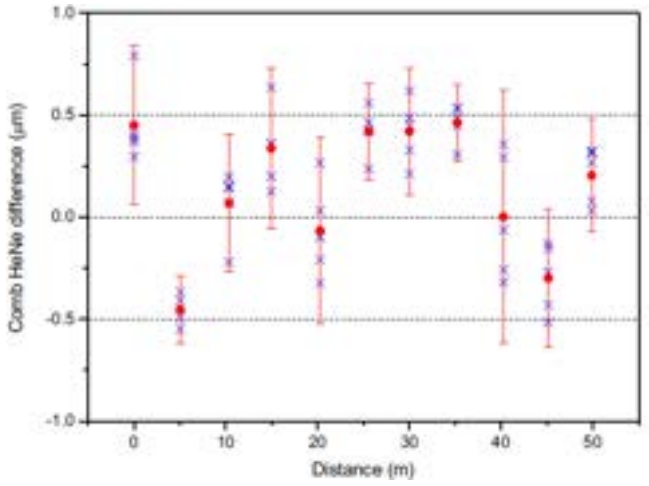


Measurement of 50m uncertainty 1 µm





s(residuals) = 113 µm



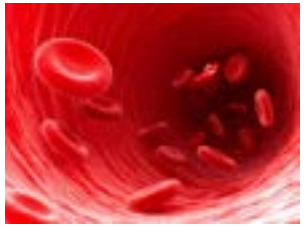
TU Delft

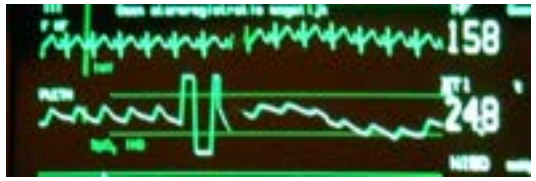
It is Photonics

Photonics is every where

Diverse Collaborations

Hemodynamics





Photoplethysmography (PPG)

Leading diverse research teams

Collaborating with doctors

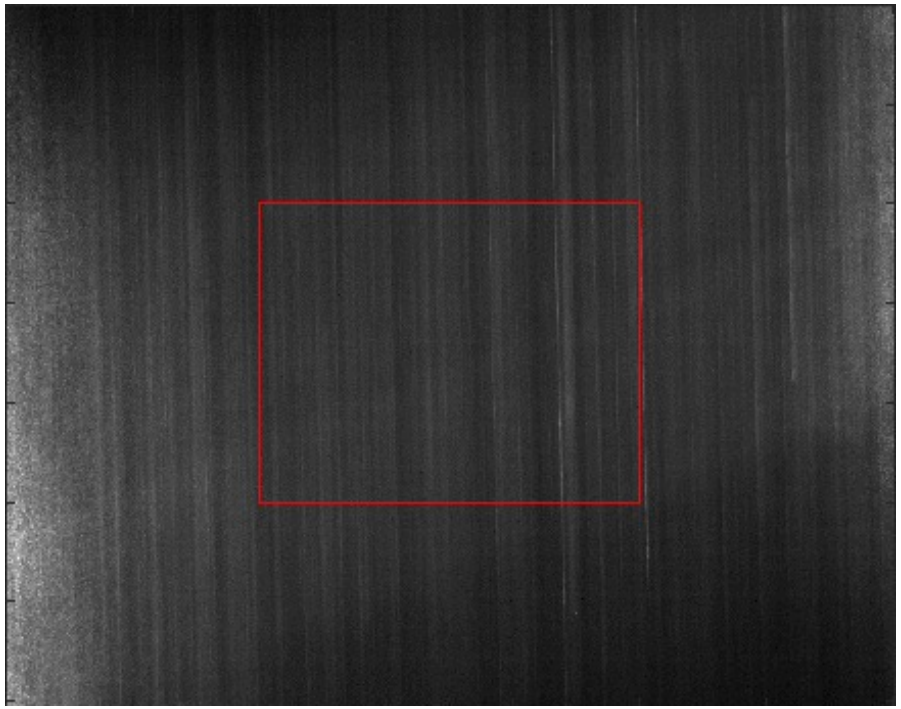
TU Delft

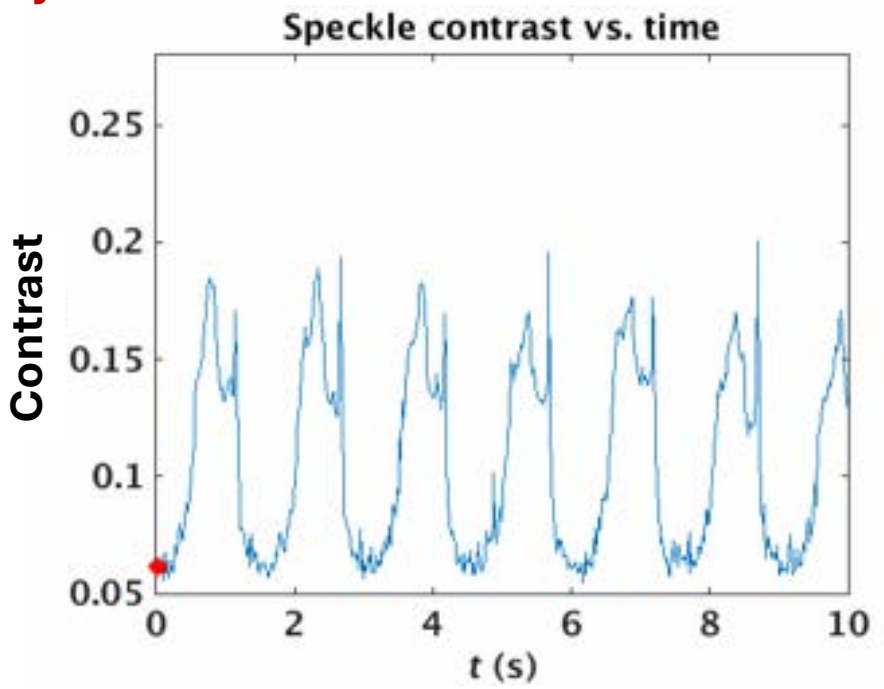
It is Photonics

Photonics is every where

Diverse Collaborations

Hemodynamics





Heart pulse retrieved from Speckle contrast

Camera Image inside Phantom

Future devices using Speckle based measurements

It is Photonics

My experience!!

