

## CURRICULUM VITAE

**SURNAME:** APERATHITIS

**FIRST NAME:** ELIAS

**DATE OF BIRTH:** 2 OCTOBER 1960

**PLACE OF BIRTH:** PIREAUS, GREECE

**MARITAL STATUS:** MARRIED, THREE CHILDREN

### **QUALIFICATIONS:**

1983 B.Sc. Physics, Patras University, Patras, Greece.

1984 M.Sc., Physics Department, Dundee University, Dundee, Scotland, U.K.  
Dissertation Title: "Photo-induced Structural Changes in a-Si"

1989 Ph.D., Applied Physics Department, Hull University, Hull, England.  
Thesis Title: " A Study of Chemiplated and All-Vacuum Evaporated  $\text{Cu}_x\text{S}/\text{CdS}$  Thin Film Solar Cells".

### **SCHOLARSHIPS:**

1) STATE SCHOLARSHIP FOUNDATION (I.K.Y.)

Scholarship for post-graduate studies abroad (programme 69<sup>o</sup>, duration 1-10-83 to 22-11-86).

2) SCHILIZZI FOUNDATION

Scholarship for finishing post-graduate studies - March 1987.

### **APPOINTMENTS:**

1991 - date Application Scientist (1991-2004), Principal Scientist (2004-date), Microelectronics Research Group (MRG), Institute of Electronic Structure & Laser (IESL), Foundation for Research and Technology-Hellas (FORTH), Crete, Greece.

1992 – 2000 Adjunct Professor, Physics Department, Crete University, Crete, Greece.

1993 - 1999 Lectures at "Summer School on Advanced Physics", Crete University, Crete, Greece.

2000 – 2005 Adjunct Professor, Department of Applied Information & Multimedia, School for Technological Applications, Tecnological Educational Institute, Crete, Greece.

2013 - 2014 Lectures at Erasmus- IP (Intensive Programme), Lifelong Learning Programme, Course title: "Transparent Electronics" organized by Technological Educational Institute of Crete, Chania,

- **7-20 July 2013**, talk topics: "ZnO-based TFTs on flexible substrates" & "TCOs for photovoltaic applications",

- **6-19 July 2014**- talk topic: "TCOs for photovoltaic applications"

- **2-6 July 2018**- talk topic: "Smart windows: how 'smart' can they be?"

2004 – date Reviewer in Journals (Appl. Phys. A, ECS J. Solid State Sci. and Techn., Journal of Alloys and Compounds, Mat.Sci. Engin. B, Materials Science in Semiconductor Processing, Phys. Stat. Solid. A & C, Solar Energy, Thin solid Films, Vacuum,...)

2015 – date Reviewer for GSRT projects

1995 – 2016 15 B.Sc. students last-year project supervision

2014 – 2021 9 M.Sc. students project supervision

2020 - 2021 **Best Greek M.Sc. Thesis Award 2021** (NiO:Nb,N (sputtering)). National Competition for Best Diploma-Postgraduate Thesis in the field of Science and Technology of Condensed Matter and Materials" organized by the *Hellenic Society of Science and Technology of Condensed Matter* (HSSTCM).

2012 – 2018 1 Ph.D. student research-technical supervision.

**Research Interests:**

- Oxide-based thin film materials & devices for transparent optoelectronic applications
- Photovoltaics (transparent and non-transparent)
- Materials and devices for smart windows and energy efficient buildings
- Nanostructured materials based on strongly correlated oxides for energy saving and storage.

**RESEARCH PROJECTS:****a) coordinator or project investigator (PI)**

- 1993 – 1995 Bilateral Joint Research Programme between Greece and Britain  
Project Title: "High Efficiency Solar Cells With Multiple Quantum Wells Structure".
- 1994 - 1996 Bilateral Joint Research Programme between Greece and Germany  
Project Title: "High Efficiency and Low Cost Solar Cells".
- 1996 - 1998 PENED 94, National Project on Photoelectrochemical Solar Cells based on TiO<sub>2</sub> nanostructures.
- 1998 – 2000 Bilateral Joint Research Programme between Greece and Slovakia  
Project Title: "Renewable Energy Sources Based on III-V Solar Cells".
- 1999 – 2000 EPET II – Special Action “MICRO”,  
"Development of System for the Study of Tolerance of Detectors, Sensors and Materials in Radioactive Environment” (Coordinator: ΕΚΕΦΕ «Dimokritos»).
- 2000 – 2001 Bilateral Joint Research Programme between Greece and Georgia  
Project Title: "Low Cost and High Efficiency Thin Film Photovoltaics Based on III-V Materials For Terrestrial Applications".
- 2004 – 2006 Programme for the promotion of the exchange and scientific cooperation between Greece and Germany, I.K.Y – DAAD (IKYDA-2003),  
Project Title: «Quaternary III-N based UV Detectors and Lasers»
- 2004 – 2006 Bilateral Joint Research Programme between Greece and Slovakia  
Project Title: " Fabrication of novel transparent and conductive oxide with enhanced properties for optoelectronic and photovoltaic applications".
- 2005 - 2009 FP6/2002/IST/C – FET OPEN (STREP), Contract No: 511925 “Novel & Advanced Transparent Conductive Oxides -NATCO”.
- 2005 – 2006 International Collaboration Programme 2005, between Photonics Group, Tyndall National Institute, Ireland και MRG, ‘Optical and Electrical properties of Indium-Tin-Oxynitride as Transparent Conductive Oxide layer on GaAs and GaN based Optoelectronic devices’.

