Kostas Kanellopulos, Ph.D.

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Kostas Kanellopulos
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Kostas Kanellopulos
Citizenship: Italy
Date of birth: 01.01.1993

Education

2020 – 2025 **Ph.D. Technical Sciences, Technische Universität Wien (TUW)** in nanoelectromechanical sensing for single-molecule and particle microscopy and spectroscopy. Characterization of materials for nanophotonics.

2017 – 2019 **M.Sc. Nanotechnologies for ICTs, Polytechnic University of Turin (PoliTO)** in Nanotechnology for Information Technology and Sensing.
Thesis title: *Spiral plasmonic lens for new generation photoemitters*.

2012 – 2017 **B.Sc. Physical Engineering, Polytechnic University of Turin (PoliTO)** in Physical Engineering.

Professional and Academic Experience

2025 – present **Postdoctoral researcher** at Technische Universität Wien, Vienna, Austria.

- Nanomechanical Photothermal sensing for single-molecule spectroscopy.

2020 – 2025 **Ph.D. candidate** at Technische Universität Wien, Vienna, Austria.

- Fabrication, characterization, and modeling of nanoelectromechanical systems (NEMS). NEMS sensing measurements for single-molecule and particle microscopy and spectroscopy, and material characterization for nanophotonics.
- B.Sc. and M.Sc. students supervision.
- Organized lab experiments with a Macro-NEMS model for teaching students.

2019 – 7 months **Visiting Graduate Research Fellow** at Molecular Foundry and Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, USA.

- Design, nanofabrication, and characterization of next-generation photoemitters for Ultrafast Electron Diffraction and Microscopy (UEDM).

2017 – 4 months **CMMS Stage** at SER Wax Industry, Santena, Italy.

- Digitization of Maintenance Plans through a Computerized Maintenance Management System (CMMS) software (CARL Software).

Research Interests

- The physics and applications of nanoelectromechanical systems (NEMS) for ultrasensitive sensing, including mechanical resonators engineered for molecular microscopy and spectroscopy, and for low-loss material characterization for nanophotonics and nanomechanics.

Synergistic Activities

- Reviewer for Nano Letters, ACS Photonics, Scientific Reports

Research Publications

Journal Articles

1. P. Martini, **K. Kanellopulos**, and S. Schmid, "Design optimization of silicon nitride nanomechanical resonators for thermal infrared detectors: A guide through key figures of merit," *arXiv*, 2025. DOI: https://doi.org/10.48550/arXiv.2510.14758.
2. **K. Kanellopulos**, F. Ladinig, S. Emminger, P. Martini, R. G. West, and S. Schmid, "Comparative analysis of nanomechanical resonators: Sensitivity, response time, and practical considerations in photothermal sensing," *Microsystems & Nanoengineering*, vol. 11, no. 28, 2025. DOI: https://doi.org/10.1038/s41378-025-00879-6.
3. **K. Kanellopulos**, R. G. West, S. Emminger, P. Martini, M. Sauer, A. Foelske, and S. Schmid, "Stress-dependent optical extinction in low-pressure chemical vapor deposition silicon nitride measured by nanomechanical photothermal sensing," *Nano Letters*, vol. 24, no. 36, pp. 11 262–11 268, 2024, PMID: 39213585. DOI: 10.1021/acs.nanolett.4c02902. eprint: https://doi.org/10.1021/acs.nanolett.4c02902.
4. **K. Kanellopulos**, R. G. West, and S. Schmid, "Nanomechanical photothermal near infrared spectromicroscopy of individual nanorods," *ACS Photonics*, vol. 10, pp. 3730–3739, 10 Oct. 2023, ISSN: 2330-4022. DOI: 10.1021/acsphotonics.3c00937.
5. P. Martini, **K. Kanellopulos**, S. Emminger, N. Luhmann, M. Piller, R. G. West, and S. Schmid, "Uncooled thermal infrared detection dear the fundamental limit using a silicon nitride nanomechanical resonator with a broadband absorber," *Communications Physics*, vol. 8, p. 166, Apr. 2025, ISSN: 2399-3650. DOI: 10.1038/s42005-025-02093-2.
6. R. G. West, **K. Kanellopulos**, and S. Schmid, "Photothermal microscopy and spectroscopy with nanomechanical resonators," *The Journal of Physical Chemistry C*, vol. 127, pp. 21 915–21 929, 45 Nov. 2023, ISSN: 1932-7447. DOI: 10.1021/acs.jpcc.3c04361.
7. H. Bešić, A. Deutschmann-Olek, K. Mešić, **K. Kanellopulos**, and S. Schmid, "Optimized signal estimation in nanomechanical photothermal sensing via thermal response modeling and kalman filtering," *IEEE Sensors Journal*, vol. 24, no. 19, pp. 30 264–30 274, 2024. DOI: 10.1109/JSEN.2024.3446369.
8. J. N. Kirchhof, Y. Yu, D. Yagodkin, N. Stetzuhn, D. B. de Araújo, **K. Kanellopulos**, S. Manas-Valero, E. Coronado, H. van der Zant, S. Reich, S. Schmid, and K. I. Bolotin, "Nanomechanical absorption spectroscopy of 2d materials with femtowatt sensitivity," *2D Materials*, vol. 10, 3 Jul. 2023, ISSN: 20531583. DOI: 10.1088/2053-1583/acd0bf.