Be curious

Work in something that challenges you

Try something new

Love atleast some part of your job (it will never be 100% for most of us)

Persist (to solve problems) but decide for how long (consult and collaborate)

Thank You

360 Carla
Manufacturing
Industry 4.0

Photonics Career Event
Delft

Hai Wang
Utrecht University

ICFO

PHOTONICS21
PHOTONICS PUBLIC PRIVATE PARTNERSHIP

This project has received funding from the European Union Horizon Europe research and innovation program under grant agreement No 101135838.

CARLA 2025

Hai Wang,
Debye Institute for nanomaterials Science,
Utrecht University
h.wang5@uu.nl

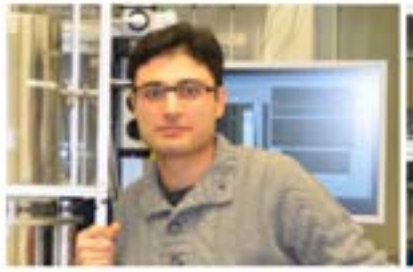
Who am I?

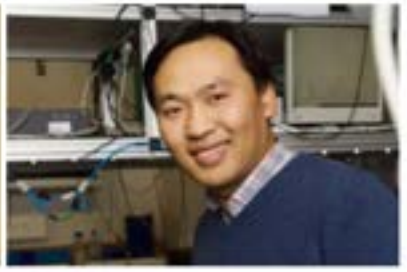
Nanophotonics group @ Utrecht university


Prof. dr. P. van der Straten


Prof. dr. A. Mosk


Dr. D. van Oosten

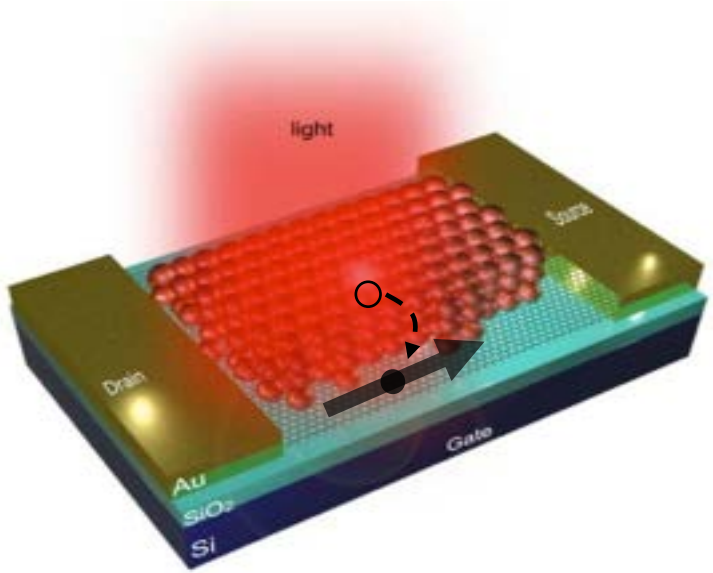

Dr. S. Faez


Dr. H. Wang

What do I do for my research?

Energy production

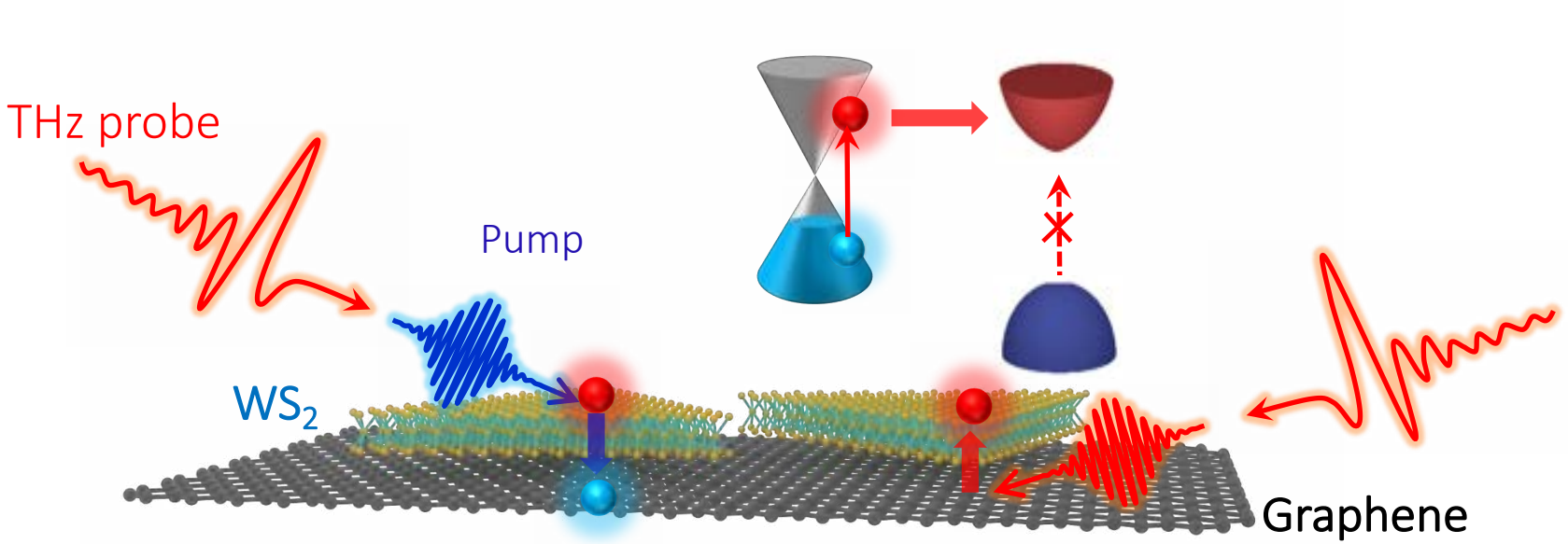
(solar cells)