**b) participation in projects**

- 2004 - 2006 FP6-NMP-STREP-505641-1 “GANANO” "New Generation of GaN-based sensor arrays for nano- and pico-fluidic systems for fast and reliable biomedical testing".
- 2009 - 2013 FP7-NMP-2009-Large-3 “ORAMA - Oxide Materials Towards a Matured Post-silicon Electronics Era”.
- 2011 - 2014 FP7-PEOPLE-2011-IRSES, MC-IRSES International Research Staff Exchange Scheme, Project Title: “Oxide Nanostructures for Wireless Chemical Sensing-WIROX ”
- 2011-2014 National Project “THALES” Project titles: “NitPhoto : “High Efficiency III-Nitride Semiconductors Photovoltaic Devices”.
- 2012 - 2015 National Project, ESPA 2007-2013, SUNERGASIA-PRAKS II  
Project Title: “Smart & Cheap Thermochromic Windows for Energy Saving in Buildings -EKSOTHERMO”.
- 2012 - 2015 National Project, NSRF 2007-2013, Regions at the Center of Development, ‘Advanced Energy Materials –PROENYL-KRIPIS’.
- 2015 – 2016 Programme for the promotion of the exchange and scientific cooperation between Greece and Germany, I.K.Y – DAAD (IKYDA-2015), Project Title: «Calibration

- standard for a Scanning Microwave Microscope embedded in an automated nano-characterization environment inside a Scanning Electron Microscope».
- 2018 – 2020 National Project, ESPA 2014-2020, Infrastructure for Nanotechnology, Advanced Materials & Micro-Nano-Electronics, INNOVATION-EL, ΟΠΣ (MIS) 5002772.
- 2018 – 2021 National project, ESPA 2014-2020, SMART SPECIALISATION STRATEGY OF THE REGION OF CRETE, RIS3Crete, Project title: “NanoTandem: High Efficiency 2-Junctions Perovskite/III-V Nanostructured Solar Cells”.

### RESEARCH EXPERIENCE:

Materials fabrication by:

- thermal evaporation (CdS, Cu<sub>2</sub>S, CuAlO<sub>2</sub>),
- ion-gun assisted e-beam evaporation (SiO<sub>2</sub>, MgF<sub>2</sub>, ZnS, HfO<sub>2</sub>, Ta<sub>2</sub>O<sub>5</sub>, YF<sub>3</sub>),
- sputtering (WTiSi, SiN, ITO, ITON, FeSi, VO<sub>2</sub>, WO<sub>3</sub>, AlN, ZnN, TaN, ZnO, ZnO:Ir-Al, NiO:N-Nb-Al),
- PECVD (SiN),
- ion-plating (Cu<sub>2</sub>S),
- PLD (ZnO, ZnO:Al, SrCu<sub>2</sub>O<sub>2</sub>).

Processing and characterization of electronic and opto-electronic materials & devices (TTFTs, FETs, HEMTs, MSMs, PVs, QWIPs, LEDs, Lasers, sensors, thermochromics, electrochromics).

Thin films and III-V solar cells (fabrication, processing, characterization).

Photolithography masks design for opto-electronic devices (PVs, QWIPs FPAs).

