

Eli Slenders

Curriculum Vitae



Profile

Eli Slenders holds a master's degree in physics from KU Leuven (Belgium) and a PhD in physics from Hasselt University (Belgium). He did a post-doc and a Marie Skłodowska-Curie Actions fellowship at the Italian Institute of Technology in Genoa, Italy, where he is currently employed as a researcher. His areas of expertise include optical imaging (image scanning microscopy, multiphoton microscopy, single-molecule imaging) and image processing, biophysics, and computational physics. Eli's current work focuses on single-molecule imaging with fast array detectors.

Employment

- 2023- **Researcher (current position)**, ITALIAN INSTITUTE OF TECHNOLOGY, Genoa, Italy.
Single molecule imaging with SPAD array detection, under supervision of Dr. G. Vicidomini (since March 1st, current position)
- 2021-2023 **MSCA IF research fellow**, ITALIAN INSTITUTE OF TECHNOLOGY, Genoa, Italy.
Single molecule imaging with SPAD array detection, under supervision of Dr. G. Vicidomini, grant agreement ID: 890923 (March 1st 2021 – February 28th 2023)
- 2019-2021 **Postdoctoral researcher**, ITALIAN INSTITUTE OF TECHNOLOGY, Genoa, Italy.
Fluorescence correlation spectroscopy with SPAD array detection, under supervision of Dr. G. Vicidomini (January 1st 2019 – February 28th 2021)
- 2018 **Researcher**, HASSELT UNIVERSITY, Belgium.
Advanced coherent and incoherent optical microscopy, under supervision of Prof. Dr. M. Ameloot (March 1st – December 31st)
- 2017 **PhD student internship**, ITALIAN INSTITUTE OF TECHNOLOGY, Genoa, Italy.
Ten-week internship (June 5th – August 11th) on Resolution Enhancement in Two-Photon Fluorescence Microscopy by using Image Scanning Technology with Pixel Reassignment, under supervision of Dr. G. Vicidomini
- 2014 – 2018 **PhD student**, HASSELT UNIVERSITY, Belgium.
Thesis subject: Resolution in Coherent and Incoherent Optical Imaging with Two-Photon Excitation Microscopy, under supervision of Prof. Dr. M. Ameloot (March 1st, 2014 – February 28th, 2018)
- 2013 – 2014 **Researcher**, KU LEUVEN, Belgium.
Thermal characterization of phase transitions in lipids, DNA and proteins, under supervision of Prof. Dr. C. Glorieux (October 1st, 2013 – February 28th, 2014)

Education

- 2018 **Machine Learning MOOC**, STANFORD UNIVERSITY (VIA COURSEREA), USA.
- 2017 **Certified teacher**, CVO LIMLO, Diepenbeek, Belgium.
- 2013 **Master of Science, Soft Matter Physics, magna cum laude**, KU LEUVEN, Belgium.
Thesis subject: Thermal characterization of nanofluids.
- 2012 **Summer School Modern Computational Science**, CARL VON OSSIETZKY UNIVERSITÄT, Oldenburg, Germany, August 2012.
- 2011 **Bachelor of Science, Physics, cum laude**, HASSELT UNIVERSITY, Belgium.
Thesis subject: Fabrication of a surface acoustic wave device using photolithography.

Bursaries and awards

- 2022 **Selected for the Falling Walls Lab MSCA competition.**
Science communication contest organized by Falling Walls during the MSCA Conference in Paris organised under the French EU-Council Presidency. Fifteen MSCA grantees were selected to pitch their research.
- 2020, 2021 **FameLab Italy, region Liguria.**
Science communication contest organized by Psiquadro.
Third place at the 2020 edition (Video at <https://www.youtube.com/watch?v=mDavPS6tzE8>.) and third place at the 2021 edition (Video at <https://www.youtube.com/watch?v=Y3Rm84qCXog&t=2370s>.)
- 2020 **Winner of a Marie Skłodowska-Curie Actions (MSCA) Individual Fellowship research grant from the European Union.**
Title: Single-molecule imaging with SPAD array detection. Grant agreement ID: 890923.
- 2019 **Laureate of the RBSM PhD thesis award in the category *Instrumentation and Methods*.**
Organized by the Royal Belgian Society for Microscopy (RBSM). Thesis based on 3 first author publications and 1 shared first author manuscript, see *Scientific output*. Prize: presenting thesis work at the annual RBSM meeting, September 9th, Louvain-la-Neuve, and a cash prize of 1000 EUR.
- 2018 **Laureate of the FWO Science Communication contest.**
Organized by Fonds voor Wetenschappelijk Onderzoek (FWO).
Video at <https://www.youtube.com/watch?v=KPYkyq9sc-I>. Prize: travel grant to the EuroScience Open Forum Conference in Toulouse, France, from July 9th 2018 to July 13th, 2018.
- 2017 **Travel grant from FWO (Fonds voor Wetenschappelijk Onderzoek) for a long research stay abroad.**
Internship at the Italian Institute of Technology in Genova, Italy, from June 3rd, 2017 to August 13th, 2017.
- 2012 **Travel Grant provided by the Deutscher Akademischer Austauschdienst (DAAD) to attend the 4th International Summer School Modern Computational Science - Optimization.**
University of Oldenburg, Germany, from August 19th, 2012 to August 31st, 2012.