Photodetector

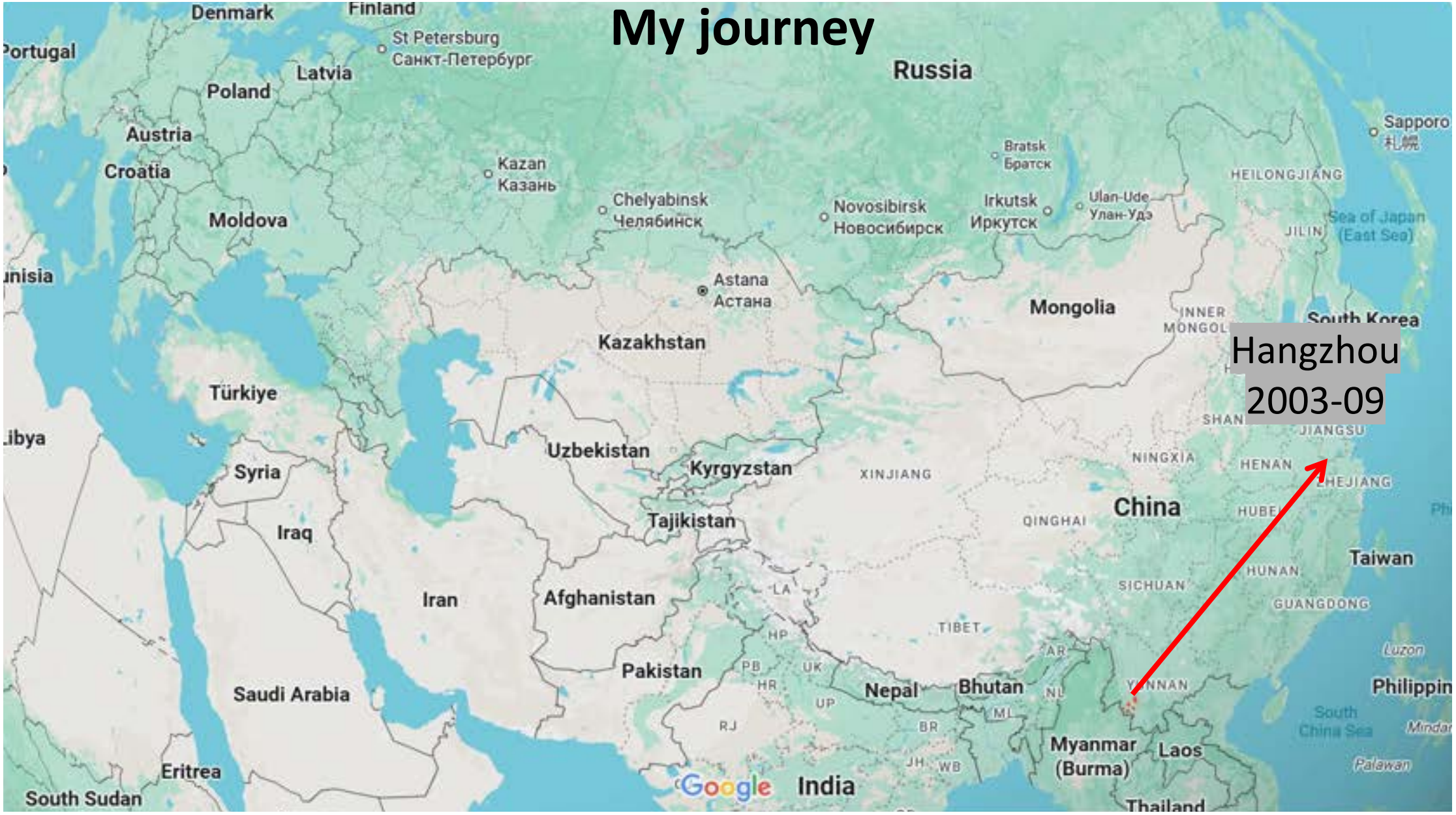
Fundamental understanding of key processes in electronic and optoelectronic materials and devices by pulsed THz spectroscopy

Ultrafast charge carrier dynamics in nanomaterials and interfaces



THz radiation interacts strongly with free charge carriers

Contact-free; sub-ps time resolution; quantitative


My journey
Hangzhou
2003-09
Denmark
Finland
St Petersburg
Санкт-Петербург
Portugal
Latvia
Russia
Poland
Austria
Croatia
Kazan
Казань
Chelyabinsk
Челябинск
Novosibirsk
Новосибирск
Irkutsk
Иркутск
Bratsk
Братск
Ulan-Ude
Улан-Удэ
Sapporo
HEILONGJIANG
Sea of Japan
(East Sea)
JILIN
Moldova
Astana
Астана
Mongolia
INNER
MONGOL
South Korea
Kazakhstan
Türkiye
Libya
Uzbekistan
Kyrgyzstan
Syria
XINJIANG
NINGXIA
HENAN
SHAN
JIANGSU
ZHEJIANG
China
Tajikistan
QINGHAI
HUBE
Iraq
Taiwan
HUNAN
SICHUAN
Iran
Afghanistan
GUANGDONG
LA
TIBET
HP
AR
Luzon
Pakistan
PB
UK
HR
Nepal
Bhutan
NL
YUNNAN
Philippin
Saudi Arabia
UP
ML
South
China Sea
RJ
BR
Myanmar
(Burma)
Laos
Eritrea
JH
WB
Palawan
South Sudan
Google
India
Thailand