### SCIENTIFIC EVENT ORGANIZATION (Role):

1. 5<sup>th</sup> International Workshop on Expert Evaluation & Control of Compound Semiconductor Materials & Technologies -EXMATEC 2000, 22-24 May, 2000, Heraklion, Crete, Greece (Local committee)
2. 13<sup>th</sup> European Workshop on Heterostructure Technology –HETECH 2004, October 3-6, 2004, Koutouloufari, Heraklio, Crete, Greece. (Local committee)
3. Biannual International Conference on Transparent Conductive Oxides (TCO’06 & TCO’08) and International Conference on Transparent Conductive Materials (TCM’10 – TCM22), October, Crete, Greece. (Local committee)
4. FEMS-EUROMAT, European Congress and Exhibition on Advanced Materials and Processes, Area C: Processing, Symposium C-3: Coatings and Surface Modification (Co-organizer):
  - (a) FEMS-EUROMAT 2015 Warsaw, Poland, September 20 – 24, 2015 and
  - (b) FEMS-EUROMAT 2017 Thessaloniki, Greece, 17-22 September 2017.

**Metrics (May 2022):** Scopus Author Identifier (SC): 6701842312

**Researcher ID: O-2973-2013,** ID: <https://orcid.org/0000-0002-2800-7509>

**Publications in peer reviewed journals 79,** **Presentations in conferences 77**

**Citations (Scopus) 972,** **h-index (Scopus) 17**

### Selected Publications:

- "*Properties of rf-sputtered Indium-Tin-Oxynitride thin films*", E. Aperathitis, et al, J. Appl. Phys. 94 (2003) 1258, DOI: 10.1063/1.1582368.
- "*Thermal oxidation of n-type ZnN films made by rf-sputtering from a ZnN target and conversion into p-type ZnO films*",

- V. Kambilafka, et al, Superlattices and Microstructures 42 (2007) 55,  
DOI: 10.1016/j.spmi.2007.04.038.
- “The effect of nitrogen on the properties of zinc nitride thin films and their conversion into p-ZnO:N films”,  
V. Kambilafka, et al, Thin Solid Films 515 (2007) 8573,  
DOI: 10.1016/j.tsf.2007.03.102.
  - “The effect of PLD deposition parameters on the properties of p-SrCu<sub>2</sub>O<sub>2</sub>/n-Si diodes”,  
E. L. Papadopoulou, et al, Thin Solid Films 516 (2008) 8154-8158,  
DOI: 10.1016/j.tsf.2008.04.024.
  - “Undoped and Al-doped ZnO films with tuned properties grown by pulsed laser deposition”,  
E.L. Papadopoulou, et al, Thin Solid Films 516 (2008) 8141,  
DOI: 10.1016/j.tsf.2008.04.022.
  - “Properties of n-type ZnN thin films as channel for transparent thin film transistors”,  
E. Aperathitis, et al, Thin Solid Films 518 (2009) 1036, DOI: 10.1016/j.tsf.2009.01.155.
  - “Thermochromic performance of Mg-doped VO<sub>2</sub> thin films on functional substrates for glazing applications”,  
M. Panagopoulou, et al, Solar Energy Materials & Solar Cells 157 (2016) 1004,  
DOI:10.1016/j.solmat.2016.08.021.
  - “Transparent All-Oxide Hybrid NiO:N/TiO<sub>2</sub> Heterostructure for Optoelectronic Applications”,  
Ch. Aivalioti, et al, Electronics 10 (2021) 988 (18pp),  
DOI: 10.3390/electronics10090988.
  - “Influence of Mg doping on the ultrafast electron dynamics of VO<sub>2</sub> films”,  
D. Karanikolopoulos, et al, Appl. Phys. A (2021) 127:751, DOI: 10.1007/s00339-021-04886-y.
  - “Study on the Ozone Gas Sensing Properties of Rf-Sputtered Al-Doped NiO Films”,  
A. Paralakis, et al, Appl. Sci. 11 (2021) 3104 (13pp), DOI: 10.3390/app11073104,  
also appeared in book “Applied Sciences, Special Issue: Advances in Air Quality Monitoring and Assessment”, ed. Th. Maggos, Oct.2021, MDPI, ISBN 978-3-0365-2140-4 (Hbk), 978-3-0365-2139-8 (PDF), DOI: 10.3390/books978-3-0365-2139-8.
  - “An Assessment of Sputtered Nitrogen-Doped Nickel Oxide for all-Oxide Transparent Optoelectronic Applications: The Case of Hybrid NiO:N/TiO<sub>2</sub> Heterostructure”,  
Ch. Aivalioti, et al, Recent Trends in Chemical and Material Sciences, Vol. 6, **Chap. 8**,  
12 February 2022, Page 86-111, DOI: 10.9734/bpi/rtcams/v6/1650A.
  - ”Oxygen-vacancy induced ferroelectricity in nitrogen-doped nickel oxide,  
M. Dragoman, et al, J. Appl. Phys. 131, 164304 (pp.1-11) (2022); DOI:  
10.1063/5.0075568. (Featured article).
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