PERSONAL INFORMATION

Family name, First name: El Sachat, Alexandros

Researcher unique identifier: AAP-6431-2020

Date of birth: 07/02/1986

Nationality: Greek

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EDUCATION

2017 **Ph.D in Applied Physics**. Thesis defense: 27/07/2017. Qualif: Excellent (highest grade from UAB). Title: "*Characterization of nanostructured materials for thermal conduction and heat transfer control*". Faculty of Science/Department of Physics/University Autónoma of Barcelona (UAB)/Catalan Institute of Nanoscience and Nanotechnology (ICN2)/ Spain. PhD Supervisor: Dr. Francesc Alzina.

2012 **M.Sc. degree in "Microsystems and Nanodevices"**
National Technical University of Athens (NTUA)/School of Applied Mathematical and Physical Sciences/ Greece.

2011 **B.Sc degree in Physics**/Department of Physics/National and Kapodistrian University of Athens (U.O.A)/ Greece.

CURRENT POSITION

2024 – present **Researcher** – **PI of the ERC StG TheMA** - «*On-chip energy harvesting and management enabled by Thermal engineering of two-dimensional Materials*»/ National Center for Scientific Research (NCSR) "Demokritos"/ Institute of Nanoscience and Nanotechnology (INN).

PREVIOUS POSITIONS

2021 – present **Marie Curie Fellow**/National Center for Scientific Research (NCSR) "Demokritos"/INN/ Epitaxy and Surface Science lab.

2020 – 2021 **Postdoctoral researcher**/ ICN2/Spain.

2018 – 2019 **Postdoctoral researcher**/Autónoma University of Madrid (UAM)/Faculty of Science/Department of Condensed Matter Physics/Spain.

2014 – 2017 **Ph.D student**/UAB-ICN2/Spain, included a Research Internship at IBM-Research in Switzerland.

2011 – 2013 **Research assistant**/National Hellenic Research Foundation/Athens, Greece.

FELLOWSHIPS AND AWARDS

2025 Micro and Nano Engineering (MNE) **Young Investigator Award and Lectureship** **https://mne2025.imnes.org/#**

2024 **ERC StG/ European Research Council (ERC)**, Project: «*On-chip energy management and harvesting enabled by thermal engineering of 2D materials*».

2021 **Marie Curie Individual Fellowship**/National Center for Scientific Research "Demokritos"/Institute of Nanoscience and Nanotechnology/ Epitaxy and Surface Science lab.

2020 **Best Ph.D thesis** ("*Premi Extraordinari de Doctorat 2016/2017*") – awarded from Autonoma University of Barcelona (03/07/2020).

2017 **Competitive mobility allowance** through a scientific proposal ("*Severo-Ochoa, ICN2*") for doctoral *Internship at IBM Research center* in Zurich. Project: *"Heat transport in two dimensional materials"*.

2012 **Best Master thesis** – Thomaideio Award of the National Technical University of Athens (NTUA), 2012.

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

9/2023 – present Supervisor of 2 phD student and 3 postdoctoral researchers.

2/2020 – 10/2021 Coordinator of the nanoscale thermal transport team at ICN2 consisting of 2 postdoctoral fellows (E. Chavez-Angel and M. Sledzinska) and 1 phD student (P. Xiao) Responsible for teaching and supervising thermal measurements conducted from P. Xiao.

INSTITUTIONAL RESPONSIBILITIES, SCIENTIFIC COMMITTEES & REVIEWING ACTIVITIES

5/2026 Co-organizer of the upcoming symposium "NAnoMaterials for Energy applications" of the European Materials Research Society (E-MRS) in Strasbourg, France, (May 2026). https://www.european-mrs.com/nanomaterials-energy-applications-emrs

6/2024 Member of the scientific committee of the 2024 Eurotherm conference "Nanoscale and Microscale Heat Transfer VIII", Girona, Spain, June 2024. https://nmht2024.eu/#organization

2023-present Guest editor in the scientific journal Nanomaterials/ Special issue: "Recent developments in thermal, electrical and thermoelectric properties of nanomaterials". https://www.mdpi.com/journal/nanomaterials/special_issues/3LDTCAP3OG.

3/2023 Member of the organizing committee of the conference "2023 Topological Matter Conference" organized in Athens. https://www.topologicalmatterconf.com/2023/index.php

2/2020 – 10/2021 Research Engineer and Project Manager/ ICN2. Responsible for all the lab equipment of the Phononic and Photonic Nanostructures (P2N) group and safe operation of the experimental infrastructures.

2016 – present Regular peer reviewer in scientific journals: Nano Letters, ACS nano, Nature Communication, ACS Applied Nanomaterials, ACS Applied Material & Interfaces and 2D materials.

RESEARCH INTERESTS

Nanoscale energy transport phenomena for applications in nanoelectronics and energy conversion; 2D materials for heat flow control and power generation; Thermal-electrical transport in atomic contacts; Nanofabrication of electronic devices; Materials engineering.

MAIN COLLABORATORS

University/Institute	Country	Partners
IBM Zurich - Research Centre	Switzerland	Dr. Bernd Gotsmann
VTT Technical Research Centre	Finland	Prof. Mika Prunnila
UAM	Spain	Prof. Nicolas Agrait
UCLouvain	Belgium	Prof. Pascal Gehring
NCSRD	Greece	Dr. Athanasios Dimoulas
ULANC	UK	Prof. Oleg Kolosov
ICN2	Spain	Prof. C. M. Sotomayor Torres
SPINTEC	France	Prof. Matthieu Jamet
University of California	US	Prof. Davide Donadio
University of Warwick	UK	Prof. Hatef Sadeghi

RESEARCH STAYS AND SCHOOLS

1/2017 Research Intern. (3 months), IBM-Research, Switzerland, project *"Heat transport in graphene".*

10/2017 Short research stay (3 weeks) in Center for Thermal Sciences (CETHIL) - Micro and Nano Scale Heat Transfer group, CNRS, France (project: *"Heat transport measurements in self-assembled thin films"*).