My journey

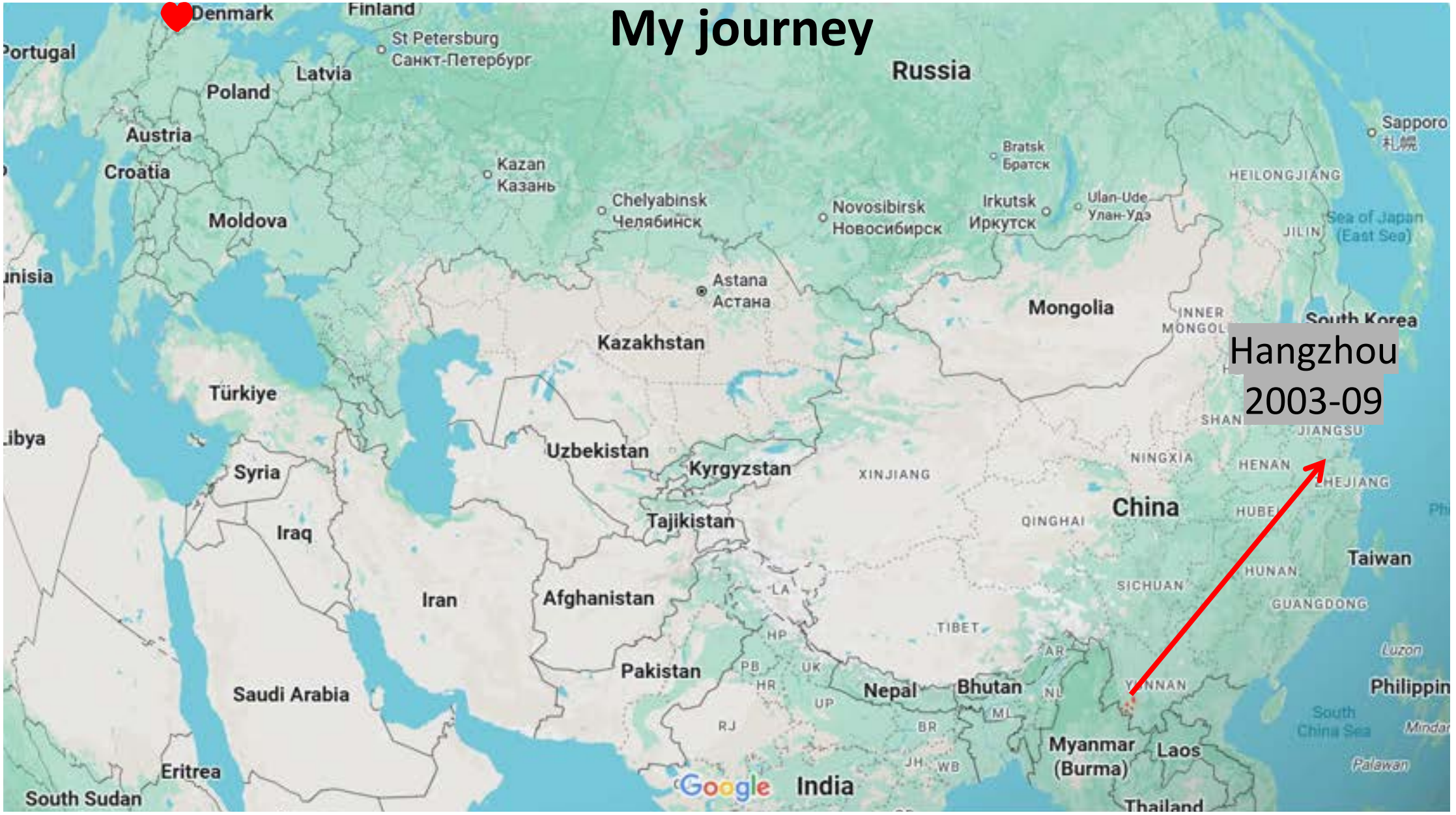
What to do (2009) after graduation?

No plans and puzzled!

Job in the industry?

Master program?

