



Celestijnenlaan 200 F, 3001 Leuven, Belgium



[boris.louis@kuleuven.be](mailto:boris.louis@kuleuven.be)



[ORCID](#)



[Google Scholar](#)



[LinkedIn](#)



[Bluesky](#)



[GitHub](#)



[YouTube](#)



## Boris Louis | Postdoctoral FWO fellow at KU Leuven | R&D | Chemist | Microscopist | AI-driven Image Analyst

### HIGHLIGHTS

- + **9+ years of experience** in research
- + Focused on **design advanced imaging, image analysis for material sciences**
- + **24+ (6 (co)-first, 1 (co)-corresponding) publications** including **Advanced Materials, ACS Nano** and **Nature communications** – **610+ citations**
- + **28 talks** in international conferences and workshops (**19 oral, 9 posters**) including US, Japan, Taiwan and Singapore.
- + **co-supervising 4 PhD students (1 graduated)**, Mentor of 3 Master students, **Promoter of 3 master students. Training of 15 + PhD and MSc students** on custom-built microscopes.
- + **13 awards and grants** obtained including PhD and Postdoc funding, Science and innovation award (KU Leuven) and Best PhD thesis in Microscopy method development (RBSM)
- + **(co)Leading 3 research lines** in Hofkens' lab
- + **3.5 years of internation mobility** including Sweden and Japan
- + **3 microscopes designed** and constructed which are currently fully booked. **+2 in building**
- + **10+ open-source software** available on my Github, for image processing, Machine Learning, Microscope control.
- + **500k+ views, 155k+ people reached, in 2025** on LinkedIn vulgarizing science, reached 2400+ followers

### PROFESSIONAL EXPERIENCE

- FWO Junior Postdoctoral fellow** | KU LEUVEN | Belgium | Oct 2023 – now
- **2 Month research stay in Hokkaido University** in Prof. Uji-i's lab.
- **2.5 Month research stay in Osaka University** in Prof. Ishihara's lab.
- **1 Month research stay in Tokyo Institute of Technology** in Prof. Martin Vacha's lab.
- **co-supervisor of 4 PhD student** (Jui-Kai Chen, Jagannath Satpathy, Qingqing Wang, Pushihan Wang)
- Mentoring of 1 PhD student (Steven Huysecom)

- **(co)-supervision of master students** (Mehak Sharma, Arne Verheyden, Lukas Paesen, Sayan Pal, Wout Van Tenderloo, Hannah Vandermaelen)

- **Leading 3 research lines at Hofkens lab:**

  - Colloidal nanoparticles, the future of data storage?

  - Functional images of optoelectronic devices

  - The primeval optical matter, optical binding outside the irradiation area

- Building of Optical trapping system, combination of optical tweezer on SEM, installation of a spatial light modulator.

**Postdoctoral Mandate** | KU LEUVEN | Belgium | Jan 2023 – Sep 2023

- Mentoring of 3 PhD student (Jui-Kai Chen, Jagannath Satpathy, Qingqing Wang)

- Building of Optical trapping system, combination of optical tweezer on SEM.

**Co-founder** | OODIMA | Belgium Dec 2021 – Mar 2024

- Lead Research and development

Developed cold-processed liquid soap based on oil that could grow in Belgium (Sunflower oil) and other cosmetic products (hydrating cream ...)

- Lead production

Managed stock, production line, and online orders

**Joint PhD candidate & researcher** | LUND UNIVERSITY & KU LEUVEN | Sweden & Belgium | Dec 2016 - Dec 2022

**Thesis title:** "Multi-dimensional imaging, a tool to unravel materials properties at the nanoscale"

- Built Multiplane microscope and related image analysis software

- Half time at Lund University and Half time in KU Leuven

- Supervision of master student (Sergey Abakumov)

- Courses on AI in Python, Computer Vision, Machine Learning and Neural Network, polymer physics, Optics and optical design

---

## EDUCATION

**DEC 2022 - PhD of science in chemistry with specialization in chemical physics - Lund university, Sweden**

Jointly with KU Leuven. Thesis title: "**Multi-dimensional imaging, a tool to unravel materials properties at the nanoscale**" with Prof. Ivan Scheblykin

**DEC 2022 –PhD of science in chemistry, KU Leuven, Belgium,**

Jointly with Lund University. With Prof. Johan Hofkens

**JUN 2016 –Master of Science in chemistry, Université de Liège, Belgium,**  
Summa cum laude

+ Master thesis performed in Prof. Hofkens Lab at KU Leuven on Stimulated emission depletion microscopy for optical DNA mapping.