Scientific output

* = shared first author

- 2023 Perego E., Zappone S., Castagnetti F., Mariani D., Vitiello E., Rupert J., Zacco E., Tartaglia G., Bozzoni I., **Slenders E.**, and Vicidomini G. *Single-photon microscopy to study biomolecular condensates*, Nat. Comm., **14**, 2023.
- Zunino A.*, **Slenders E.***, Fersini F., Bucci A., Donati M., and Vicidomini G. *Open-source tools enable accessible and advanced image scanning microscopy data analysis*, Nat. Photonics, **17**, 2023. (correspondence, not peer-reviewed)
- Slenders E.**, and Vicidomini G. *ISM-FLUX: MINFLUX with an array detector*, Phys. Rev. Research, **5**, 2023.
- Sheppard C. J. R., Castello M., Tortarolo G., Zunino A., **Slenders E.**, Bianchini P., Vicidomini G., and Diaspro A. *Background Rejection in Two-Photon Fluorescence Image Scanning Microscopy*, Photonics, **10 (5)**, 2023.
- 2022 Rossetta A.*, **Slenders E.***, Donato M.*, Perego E., Diotalevi F., Lanzaó L., Koho S., Tortarolo G., Crepaldi M., Vicidomini G. *The BrightEyes-TTM: an Open-Source Time-Tagging Module for Single-Photon Microscopy*, Nature Communications, **13**, 2022.
- Sheppard C. J. R., Castello M., Tortarolo G., Zunino A., **Slenders E.**, Bianchini P., Vicidomini G., and Diaspro A. *Signal strength and integrated intensity in confocal and image scanning microscopy*, Optical Society of America A, **40 (1)**, 2022.
- 2021 **Slenders E.***, Perego E.*, Buttafava M., Tortarolo G., Conca E., Zappone S., Pierzynska-Mach A., Villa F., Petrini E. M., Barberis A., Tosi A., Vicidomini G. *Cooled SPAD array detector for low light-dose fluorescence laser scanning microscopy*, Biophysical Reports, 2021.
- Slenders E.**, Castello M., Buttafava M., Villa F., Tosi A., Lanzaó L., Koho S. V., Vicidomini G. *New detector for biomolecule dynamics studies*, Imaging & Microscopy, **3**, 2021. (invited, not peer-reviewed)
- Slenders E.**, Castello M., Buttafava M., Villa F., Tosi A., Lanzaó L., Koho S., Vicidomini G. *Confocal-based Fluorescence Fluctuation Spectroscopy with a SPAD Array Detector*, Light, science & applications, 2021.
- 2020 Koho S.*, **Slenders E.***, Tortarolo G., Castello M., Buttafava M., Villa F., Tcarenkova E., Ameloot M., Bianchini P., Sheppard C.J.R., Diaspro A., Tosi A., Vicidomini G. *Two-photon image-scanning microscopy with SPAD array and blind image reconstruction*, Biomedical Optics Express, **11 (6)**, 2020.
- Witters K., Plusquin M., **Slenders E.** Aslam I., Ameloot M., Roefsaers M. B. J., Vangronsveld J., Nawrot T. S., Bové, H. *Monitoring indoor exposure to combustion-derived particles using plants*, Environmental Pollution, **266 (1)**, 2020.
- Sheppard C. J. R., Castello M., Tortarolo G., **Slenders E.**, Deguchi T., Koho S., Vicidomini G., Diaspro A. *Image scanning microscopy with multiphoton excitation or Bessel beam illumination*, Journal of the Optical Society of America A, **37 (10)**, 2020.