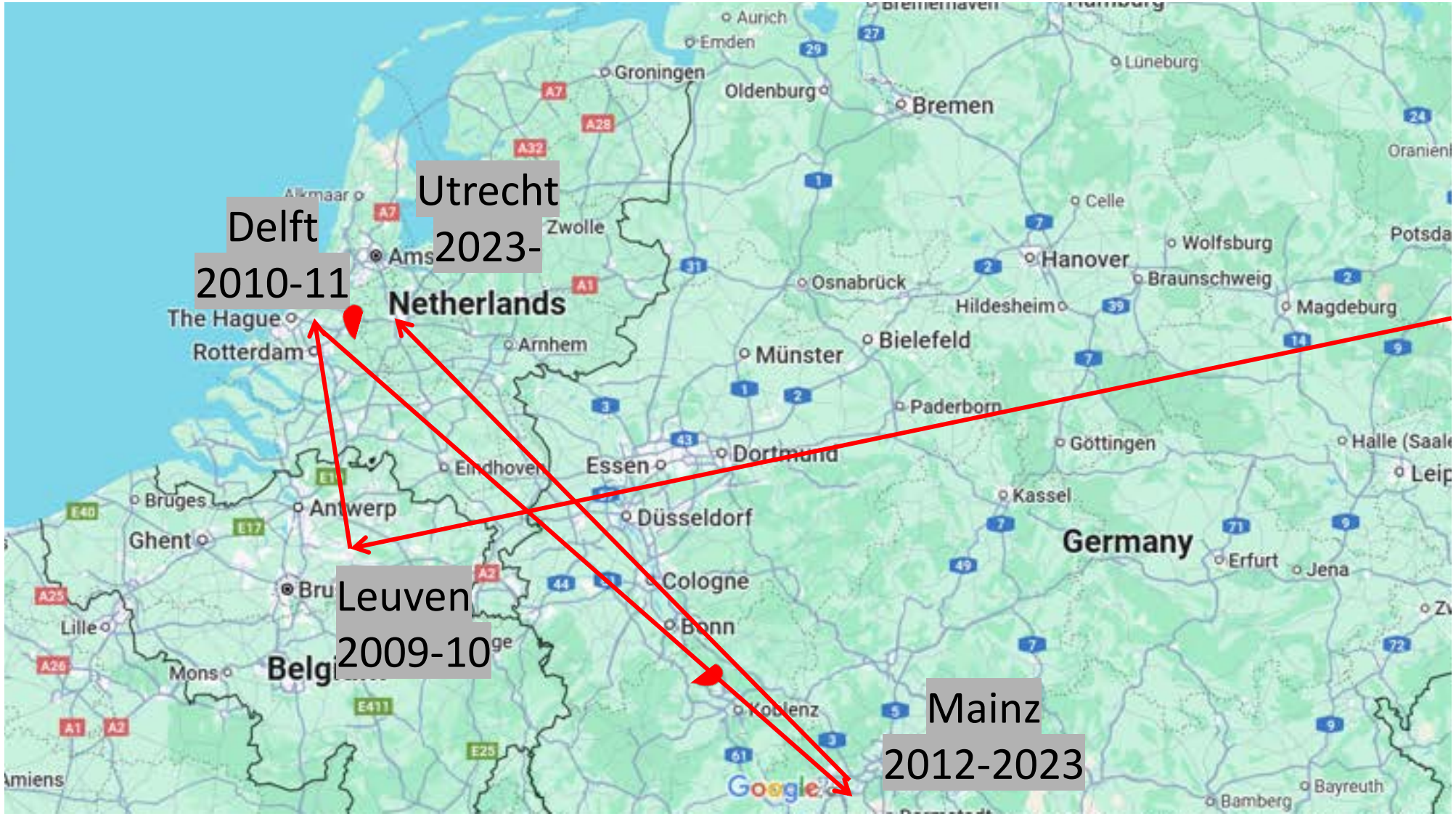
passion for semiconductor physics


My journey
Denmark
Finland
St Petersburg
Санкт-Петербург
Portugal
Latvia
Poland
Russia
Austria
Croatia
Moldova
Kazan
Казань
Chelyabinsk
Челябинск
Novosibirsk
Новосибирск
Irkutsk
Иркутск
Bratsk
Братск
Ulan-Ude
Улан-Удэ
Sapporo
HEILONGJIANG
Sea of Japan
(East Sea)
JILIN
Astana
Астана
Kazakhstan
Mongolia
INNER MONGOL
South Korea
Hangzhou
2003-09
Türkiye
Libya
Uzbekistan
Kyrgyzstan
Syria
XINJIANG
NINGXIA
HENAN
SHAN
JIANGSU
ZHEJIANG
China
Tajikistan
QINGHAI
HUBEI
Iraq
Taiwan
HUNAN
SICHUAN
Iran
Afghanistan
GUANGDONG
LA
TIBET
HP
AR
Luzon
Pakistan
PB
UK
HR
Nepal
Bhutan
NL
YUNNAN
Philippin
Saudi Arabia
UP
ML
RJ
BR
South
China Sea
Myanmar
(Burma)
Laos
JH
WB
Palawan
Eritrea
Google
India
South Sudan
Thailand

My journey: China->Belgium->NL->DE->NL

Two years of Master’s study in Europe, and then a job back in China

That was the plan!



Still here after 16 years: Let life lead the way —don't try to predict it.

- Master project at Delft: Inspired for nanoscience and laser spectroscopy

Excellent mentorship from my teacher and daily supervisor;

Experience with the flat research culture in the NL;

Development of interpersonal skills (communication and openness)

Learning is fun when you feel inspired.

PhD study + postdoc in Mainz (2012-2017)

Fantastic research and social environment

Follow your heart, but remember that passion alone may not lead to instant success.

Confidence and independence are not innate—they can be developed through mastery and experience.

Ultrafast Dynamics in Nano-Optoelectronic Materials (2017-2024)

- Treat students the way you wanted to be treated

- Inspiration is the best teacher

-Motivation grows when you actively encourage your students

Group leader at Max Planck Institute

Home messages

Learning is fun when you feel inspired = **Inspiration** is the best teacher;

It’s good to have plans, but it’s also okay to **follow your passion** and let life guide you;

Follow your heart, but remember that **passion alone may not lead to instant success**;

Confidence and independence are not innate—they **can be developed** through mastery and experience.

360 Carla
Manufacturing
Industry 4.0

Photonics Career Event
Delft

Ralf Kohlhaas
SRON

ICFO

PHOTONICS21
PHOTONICS PUBLIC PRIVATE PARTNERSHIP

This project has received funding from the European Union Horizon Europe research and innovation program under grant agreement No 101135838.