Conference Proceedings

1. P. Martini, **K. Kanellopulos**, and S. Schmid, "Towards photon-noise limited thermal ir detection with optomechanical resonators," in *2023 IEEE SENSORS*, 2023, pp. 1–4. DOI: 10.1109/SENSORS56945.2023.10325323.

2 P. Martini, **K. Kanellopulos**, and S. Schmid, "Towards an optomechanical photon-noise limited thermal ir detector," in *2023 IEEE Nanotechnology Materials and Devices Conference (NMDC)*, 2023, pp. 513–514. DOI: 10.1109/NMDC57951.2023.10343532.

3 D. B. Durham, C. M. Pierce, F. Riminucci, S. R. Loria, **K. Kanellopulos**, I. Bazarov, J. Maxson, S. Cabrini, A. M. Minor, and D. Filippetto, "Characterizing plasmon-enhanced photoemitters for bright ultrafast electron beams," in *Plasmonics: Design, Materials, Fabrication, Characterization, and Applications XIX*, D. P. Tsai, T. Tanaka, and Y.-J. Lu, Eds., International Society for Optics and Photonics, vol. 11797, SPIE, 2021, p. 117972D. DOI: 10.1117/12.2597708.

4 D. B. Durham, F. Riminucci, **K. Kanellopulos**, S. R. Loria, F. Ciabattini, A. Mostacci, A. M. Minor, S. Cabrini, and D. Filippetto, "Plasmonic lenses for ultrafast electron nanoemission," in *Conference on Lasers and Electro-Optics*, Optica Publishing Group, 2020, FM2Q.2. DOI: 10.1364/CLEO_QELS.2020.FM2Q.2.

5 D. B. Durham, S. R. Loria, F. Riminucci, **K. Kanellopulos**, X. Shen, F. Ciabattini, A. Mostacci, P. Musumeci, A. M. Minor, S. Cabrini, and D. Filippetto, "Design and testing of ultrafast plasmonic lens nanoemitters," in *Plasmonics: Design, Materials, Fabrication, Characterization, and Applications XVIII*, D. P. Tsai and T. Tanaka, Eds., International Society for Optics and Photonics, vol. 11462, SPIE, 2020, p. 1146222. DOI: 10.1117/12.2567540.

Skills

Languages

Language levels

- English: C1 level
- Spanish: C1 level
- Italian: Mother tongue
- German: B2 level

Coding — C, Matlab, Python, LaTeX, Microsoft Office.

Design software — Comsol, Lumerical, Solidworks, KLayout, L-Edit, Inkscape, CARL CMMS.

Operating System — Microsoft Windows, Mac OS.

Miscellaneous — Academic research, teaching, training, LaTeX typesetting and publishing.

Miscellaneous Experience

Awards and Achievements

2019 **Outgoing mobility**. Travel grant awarded by Polytechnic University of Turin.

Certification

2023 **Deutschkurszertificat B2** - INNES Institute Vienna. German language certification.

2019 **Curso de Castellano** - Instituto Hemingway. Spanish language certification.

2018 **IELTS** - British Council. English language certification.

References

Prof. Dr. Silvan Schmid
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