

Michaël Lobet, Ph.D.

RESEARCH INTERESTS

My research interests combine **photonics, materials science, quantum** and **solid-state physics**. I work on nanoscale light-matter interactions in a broad sense: metamaterials, photonic crystals, plasmonics, non-linear optics, photovoltaics, electrodynamics of 2D and near-zero refractive index materials, molecular electronics and biophotonics.

I'm also investigating **active learning strategies** and the impact of **IA on education**.

RESEARCH EXPERIENCE

- Oct. 2022 -** **Research associate FNRS**, Département de Physique, NISM-IRDENA institutes, UNamur
Projects: Moiré photonic crystals, nanophotonics
- 2018 -** **Associate**, Harvard John A. Paulson School of Engineering and Applied Sciences, Harvard University
Faculty Advisor: Pr Eric Mazur
Projects: Zero-index metamaterials, twisted photonic crystals, nanophotonics
- 2020 - Sept. 2022** **Postdoctoral fellow in Physics**, Département de Physique, NISM institute, UNamur
Faculty Advisor: Pr Luc Henrard
Project: Plasmonics for electrochromism applications
- 2018-20** **Postdoctoral fellow in Physics**, Centre Spatial de Liège, ULg
Faculty Advisor: Dr Jérôme Loicq
Project: Photonics for solar cells
- 2017-18** **BAEF postdoctoral fellow**, Harvard John A. Paulson School of Engineering and Applied Sciences, Harvard University
Faculty Advisor: Pr Eric Mazur
Projects: Zero-index metamaterials, molecular electronics, perfect absorbers, nanophotonics

EDUCATION

- 2020-23** **Specialized master in university and higher education pedagogy**, UCLouvain
Thesis: "Pédagogies actives: perceptions des modes d'échecs, limites et perspectives par des innovateurs pédagogiques reconnus"
Advisors: Marc Romainville
- 2011-16** **Ph.D. in Physics**, University of Namur
Thesis: "Super absorbers: a metamaterial approach"

Advisors: Luc Henrard and Olivier Deparis

2009-11 **Master in Physics**, University of Namur

Thesis: "Etude de la rétrodiffusion de la lumière dans les systèmes nanocomposites stratifiés"

Advisors: Olivier Deparis and Cédric Vandenberghe

2006-09 **Bachelor in Physics**, University of Namur

PUBLICATIONS

I have published **29 articles** in ISI-rated journals with a high impact factor, **11 conference proceedings**, **2 book chapters**, and **2 articles in the magazine** of the Belgian Society of Physics. My **h-index is 17** with **701 citations** (Google Scholar, 28/12/2024).

I have presented my work in **39 oral presentations** (including 20 invited and 2 plenaries) at international/national conferences or workshops and **14 posters** at international/national conferences.

5 representative publications of my scientific work. The full list of scientific publications, conference proceedings, book chapters, and communications is available attached.

1. **M. Lobet**, N. Kinsey, I. Liberal, H. Caglayan, P. A. Huidobro, E. Galiffi, J. R. Mejía-Salazar, G. Palermo, Z. Jacob, N. Maccaferri, "New horizons in near-zero refractive index photonics and hyperbolic metamaterials." *ACS Photonics*, 10, 3805–3820 (2023).
2. H. Li, Z. Zhou, W. Sun, **M. Lobet**, N. Engheta, I. Liberal, Y. Li, "Direct Observation of Ideal Electromagnetic Fluids", *Nat. Com.* 13, 4747 (2022).
3. **M. Lobet**, I. Liberal, L. Vertchenko, A. Lavrinenko, N. Engheta, E. Mazur, "Momentum considerations inside near-zero index materials", *Light Science and Appl.* 11, 110(2022).
4. **M. Lobet**, I. Liberal, E. N. Knall, M. Zahirul Alam, O. Reshef, R. W. Boyd, N. Engheta, E. Mazur, "Fundamental Radiative Processes in Near-Zero-Index Media of Various Dimensionalities", *ACS Photonics*, 7 (8), 1965-1970 (2020).
5. I. Liberal, **M. Lobet**, Y. Li, N. Engheta, "Near-zero index media as electromagnetic ideal fluids", *Proceedings of the National Academy of Sciences*, 117 (39) 24050-24054 (2020).

TEACHING EXPERIENCE

Lecturer (Spring 2017 – present)

Responsibilities included lecturing, supervising lab activities and tutoring (exercises) with teaching assistants, meeting with students individually, designing and grading all assignments.

I have been teaching to a large variety of students (physicists, med, veterinary, chemists, biologists), from 1st bachelor to 2nd master, including small groups (~ 10 students) to big groups (more than 400 students).

- University of Namur (spring 2017, fall 2019, 2020-24)
 - Quantum Mechanics (2nd bachelor physics)
 - Optics (1st bachelor veterinary and biology)
 - Theoretical and numerical photonics (1st master physics)
 - Mechanics and wave phenomena for life sciences (1st bachelor geology, geography, veterinary and biology)
 - Plasmonics and applications (1st master physics)
 - Nanomaterials and applications of Solid-State physics (1st master physics)

- Mathematical physics (2nd bachelor physics)
- Complement of classical and quantum physics (2nd bachelor chemistry)
- Chemistry and physics for life science (1st bachelor veterinary)
- Scientific communication (1st master physics)
- Service learning in physics (1st master physics)
- University St Louis Brussels (2021-2022)
 - Conceptual physics with technical applications (2st bachelor business engineering, bachelor fully in English)
 - Electronic circuits, systems and data processing (2st bachelor business engineering, bachelor fully in English)
- Ecole industrielle et commerciale de la Ville de Namur (2016-17)
 - Applied physics: Cinematics, Optics, Fluid Mechanics (2st bachelor chemistry, social advancement program)

Teaching Assistant (Fall 2011-Summer 2017)

Responsibilities included peer instruction and flipped classroom method, leading class discussions, lab activities, tutoring, and designing and grading all assignments.