TO BRING ABOUT BREAKTHROUGHS IN INTERNATIONAL SPACE RESEARCH

CARLA 2025 Academic Pitch

RALF KOHLHAAS, HEAD OF OPTX SECTION AT SRON

SRON SPACE RESEARCH ORGANISATION NETHERLANDS

Private / current position

- 38 years old, German
- Married, two sons (2.5 years old and 3 months old)

- Head of OptX Section at SRON

SRON

Private / current position

- 38 years old, German
- Married, two sons (2.5 years old and 3 months old)

- Head of OptX Section at SRON

Space Research Organisation Netherlands

National institute for space research

SRON building in Leiden

SRON

Private / current position

- 38 years old, German
- Married, two sons (2.5 years old and 3 months old)

- Head of OptX Section at SRON

15 people working on optical instrumentation for space

Space Research Organisation Netherlands

National institute for space research

- 50% of my time spent on R&D
- 1 day/week guest scientist at TU Delft

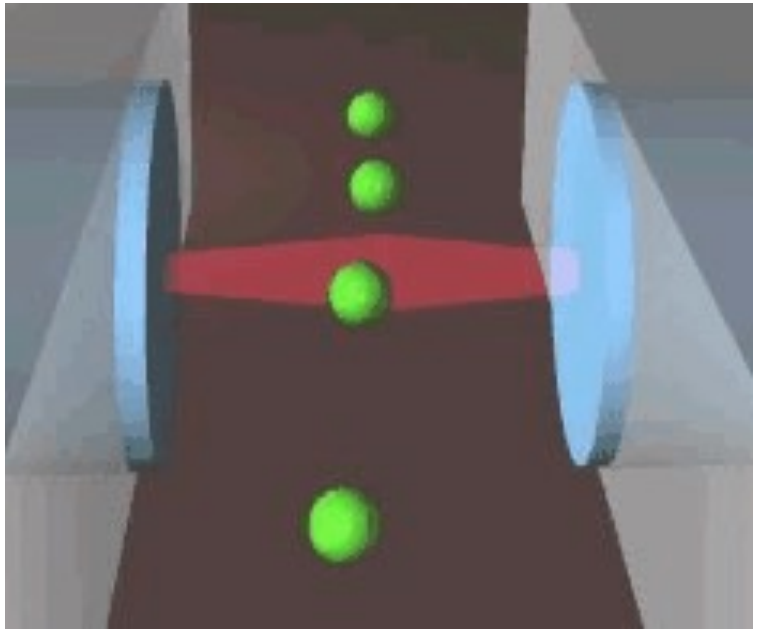
SRON building in Leiden

SRON

Why did I choose a career in optics?

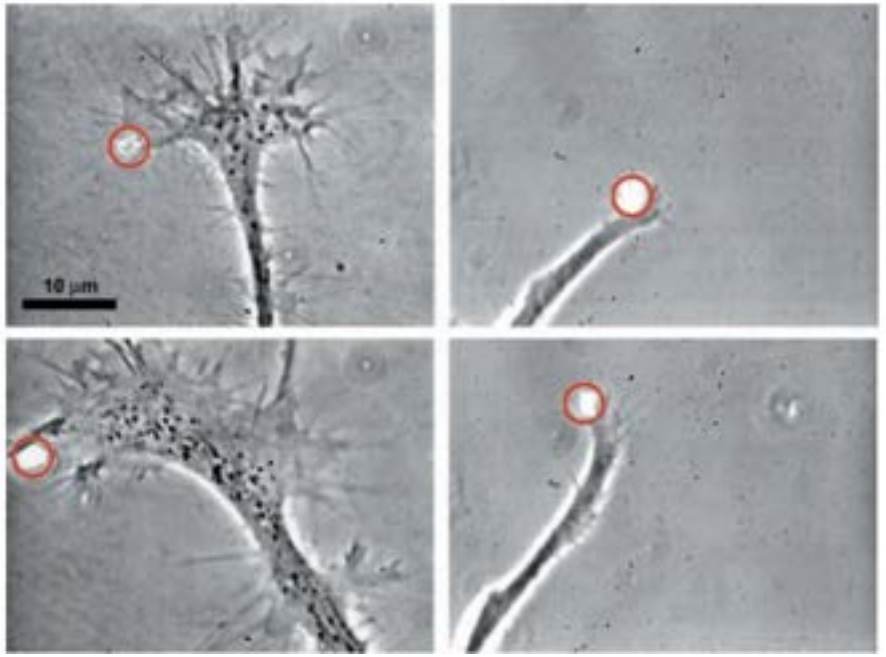
- BSc. in Physics in Leipzig
- Interest triggered in optics in biophysics

Optical stretcher



J. Guck, et. al, Biophys. J. 88(5):3689-3698 (2005)

Optical neuronal guidance



A. Ehrlicher, et al., PNAS 99.25 (2002): 16024-16028.

Bachelor thesis in Leipzig in neuronal guidance on soft substrates

SRON

Bachelor ➡ Master

- Erasmus Mundus Double Master in Optics and Photonics at Imperial College London and Institut d'Optique Graduate School
- Financial support of German Konrad-Adenauer-Foundation