+ 1 year Erasmus at Lund University including internship in Prof. Ivan Scheblykin lab

**JUN 2014 –Bachelor of science in chemistry, Université de Liège, Belgium,**  
Magna cum laude

I have currently a total of 25 papers (6 (co) first authors), 1 Co-corresponding published in international peer-reviewed journals, including Adv. Mat., Nat. Comm. and ACS Nano totalling over 570 citations.

**Peer reviewed:**

1. J. Satpathy *et al.*, *ACS Nano*, in press, doi:10.1021/acsnano.5c22002.
2. J. J.-K. Chen *et al.*, *Nanoscale Adv.*, in press, doi:10.1039/D5NA00926J.
3. J. J. Chen *et al.*, *Adv. Opt. Mater.*, e03071 (2025).
4. S. Zaman *et al.*, *Mater. Des.* **260**, 115044 (2025).
5. A. Gholivand *et al.*, *Phys. Fluids*. **37**, 112010 (2025).
6. Q. Q. Wang *et al.*, *Adv. Opt. Mater.*, e01021 (2025).
7. P.-H. Huang *et al.*, *Photochem. Photobiol. Sci.* **24**, 751–764 (2025).
8. S. Seth *et al.*, *Chem. Biomed. Imaging*, in press, doi:10.1021/cbmi.4c00113.
9. B. Louis *et al.*, *Adv. Mater.* **37**, 2413126 (2025).
10. C.-H. Huang *et al.*, *J. Phys. Chem. C*. **128**, 5731–5740 (2024).
11. B. Louis *et al.*, *ACS Nano*. **18**, 32746–32758 (2024).
12. B. Louis *et al.*, *ACS Nano*. **17**, 3797–3808 (2023).
13. T. Kudo *et al.*, *Chem. Sci.* **14**, 10087–10095 (2023).
14. C.-H. Huang *et al.*, *Nat. Commun.* **13**, 5325 (2022).
15. H. Yuan *et al.*, *Proc. Natl. Acad. Sci.* **120**, e2216934120 (2023).
16. G. Grześ *et al.*, *Int. J. Mol. Sci.* **23**, 5886–5886 (2022).
17. A. Acke *et al.*, *Nucleic Acids Res.* **50**, e100–e100 (2022).
18. M. Gerhard *et al.*, *Adv. Opt. Mater.* **9** (2021), doi:10.1002/adom.202001380.
19. R. Bresolí-Obach *et al.*, *ACS Photonics*. **8**, 1832–1839 (2021).
20. J. S. Lu *et al.*, *J. Phys. Chem. C* (2020), doi:10.1021/acs.jpcc.0c07735.
21. B. Louis *et al.*, *Opt. Express*. **28**, 28656–28656 (2020).
22. J. Vandaele *et al.*, *Soft Matter*. **16**, 4210–4219 (2020).
23. M. Gerhard *et al.*, *Nat. Commun.* **10** (2019), doi:10.1038/s41467-019-09640-w.
24. A. Merdasa *et al.*, *ACS Energy Lett.* **4**, 1370–1378 (2019).
25. B. Louis, S. Caubergh, P. O. Larsson, Y. Tian, I. G. Scheblykin, *Phys. Chem. Chem. Phys.* **20**, 1829–1837 (2018).

**Non-peer reviewed (yet)**

26. S. Huysecom *et al.*, M3Scope a 3D multimode multiplane microscope for imaging nanoscale dynamics in soft matter (2025), , doi:10.48550/arXiv.2511.10174.
27. S. Huysecom *et al.*, Quantitative Analysis of Cytoplasmic Viscosity in Colorectal Cancer Cells by Differential Dynamic Microscopy of Genetically Encoded Nanoparticles (2025), , doi:10.1101/2025.11.13.687967.
28. T. Behera *et al.*, Microscopic Intricacies of Self-Healing in Halide Perovskite-Charge Transport Layer Heterostructures (2025), , doi:10.48550/ARXIV.2510.11948.
29. L. Torella-Adriaensen *et al.*, Absorption force that rules them all: chemical control over optical trapping (2025), , doi:10.26434/chemrxiv-2025-4g3t1.
30. M. Bravo *et al.*, Beyond One-Size-Fits-All: Tumor Biology Influences Nanoparticle Behaviour in Cancer Models (2025), , doi:10.1101/2025.03.26.645442.
31. F. de Jong *et al.*, Three-dimensional Optical Reconstruction of colloidal electrokinetics via multiplane imaging (2025), , doi:10.48550/ARXIV.2503.23839.