6/2017 Short research stay (2 weeks) in University of Lancaster (ULANC), UK for nanoscale thermal and mechanical measurements.

2/2015 Summer School: *"Les Houches School of Physics"*, University of Grenoble, Alpes, France

7/2014 8th International Summer School: *"Nanosciences & Nanotechnologies*, *Organic Electronics & Nanomedicine"* (ISSON14), Thessaloniki, Greece.

5/2011 Graduate Internship at *"Nuclear Magnetic Resonance Laboratory"*, Institute of Material Science of NCSR "Demokritos" (IMEL), Athens, Greece.

CARRER RECORD

30 scientific publications in peer-reviewed international journals, **16 in high-impact factor journals** including:

1 Advanced Materials | 1 Science Advances | 1 Nature Communication | 4 Nano Letters | 2 Nanoscale| 1 npj 2D materials and Applications | 2 2D materials | 1 ACS Applied Polymer Materials | 1 Nanomaterials

Citations: ~ 900 h-index = 14 i10-index = 18

Corresponding Author (CA) in 13 publications (+1 submitted)

8 publications as first and CA, 4 publications as Last and CA (+1 submitted)

3 Invited Review articles (2 as CA)

1 book chapter

25 contributions to conferences, including 8 Invited oral talks (presenting author)

SELECTED PUBLICATIONS

1. E. Chavez-Angel, P. Tsipas, P. Xiao, M. T. Ahmadi, A. Daaoub, H. Sadeghi, C. M. Sotomayor Torres, A. Dimoulas and **A. El Sachat** *"Engineering Heat Transport Across Epitaxial Lattice-Mismatched van der Waals Heterointerfaces",* **Nano Letters**, 23 (15), 6883-6891, 2023.
2. P. Xiao, **A. El Sachat** et al., "*MoS_2 phononic crystals for advanced thermal management*", **Science Advances**, 10, 13, 2024.
3. P. Xiao, E. Chavez-Angel, S. Chaitoglou, M. Sledzinska, A. Dimoulas, C. M. Sotomayor Torres and **A. El Sachat** *"Anisotropic Thermal Conductivity of Crystalline Layered $SnSe_2$",* **Nano Letters**, 21, 9172–9179, 2021.
4. **A. El Sachat**, P. Xiao, D. Donadio, F. Bonell, M. Sledzinska, A. Marty, C. Vergnaud, H. Boukari, M. Jamet, G. Arregui1, Z. Chen, F. Alzina, C. M. Sotomayor Torres, E. Chavez-Angel *"Effect of crystallinity and film thickness on thermal transport in layered $PtSe_2$"*, **npj 2D materials and Applications**, 6, 32 2022.
5. **A. El Sachat,** F. Könemann, F. Menges, E. Del Corro, J. A Garrido, C.M. Sotomayor Torres, F. Alzina, B. Gotsmann *"Crossover from ballistic to diffusive thermal transport in suspended graphene membranes"*, **2D Materials**, 6, 2, 2019.
6. B. Graczykowski, **A. El Sachat**, J. S. Reparaz, M. Sledzinska, M. R. Wagner, E. Chavez-Angel, S. Volz, Y. Wu, F. Alzina and C. M. Sotomayor Torres, *"Thermal conductivity and air convection losses in periodic porous silicon membranes at high temperatures"*, **Nature Communication**, 8, 415, 2017.

SELECTED INVITED ORAL PRESENTATIONS

1. **A. El Sachat** *"Engineering thermal and thermoelectric transport in two-dimensional (2D) semiconductors and devices"* 51st International Micro and Nano Engineering Conference, Southampton, UK 15-18 September 2025.
2. **A. El Sachat** *"Controlling thermal and thermoelectric transport using engineered two-dimensional materials"* Future Leaders Network for Quantum Energy Conversion incubator workshop, London, UK 19-21 July 2023.

3. P. Xiao, E. Chavez-Angel, S. Chaitoglou, M. Sledzinska1, A. Dimoulas, C. M. Sotomayor Torres and **A. El Sachat** *"Anisotropic Thermal Conductivity of Crystalline Layered $SnSe_2$"* Nanoscale and Microscale Heat Transfer VII, Eurotherm seminar No 114, Palermo, Italy, 30 May - 3 June, 2022.
4. **A. El Sachat** *"Thermal and thermoelectric transport in low-dimensional materials using scanning probe microscopy"* 1st Severo Ochoa Workshop on Phononics and Thermal Transport (SOPHOT2021), Barcelona, 18-19 October 2021.
5. E. Chavez-Angel, P. Xiao, S. Chaitoglou, M. Sledzinska1, A. Dimoulas, C. M. Sotomayor Torres and **A. El Sachat** *"Anisotropic Thermal Conductivity of Crystalline Layered $SnSe_2$"* Trends in Nanotechnology International Conference (TNT2021), 2021.
6. **A. El Sachat**, B. Graczykowski, J. S. Reparaz, *et al., "Tuning the temperature dependence of the thermal conductivity in silicon membranes by nanopatterning"*, Eurotherm seminar 108 - Nanoscale and Microscale Heat Transfer V, Santorini, Greece, 2016.
7. **A. El Sachat,** F. Alzina, J. S. Reparaz, *et al., "Structure, composition, and thermal properties of epitaxial $Si_{1-x}Ge_x$ alloy nanowires studied by scanning thermal microscopy",* Workshop: *"Nanothermal measurements and heat transport"*, York, United Kingdom, 15-16 December 2015.