Image source: https://ukcollegeadmissions.com/

Image source: wikimedia commons

- Solid optics education, with mix of theoretical work and labwork

SRON

PhD

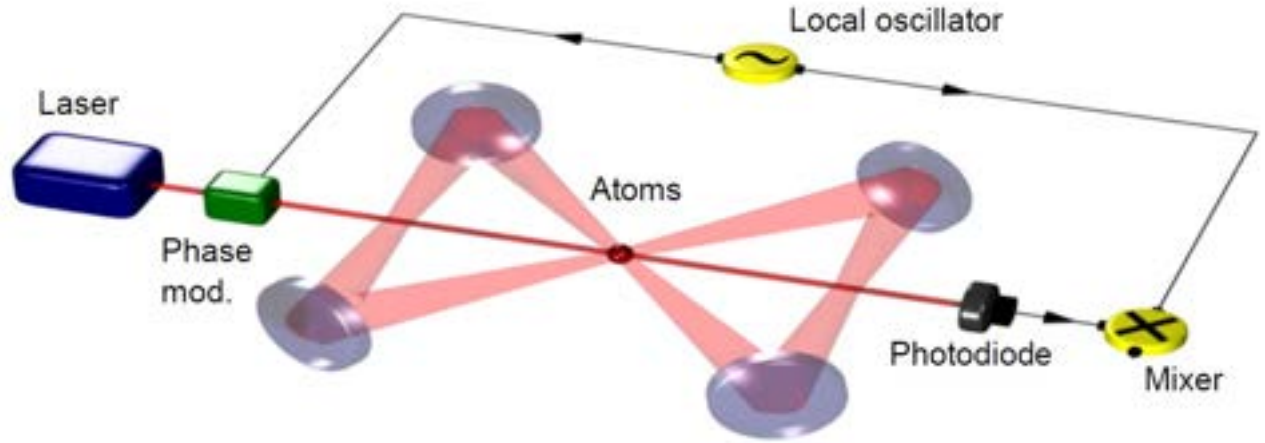
- PhD at Institut d'Optique on weak non-destructive measurements and feedback control of atomic ensembles
- Supervisors:

  Philippe Bouyer

  Alain Aspect

Nobel prize 2022 for violation of Bell inqualities

Photo: wikimedia



Critical for education during my PhD:

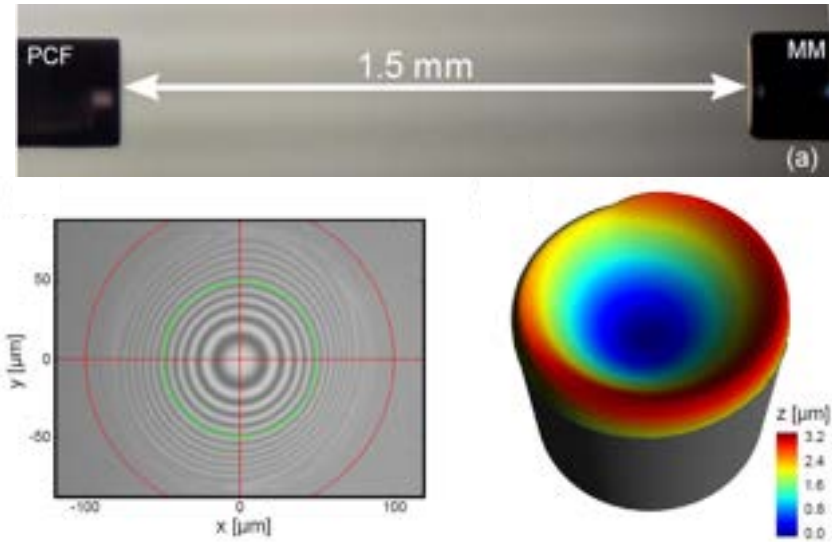
Senior PhD students + Postdoc (Simon Bernon, Thomas Vanderbruggen, Andrea Bertoldi)

SRON

Postdoc / job search

- Girlfriend wanted to go back to the Netherlands but needed to finish PhD, therefore short postdoc at Observatoire de Paris
- Topic:

  Chip-scaled atomic clocks with integrated optical fiber cavities



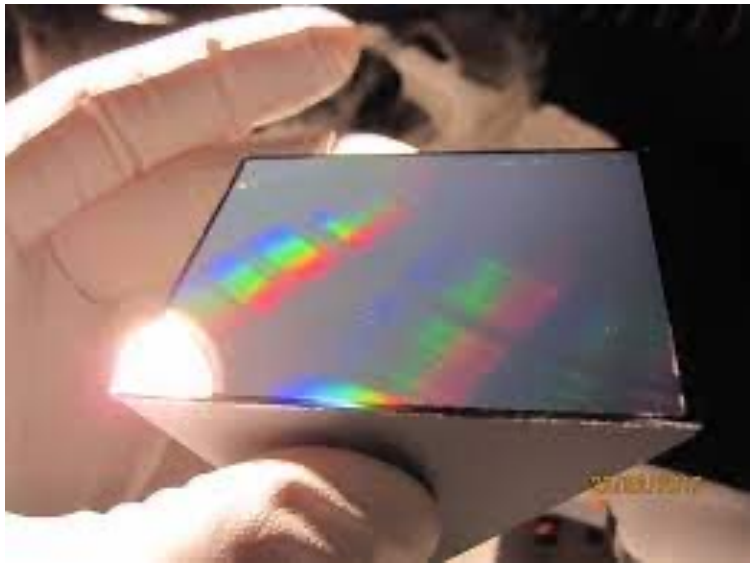
Job searchin NL: ASML, European Patent Office, …