**Invited (non-peer-reviewed):**

32. Boris Louis, From Noise to Function with Correlation Clustering imaging Mapping Functional Domains in Photovoltaic Devices, *Microscopy and Analysis*, Wiley, vol. 39 Issue 3 (2025)

## TALKS

**[conference talk]** – Dutch Biophysics – Veldhoven, Netherlands  
**[invited talk]** – SPIE optics + Photonics – San Diego, United States  
**[conference talk]** – ICP 2025 – Aachen, Germany  
**[invited talk]** – ISPN 2025 – Singapore  
**[invited talk]** – Prof. Jörg Enderlein – Göttingen University, Germany  
[Colloquium] - Taiwan  
**[conference talk]** – OPL 2024, Spain  
**[invited talk]** Prof. Ito laboratory – 26 July 2024 - Osaka University, Japan  
**[invited talk]** IQS, Barcelona – 23 July 2024, Spain  
**[conference talk]** PhotolUPAC 2024, Spain  
**[invited talk]** IMEC microfluidic meeting May 2024, Belgium  
**[invited talk]** IMEC partner week April 2024, Belgium  
**[invited talk]** prof. Martin Vacha's lab November 2023 – Tokyo Institute of Technology, Japan  
**[invited talk]** Prof. Omatsu's lab August 2023 Chiba University, Japan  
**[invited talk]** Prof. Hosokawa July 2023 Osaka prefecture University, Japan  
**[conference talk]** 31<sup>st</sup> International conference on Photochemistry (ICP 2023), Sapporo, Japan.  
**[Organization of talk]** Organization of a symposium on advanced optical microscopy for biology, physics and chemistry., December 2022 in Sweden.  
**[invited talk]** the 5<sup>th</sup> Australia-Belgium-Japan symposium on excitonic and cellular communication. 2022 online.  
[Poster] Method and applications in Fluorescence (MAF 2022), Sweden  
[Poster] Hole burning and single molecule spectroscopy related methods (HBSM), 2022, Germany  
[Poster] NanoLund annual meeting, Lund, 2021  
**[Oral Talk]** Winter school SOLA (Organic photovoltaic) February 2020, Sweden  
**[Oral talk]** Collective opto-fluidic dynamic of Nanoparticle (COODY-Nano) workshop November 2019, Japan  
[Poster] Symposium on Plasmonics and Nano-photonics (ISPN) November 2019, Japan  
**[Oral talk]** Collective opto-fluidic dynamic of Nanoparticle (COODY-Nano) workshop November 2019, Leuven, Belgium  
[Poster] Dutch Biophysics 2018, Netherland  
[Poster] Hole burning and single molecule spectroscopy related methods (HBSM), 2018, Russia  
[Poster] Belgian polymer group meeting (BPG) 2018, Belgium  
[Poster] Method and applications in Fluorescence (MAF 2017), Belgium  
[Poster] Swedish organic photovoltaicworkshop (SOLA 2017) Sweden

---

## AWARDS

• Seal of excellence – European commission – Horizon Europe MSCA  
• JSS Postdoctoral fellowship – Visiting Postdoc researcher – Japanese Society of Science – Hokkaido university – Uji's lab, 2026)

- Conference travel grant - Research Foundation - Flanders (FWO) – SPIE 2025 San Diego (USA)
- **Young researcher award** - ISPN 2025 (Singapour)
- **Science and Innovation Award** - Faculty of Science KU Leuven – top 3
- Travel grant - Research Foundation Flanders (FWO) - 2.5 months travel grant to Osaka University, Prof. Ishihara's lab –. 2024
- **Best PhD Thesis award** in Microscopy techniques development by the Royal Belgian Society of Microscopy (2024)
- **Junior FWO Postdoctoral fellowship** - Research Foundation Flanders (FWO) 3-year postdoctoral fellowship - 2023.
- **Postdoctoral mandate internal funds** (PDM), KU Leuven. 1-year grant within the framework of international mobility – 2023
- Conference travel grant - Research Foundation - Flanders (FWO) - for the international conference on photochemistry ICP 2023, Sapporo, Japan –. 2023
- **Best Poster award** - Method and application of fluorescence (MAF) conference, Goteborg, Sweden - 2022
- Travel grant – Research Foundation Flanders (FWO) – 6 months to Lund University 2021
- **FWO PhD fellowship** – Research Foundation Flanders (FWO). 4 years starting from 2018