- 2019 Bové, H., Bongaerts E., **Slenders E.**, Bijmens E. M., Saenen N. D., Gyselaers W., Van Eyken P., Plusquin M., Roeffaers M. B. J., Ameloot M., Nawrot T. S. *Ambient black carbon particles reach the fetal side of human placenta*, Nature Communications, **10 (3866)**, 2019.
- 2018 **Slenders E.** *Resolution in coherent and incoherent optical imaging with two-photon excitation microscopy*, PhD thesis, Hasselt University, 2018.
- Bové, H., Devoght, J., Rasking, L., Peters, M., **Slenders E.**, Roeffaers, M., Jorge-Penas, A., Van Oosterwyck, H., Ameloot, M. *Combustion-derived particles inhibit in vitro human lung fibroblast-mediated matrix remodeling*, Journal of Nanobiotechnology, **16**, 2018.
- Slenders E.**, Bové H., Urbain M., Mugnier Y., Sonay A. Y., Pantazis P., Bonacina L., Vanden Berghe P., vandeVen M., Ameloot M. *Image correlation spectroscopy with second harmonic generating nanoparticles in suspension and in cells*, The Journal of Physical Chemistry Letters, **9**, 2018.
- Collins J. T., Zheng X., Braz N. V. S., **Slenders E.**, Zu S., Vandenbosch G. A. E., Moshchalkov V. V., Fang Z., Ameloot M., Warburton P. A., Valev V. K. *Enantiomorphing chiral plasmonic nanostructures: a counterintuitive sign reversal of the nonlinear circular dichroism*, Advanced Optical Materials, **2018**, 2018.
- Slenders E.**, Seneca S., Pramanik S. K., Smisdom N., Adriaensens P., vandeVen M., Ethirajan A., Ameloot M. *Dynamics of the phospholipid shell of microbubbles: a fluorescence photoselection and spectral phasor approach*, Chemical Communications, **54 (38)**, 2018.
- 2017 Coninx L., Thoonen A., **Slenders E.**, Morin E., Arnauts N., De Beeck M. O., Kohler A., Ruytinx J., Colpaert J. V., Seneca S., Pramanik S. K., Smisdom N., Adriaensens P., vandeVen M., Ethirajan A., Ameloot M. *The SIZRT1 gene encodes a plasma membrane-located ZIP (Zrt-, Irt-like protein) transporter in the ectomycorrhizal fungus suillus luteus*, Frontiers in Microbiology, **8**, 2017.
- 2016 Donders R., Sanen K., Paesen R., **Slenders E.**, Gyselaers W., Stinissen P., Ameloot M., Hellings N. *Label-free imaging of umbilical cord tissue morphology and explant-derived cells*, Stem Cells International, **2016**, 2016.
- Bové H., Steuwe C., Fron E., **Slenders E.**, D'Haen J., Fujita Y., Uji-i H., vandeVen M., Roeffaers M., Ameloot M. *Biocompatible label-free detection of carbon black particles by femtosecond pulsed laser microscopy*, Nano Letters, **16 (5)**, 2016.
- 2015 **Slenders E.**, vandeVen M., Hooyberghs J., Ameloot M. *Coherent intensity fluctuation model for autocorrelation imaging spectroscopy with higher harmonic generating point scatterers - a comprehensive theoretical study*, Physical Chemistry Chemical Physics, **17**, 2015.
- Losada-Perez P., Mertens N., de Medio-Vasconcelos B., **Slenders E.**, Leys J., Peeters M., van Grinsven B., Gruber J., Glorieux C., Pfeiffer H., Wagner P., Thoen J. *Phase transitions of binary lipid mixtures: a combined study by adiabatic scanning calorimetry and quartz crystal microbalance with dissipation monitoring*, Advances in Condensed Matter Physics, **2015**, 2015.

Kouyate M., Flores-Cuautle J. J. A., **Slenders E.**, Sermeus J., Verstraeten B., Ramirez B. M. L. G., Martinez E. S. M., Kubicar L., Vretenar V., Hudec J., Glorieux C. *Study of thermophysical properties of silver nanofluids by ISS-HD, hot ball and IPPE techniques*, *International Journal of Thermophysics*, **36 (10-11)**, 2015.

2014 Leys J., Losada-Perez P., **Slenders E.**, Glorieux C., Thoen J. *Investigation of the melting behavior of the reference materials biphenyl and phenyl salicylate by a new type adiabatic scanning calorimeter*, *Thermochimica Acta*, **582**, 2014.

Organization of international conferences and workshops

NIC@IIT Lecturer at the 2021 and 2022 editions of the Nikon Imaging Center workshops at the Italian Institute of Technology (Italy).

μ FiBR 2014 Co-organizer of the 2014 edition of the MicroFluorimetry in Biomedical Research (μ FiBR) symposium on October 3rd at Hasselt University (Belgium).

Oral presentations

2023 Single-molecule image scanning microscopy, *CLEO Europe*, June 28th, 2023.

The Bright-Eyes TTM: A time-tagging module to democratize single-photon microscopy, *LIBRE hub (online)*, invited talk, June 7th, 2023.