- Harvard University, Cambridge, MA
 - Applied Physics: Electricity, magnetism and electromagnetism (2nd year students, sciences and engineering)
- University of Namur, Physics Department
 - Medical Physics (1st bachelor Medicine)
 - General Physics (Mechanics, Electricity, Optics) (1st bachelor geology, geography, biology, veterinary).
 - Scientific Communication (1st master physics).
 - Quantum Mechanics (2nd and 3rd bachelor physics).
 - Systems of Quantum Particles (1st master physics)
 - Simulation in Optics (2nd master physics).
 - Physics of Nanostructured Systems (1st master physics).
 - Initiation to Scientific Research (3rd bachelor physics)
 - Remediation (Operation “Tremplin”) (1st bachelor science and medicine).

Mentoring & outreach activities (Fall 2015-Present)

Over the years, both at Harvard University and UNamur, I **mentored 19 students**: 1 finished PhD thesis (L. Konig, co-supervision with ULg), 3 current PhD students (A. Debacq, A. Padhy, L. Viseur), 5 master thesis (B. Majerus, N. De Moor, R. Ngankam, A. Debacq, M. Soumoy), 5 master research projects (A. Debacq, M. Soumoy, T. Laboureur, T. Nivaille, H. Lemineur), 2 student internships (S. Adams, N. Muller) and mentored 6 PhD students. It resulted in multiple peer-reviewed publications and B. Majerus was awarded the prize of the Belgian Physical Society for “*one of the best three Physics Master’s theses of Belgium*” and A. Debacq received the prize of the Belgian Physical Society for *the best poster* of 2024 annual conference. My current team comprises of 3 master students and 3 PhD students.

During the past few years, I have participated actively in outreach activities (e.g. “Printemps des Sciences” at UNamur or [TEDx](#)). Several times I have also represented the Physics’ department of UNamur in different schools (Ste Marie Namur, Champion, Bastogne...) or in salon education (SIEP).

FELLOWSHIPS & PRIZES (chronological order)

Fellowships

- BAEF post-doctoral Fellowship 2018 (45k\$, To go to Harvard University,US)
- ERASMUS Fellowship 2010 (To go to KTH Stockholm, Sweden)

Prizes

- Applied Sciences 2021 Travel Award in Nanotechnology and Applied Nanosciences
- Young Speaker award of the Belgian Physical Society, 2017 (1st prize)
- Prize Georges Vanderlinden of the Royal Academies for Science and the Arts of Belgium (Quadrennial prize 2013-2016)
- Belgian Physical Society prize for one of the best three Physics Master's theses, 2012
- Best poster prize discerned by the Quantum Electronics and Photonics division of the Institute of Physics (UK) at the conference Photon12 (Durham)

Grants (chronological order)

- "Physix, L'énergie", subvention à des médias, Fonds Wernaers, 2024, 14k€.
- GenAI4Students, PUNCH -UNamur, 30 k€, 2024-2025.
- MOONSHINE: Moiré phOtONic platformS for enHanced light-matter iNtEractions, Fonds National de la Recherche Scientifique (FNRS), PDR Funding period: 01/2024-12/2027, Budget: 483 k€
- LAZIM: Lasers dans des milieux à faible indice de réfraction
Fonds National de la Recherche Scientifique (FNRS), PhD student (A. Debacq) Funding period: 10/2023-09/2027, Budget: 200 k€
- FSR (Fond Spécial de Recherche) UNamur « *Effet du traitement thermique sur les propriétés optiques des verres composés de multicouches métaux-diélectriques* », en collaboration avec AGC (2021-2022, 2x21.5k€)
- Collaboration WBI-Chine 2021-2024 (15k€)
- Excellence grant WBI. World 2018 (Declined)

PROFESSIONAL SERVICE

Conference organization

- Founding member of bePOM, the Belgian Photonic Online Meetup (<https://www.bepom.org/>, 2020-2023, 4 editions)

Committee Work

- Board member, Faculty of Science, University of Namur (October 2016- August 2017)
- Teaching board member, Department of Physics, University of Namur (May 2015- August 2017)
- Board member, Department of Physics, University of Namur (September 2011- August 2017, September 2019 - present)
- Young Minds ULg, member, University of Liège (July 2019 – present)

Political and Leadership Activities

- City councilor, Eghezée (December 2012 – August 2017 and December 2018-December 2019)
- Member of general assembly, NGO "Le Patro" (June 2020 – present)

Founding member and treasurer, NGO "Salle du 15 août" (August 2012 – present)
Board member, NGO "Centre Sportif d'Eghezée" (June 2013 – August 2017)
President of a local youth political movement (December 2013 – present)
Vice-president of a provincial youth political movement (December 2014 – August 2017)
Board member and treasurer, NGO "Jeunes MR" (February 2016 – February 2018)
Children/teen animator and formator, NGO "Le Patro" (September 2005 – August 2013)