---

#### MOBILITY

- **February-April 2026:** Research stay (2 months) in Osaka University (Japan) in Prof. Ishihara's group
- **July-September 2024:** Research stay (2.5 months) in Osaka University (Japan) in Prof. Ishihara's group
- **November-December 2023:** Short research stay (1 month) in Tokyo Institute of Technology (Japan) in Prof. Vacha's laboratory
- **September 2016 – December 2022:** In the framework of my double-degree PhD studies I have been travelling between KU Leuven and Lund University on a regular basis spending about 2.5-3 years in both places.
- **September – June (2015-2016):** Internship at KU Leuven (Erasmus Belgica) in which I realized my master's thesis on stimulated emission depletion microscopy for optical DNA mapping.
- **September – June (2014-2015):** Erasmus stay at Lund University during which I performed a research stay in Prof. Ivan Scheblykin's lab, the results were later published in Physical chemistry chemical physics journal (first author).

---

#### TEACHING AND SUPERVISION

- **Supervision of PhD student:** Jagannath Satpathy, Jui-Kai Chen, Qingqing Wang, Pushihan Wang Steven Huysecom. (**co-supervisor of the first 4**)
- **Supervision of master students:** Sergey Abakumov, Mehak Sharma, Arne Verheyden, Lukas Paesen, Sayan Pal, Wout Van Tenderloo, Hannah Vandermaelen
- **Teaching** optics courses and exercises (4h, every year (3))

- **Training** of 10+ master students, 5 PhD students and 2 postdocs on optical microscopes
- **Supervision** of bachelor student: Margaux Billen
- **Outreach:** Made and presented an activity for High school students at KU Leuven Info Day. **Social media vulgarization communication:** 500k+ views 155k+ people reached in 11 months

---

#### SOFTWARE

The software I developed for image processing in MATLAB are available on my [GitHub](#):

- I. **Segmentation:** A segmentation code for the analysis of fluorescently labelled porous polymer networks.(22)
- II. **3D image processing** A 3D analysis software for Multiplane data, including 3D particle tracking.(12, 13, 19, 21)
- III. **goldTracking** A Software for tracking particles that are very close to each other, assuming that their number is known. The related article is published in Nature Communications.(10, 11, 14)
- IV. **Colocalization** A colocalization software for epigenetic readers in expansion microscopy. The related article is published in Nucleic Acids Research. (17)
- V. **fiberRemodelling** An algorithm to quantify the remodeling of hydrogel upon cell activity (pulling, pushing the gel) as well as cell deformations.(15)
- VI. **CLIM** An algorithm to analyze intensity fluctuations (e.g. blinking) in high-density samples such as semiconductor films. (8, 9)
- VII. (in progress) Algorithm to map force field in 3D for optical trap and dielectrophoresis

---

#### OPTICS AND MICROSCOPY

- Building of three Microscopes (two more are in process)
- Development, maintenance, and responsible person for a multiplane microscope with an optical trap. This includes the development and alignment of the optics, the development and documentation of alignment and calibration procedures, the upgrade of the safety level required due to the class IV laser (10W, 1064nm laser) and the training of new users willing to use the optical system.
- Design & development of an optical trapping on an SEM microscope
- Design & development of a super-continuum microscope for optical trapping and single particle/molecule emission spectroscopy
- Installation of a Spatial Light Modulator
- CAD based design for 3D printing of mechanical components including sample holder
- Hardware synchronization for fast acquisition using 2 cameras
- Control of waveform generator using LabVIEW
- Design & development of optical Fourier filtering for phase-imaging in dark field

## REFERENCES

### **PROF. JOHAN HOFKENS**

Full professor at KU Leuven & Research fellow at Max Planck Institute

[Johan.hofkens@kuleuven.be](mailto:Johan.hofkens@kuleuven.be)

### **PROF. HIROSHI MASUHARA**

Prof. Emeritus at Osaka University & Prof. at NYCU (Taiwan)

[masuhara@masuhara.jp](mailto:masuhara@masuhara.jp)