Single-molecule image scanning microscopy, *Indian Institute of Science (online)*, invited talk, April 27th, 2023.

2022 Pushing the resolution limit with ISM-FLUX, *Euro-Biomaging, virtual pub* (invited talk), October 7th, 2022.

Time-resolved single-molecule imaging with structured illumination and minimal fluorescence emission, *Focus on Microscopy*, Online conference, April 13th, 2022.

2021 Fluorescence lifetime fluctuation spectroscopy with a SPAD array detector, *26th International Workshop on Single Molecule Spectroscopy and Super-resolution Microscopy*, Berlin, Germany, October 1st, 2021.

Confocal-based fluorescence fluctuation spectroscopy with a SPAD array detector, *Focus on Microscopy*, Online conference, March 28th, 2021.

2019 Resolution in coherent and incoherent optical imaging with two-photon excitation microscopy, *RBSM annual meeting*, Louvain-la-Neuve, Belgium, September 9th, 2019.

2018 Image scanning microscopy - juggling with pixels for lateral resolution enhancement, *NanoMacro Microscopy Workshop*, Diepenbeek, Belgium, September 6th, 2018.

Characterization of the phospholipid shell of microbubbles using fluorescence microscopy, *Belgian Physical Society Conference*, Antwerp, Belgium, April 11th, 2018.

2015 Coherent intensity fluctuation model for autocorrelation imaging spectroscopy with higher harmonic generating nanoparticles, *Annual Scientific Meeting IAP*, Hasselt, Belgium, September 11th, 2015.

Teaching experience

- 2023 Lecturer of the UniGe PhD course *Optics for Microscopy and Spectroscopy*, (12 hours), together with dr. A. Zunino, April-May 2023.
- 2019-2021 Various teaching sessions for PhD students and postdocs in IIT, such as *Fluorescence Fluctuation Spectroscopy with a SPAD array detector* (May 2nd, 2019) and the Journal club *Paper Pals* on MINFLUX (July 8th, 2021).
- 2014-2018 As part of the minimal requirements to obtain a PhD degree imposed by the doctoral school of Sciences and Technology, I was involved as a teaching assistant in several courses between 2014 and 2018:
- Biophysics - bachelor program Biomedical Sciences (2014, 2015, 2016, 2017)
 - Focus on Life - bachelor program Biomedical Sciences (2014, 2015)
 - Tutorial confocal microscopy - bachelor program Biomedical Sciences (2014, 2015, 2016, 2017)
 - Cell biology - bachelor program Biomedical Sciences (2016, 2017, 2018)
 - Lab sessions Electromagnetism - bachelor program Physics (2015, 2016, 2017)

Since 2017, I hold an official teachers degree from CVO LimLO, Diepenbeek, Belgium (60 ECTS), which allows me to teach scientific courses to students in high schools (age 12-18).

Supervision experience

- Sanket Patil - *Single-molecule imaging with a SPAD array detector*, PhD, 2022-2024.
- Sebastian Acuña - *Building a confocal laser scanning microscope with a SPAD array detector*, internship project, 2019.
- Tom Goyens - *Using structured illumination in laser scanning microscopy for enhanced lateral resolution*, bachelor thesis Physics, 2016.
- Richeek Dey - *Analysis of SHG correlation spectroscopy and Laurdan fluorescence microscopy*, master program Biomedical Sciences, 2015.
- Sigurd Mertens - *Using structured illumination in second harmonic generating microscopy for enhanced lateral resolution*, bachelor thesis Physics, 2015.
- Ardit Zaçlli and Richeek Dey - *Characterization of second harmonic generation signal and the cytotoxicity of BaTiO₃ nanoparticles*, master program Biomedical Sciences, 2014.

IT knowledge

Operating systems	Windows, basic knowledge of Ubuntu, Linux
Business communication	Microsoft Teams
Office	Microsoft Office (Word, Excel, PowerPoint), LibreOffice (Writer, Calc, Draw), L ^A T _E X

Programming Python, LabVIEW, LabVIEW FPGA, Matlab/Octave, PHP, C, Java, MySQL, Arduino IDE
Mathematics Maple, Origin
Web HTML, CSS
Version control Git, Subversion
Design Adobe Illustrator, Adobe Photoshop/Gimp, Adobe Premiere Pro, Inkscape

Personal information

First name Eli
Last name Slenders
Date of birth [REDACTED]
Nationality [REDACTED]
Languages Dutch (mother tongue), English (professional working proficiency), Italian (basic proficiency), French (basic proficiency)

Interests

Hiking, roller skating
Guitar
Science communication, tutoring mathematics and physics
Language learning, reading