➡ Choice of SRON for first job

SRON

Instrument Scientist SRON

Main project in the first years: Immersed gratings

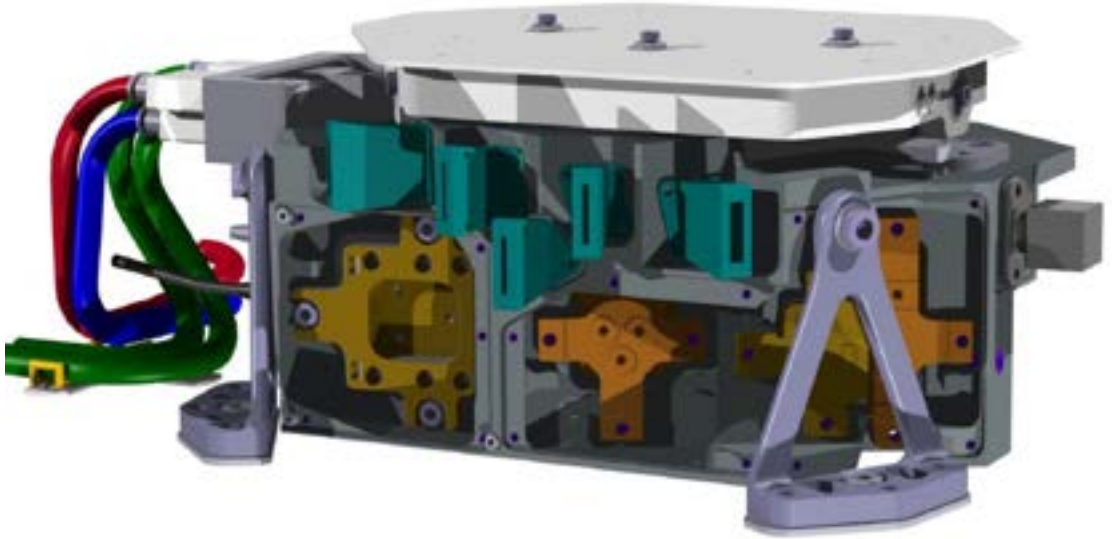


S-5 immersed grating

Performance engineer, then project manager for spectropolarimeter

Sentinel-5A launch on 13th of August!

First project on I was working on is now in space

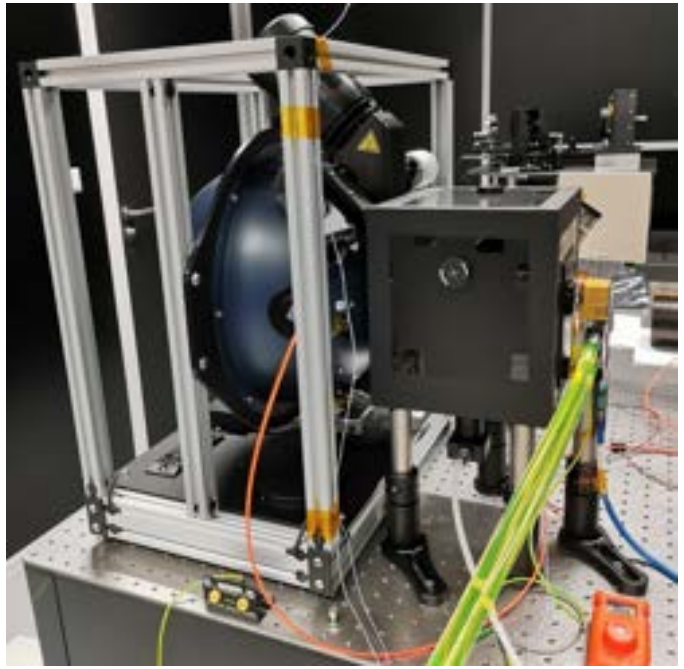


SPEXone SG spectropolarimeter

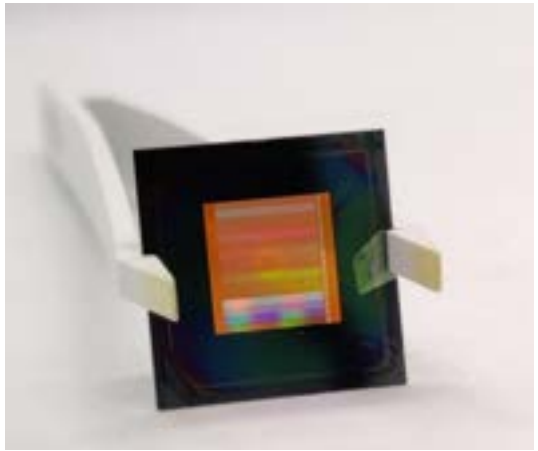
Since 2020: head of OptX section at SRON

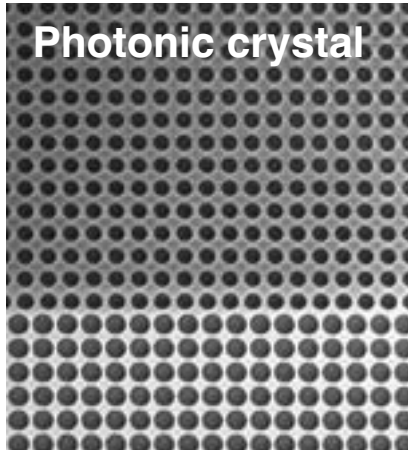
Tasks:

- Allocate staff to projects
- Staff personal development and work happiness
- Support acquisition of new projects
- Work on medium to long-term strategy
- Brainstorm on new instruments



Detector testing setup in the visible





Research work:

Nanostructured components and computational optics for space

SRON

Advice/tips for students

- Go the extra mile when it is necessary. But do not stucturally overwork yourself.
- For choosing your job/next position: choose your team, inquire within your network about the work environment
- Respect colleagues with other qualifications/background
- Continue learning
- Actively follow the state-of-the-art, in your field and beyond

SRON

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Thank you!

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Institutes Organisation of NWO
WWW.SRON.NL

Niels Bohrweg 4
2333 CA Leiden
+31 (0)88 777 56 00
The Netherlands

Landleven 12
9747 AD Groningen
+31 (0)50 363 40 74
The Netherlands

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