

SCHANNE-KLEIN Marie-Claire

Research director at CNRS (Physics)

60 year old

Positions

- 2026-present: director of the **Laboratory for Optics and Biosciences**, Ecole Polytechnique - CNRS - Inserm – Institut Polytechnique de Paris, 91 128 Palaiseau, France.
- 2001-present: Junior scientist then senior scientist at the **Laboratory for Optics and Biosciences**, **PI of the group "Second Harmonic Generation in Biological Tissues"** in the "Advanced microscopies & tissue physiology" team
- 1991-2001: Junior scientist at the Laboratory for Quantum Optics, Ecole Polytechnique - CNRS

Education

- 2003: Habilitation, Paris-Saclay University, France
- 1989-1992: PhD, Ecole Polytechnique, France
- 1988-1989: Master of Science "Lasers and Matter", Paris-Saclay University, France
- 1985-1988: Ecole Polytechnique (best French engineering school)

Teaching activities and student supervision

- Before 2014 and after 2021: \approx 15 h/y of physics teaching for master's students (Lasers, nonlinear optics)
- 2014-2021 : \approx 77 h/y of teaching in the physics department of Ecole Polytechnique for master's students and 3rd year engineering students (Laser physics, nonlinear optics, biophotonics)
- 2021-present: Design of a new course about Advanced Microscopies for master's students
- 2019-present: Head of the graduate school physics committee, Institut Polytechnique de Paris, France
- Supervision of 7 postdoctoral fellows, 14 PhD students (including 6 co-supervision), 32 interns
- Participation to 46 PhD defence committees (4 abroad) and 5 Habilitation committees

Synergetic activities

- Regular participation in university recruitment committees and evaluation committees
- 2003-2007: French National University Council [optical section/30° section CNU]
- 2012-2016: CoNRS scientific committees in lasers/optics [Section 04] and physics-biology interface [CID54] => evaluation, recruitment of \approx 40 junior scientists and promotion of \approx 40 senior scientists at CNRS
- 2007, 2009, 2012, 2014, 2016, 2018: Scientific Committee of OPT-DIAG Conference (Paris)
- 2008-present: Scientific Committee of "Photonique", the journal of the French optical society (SFO)
- 2017-present: member of SFO (French optical society) executive board
- 2017-2019: member of Scientific Reports Editorial Board
- 2019-2020: jury of the French Physicist's Tournament (French national selection for the International Physicist's tournament: "physics fights" for bachelor and master students)
- 2019, 2021: program chair (2019) then chair (2021) of the OSA conference "Optics in the Life Sciences: Novel Techniques in Microscopy"
- 2019-present: Scientific Board of "Institute Marseille Imaging", Marseille, France
- 2020-2023: scientific committee of biophotonics sessions of SFP 2020, SFO 2021, 2022, 2024 conferences

Grants and awards

- Grants : 22 academic grants (14 as PI and 8 as co-PI); 7 industrial partnerships, mainly with L'Oréal Advanced Research
- 4 patents, 3 of which have been extended internationally

- 2019: Silver medal from CNRS
- 2021: Research prize of French Eye Bank

Publications

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Web Of Science: 162 publications; 5761 citations; h=39 - Google scholar: 8617 citations, h=42
61 invited talks at conferences and invited seminars - 6 Book chapters

Selected publications

A. I. Ekimov[#], F. Hache, **M.-C. Schanne-Klein**, D. Ricard, C. Flytzanis, I. A. Kudryavtsev, T. V. Yaveza, A. V. Rodina and A. L. Efros, *Absorption and intensity-dependent photoluminescent measurements on CdSe quantum dots: assignment of the first electronic transitions.*

J. Opt. Soc. Am. B **10**, 100-106 (1993) <https://doi.org/10.1364/JOSAB.10.000100>

[#] 2023 Nobel Prize in Chemistry

A.-M. Pena, T. Boulesteix, T. Dartigalongue and **M.-C. Schanne-Klein**, *Chiroptical effects in the second harmonic signal of collagens I and IV*

J. Am. Chem. Soc. **127**, 10314-10322 (2005)

D. Débarre, W. Suppato, A. M. Pena, A. Fabre, T. Tordjmann, L. Combettes, **M. C. Schanne-Klein** and E. Beaufrepère, *Imaging lipid bodies in cells and tissues using third-harmonic generation microscopy*
Nat. Methods **3**, 47 - 53 (2006) - doi: 10.1038/nmeth813

M. Strupler, A.-M. Pena, M. Hernest, P.-L. Tharaux, J.-L. Martin, E. Beaufrepère and **M.-C. Schanne-Klein**, *Second harmonic imaging and scoring of collagen in fibrotic tissues*
Opt. Express **15**, 4054-4065 (2007)

A. Deniset-Besseau, J. Duboisset, E. Benichou, F. Hache, P.-F. Brevet, **M.-C. Schanne-Klein**, *Measurement of the Second-Order Hyperpolarizability of the Collagen Triple Helix and Determination of its Physical Origin*
J. Phys. Chem. B **113**, 13437-13445 (2009)

Gusachenko, I., Y. Goulam Houssen, V. Tran, J.-M. Allain, and **M.-C. Schanne-Klein**, *Polarization-resolved second-harmonic microscopy in tendon upon mechanical stretching*
Biophys. J. **102**, 2220-2229 (2012). <https://doi.org/10.1016/j.bpj.2012.03.068>

S. Bancelin, C. Aimé, I. Gusachenko, L. Kowalczyk, G. Latour, T. Coradin, and **M.-C. Schanne-Klein**, *Determination of collagen fibril size via absolute measurements of second-harmonic generation signals*
Nat. Commun. **5**, art. 4920 (2014) - DOI 10.1038/ncomms5920

S. Bancelin, B. Lynch, C. Bonod-Bidaud, G. Ducourthial, S. Psilodimitrakopoulos, P. Dokladal, J.-M. Allain, **M.-C. Schanne-Klein***, and F. Ruggiero*, *Ex vivo multiscale quantitation of skin biomechanics in wild-type and genetically-modified mice using multiphoton microscopy*
Sci. Rep. **5**, 17635 (2015).

M. Schmeltz, C. Teulon, M. Pinsard, U. Hansen, M. Alnawaiseh, D. Ghoubay, V. Borderie, G. Mosser, C. Aimé, F. Légaré, G. Latour, **M.-C. Schanne-Klein**, *Circular Dichroism-SHG microscopy probes the polarity distribution of collagen fibrils*
Optica **7**, 1469-1476 (2020) <10.1364/OPTICA.399246>

M. Schmeltz, L. Robinet, S. Heu-Thao, J.-M. Sintès, C. Teulon, G. Ducourthial, P. Mahou, **M.-C. Schanne-Klein**, G. Latour, *Noninvasive quantitative assessment of collagen degradation in parchments by polarization-resolved SHG microscopy*
Sciences Advances **7**, eabg1090 (2021). 10.1126/sciadv.abg1090C.

Raoux, A. Chessel, P. Mahou, G. Latour, and **M.-C. Schanne-Klein**, *Unveiling the lamellar structure of the human cornea over its full thickness using polarization-resolved SHG microscopy*
Light: Science and Applications **12**, 190 (2023). 10.1038/s41377-023-01224-0

B. Asadipour, E. Beaufrepère, X. Zhang, A. Chessel, P. Mahou, W. Suppato, **M.-C. Schanne-Klein**, and C. Stringari, *Modelling and predicting second harmonic generation from protein molecular structure*
Phys. Rev. X **14**, 011038 (2024). 10.1103/PhysRevX.14.011038