

## Curriculum Vitae



**Dr. Alexandru Müller,**

Ph.D. in Semiconductor Physics, since 1990,

Habilitated for doctoral studies in Electronics, Telecommunications and Information Technology by National University of Science and Technology POLITEHNICA Bucharest, since 2017.

**Employment** 1972 -1996 ICCE Bucharest (*microwave devices group head*); 1996-present: IMT Bucharest *head of the* Micromachined structures, microwave circuits and devices laboratory

### **Most important results obtained in the period 1972-1996**

The design and manufacturing of the **first Romanian silicon and GaAs based microwave diodes**: pin diodes for switching applications in the 2-20 GHz range, abrupt and hyper-abrupt tuning varactor diodes, step-recovery diodes (SRD) for frequency multipliers with  $f_{out}$  in the range 4-18 GHz; GaAs Schottky and Gunn diodes. Development of novel technological processes for manufacturing these types of devices;

The elaboration of an **original approach for the switching behavior of a narrow base pin diodes**, with practical results for maximizing the stored charge (and efficiency) of SRDs (**A Müller** and S Voinigescu, **Solid State Electronics** 1989, 32, 593); S. Voinigescu, **A. Müller**, et. al, **Solid State Phenomena** 1989, 6&7, 315). This was one of the main topics of the PhD thesis (1990).

The original approach was successful used in obtaining very efficient SRDs. Maximizing the doping level in the  $p^+$  layer ICCEs SRD had a better efficiency in the X8 multipliers (from 05 to 4 GHz) than all similar devices fabricated by famous providers like Thomson, Microwave Associates, Varian etc.

### **Most important results obtained in the period 1996-present**

The manufacturing of membrane supported mm wave circuits microwave passive circuits supported on 1.5  $\mu\text{m}$  thin dielectric membranes ( $\text{SiO}_2/\text{Si}_3\text{N}_4/\text{SiO}_2$ ) obtained by Silicon micromachining, an European priority in this new topics (**A. Müller**, et al, **European Semiconductor**, 1997, 11, 27)

In 1997 Dr. Müller won, as coordinator, the FP4 Project No 977131 "Micromachined Circuits for Microwave and Millimeter Wave Applications" **MEMSWAVE**. It was one of the first EU projects in the RF MEMS topics, with 9 partners from 6 countries. **It was the first ICT European project coordinated (and for a long time the only one) by an Eastern Europe country**. The results obtained in the frame of this EU project have contributed to the **SoTA in the topic**. In 2002 the project was nominated between the **10 finalists for the Descartes prize of the EC 2002**. The project has generated an itinerant European workshop in RF MEMS called "**MEMSWAVE**" (first 2 editions in Sinaia 1999 and 2001). The manufacturing of first membrane supported mm wave filters and antennae for mm wave frequencies (38 GHz, 60 GHz and 77 GHz) and of a micromachined receiver module for mm wave frequencies with the antenna and the Schottky diode, monolithic integrated on the same 2  $\mu\text{m}$  thin GaAs membrane (**A. Müller** et. al, **JMM**, 2001, 11, 1; **A. Müller**, et. al, **JMM**, 2000, 10, 130, G. Konstantinidis, **A. Müller**, **JMM**, 2003, 13, 353).

**Coordinator of: FP7 REGPOT project MIMOMEMS** "European Centre of Excellence in Microwave, Millimeter Wave and Optical Devices based on Micro-Electro-Mechanical Systems for

Advanced Communication Systems and Sensors” (2008-2011). This project has ensured the SoTA results obtained in research in MEMS microwave/mm wave circuits, Dr. A Müller co-authoring papers in prestigious journals like IEEE MTT, IEEE Microwave Antennas and Propagation and Applied Phys. Lett., JMM. etc. Apart from the support for scientific activities this project together with national projects SIMCA (Capacities) and Microlab (Module 4) ensured the actual SoTA infrastructure of the lab including complete microwave/mm-wave characterization equipment.

**Dr. Müller has coordinated the ESA project** “Microwave filter based on GaN/Si SAW resonators operating at frequencies above 5 GHz” (2015-2017) and the **H2020 Marie Curie - SelectX** “Integrated Crossbar of Microelectromechanical Selectors and Non-Volatile Memory Devices for Neuromorphic Computing” (2016-2018) (as “supervisor”).

**Dr. Müller** has obtained state of the art results in manufacturing of FBAR and SAW on GaN/Si resonators operating in the GHz frequency range as well as and temperature and pressure sensors based on GaN/Si, AlN/Si and ScAlN/Si. Also, Dr Muller worked on analysis and application in sensors of superior propagation modes in GaN/Si and GaN membranes (Sezawa, respectively Lamb modes). These **results represent the state of the art** for this type of devices and were published in top journals in the topics (**A. Müller et al IEEE Electron Devices Lett.**, 36(12), **2015**; **A. Müller, et. al, Sensors and Actuators A** 209, **2014**; **A. Müller, et al, Thin Solid Films**, 520(6) **2012**; **A. Müller, et al. IEEE Electron Devices Lett.**, 31(12), **2010**; **A. Müller, IEEE Electron Devices Lett.** 30(8), **2009**; **A. Müller, et al, Applied Optics**, 47(10), **2008**; A Nicoloiu, GE Stan, C Nastase, G Boldeiu, C Besleaga, A Dinescu, **A Müller, IEEE Trans. Ultrason. Ferroelectr. Freq. Control**, 68(5), **2021**; G Boldeiu, GE Ponchak, A Nicoloiu, C Nastase, I Zdru, A Dinescu, **A Müller, IEEE Acces** 10, **2022**, A Nicoloiu, G Boldeiu, C Nastase, M Nedelcu, C Ciornei, I Zdru, G Stavrinidis, D Vasilache, A Stavrinidis, A Dinescu, G Konstantinidis, **A Müller, IEEJ Trans. Electr. Electron. Eng.**, early acces: FEB **2024**), and at the prestigious conferences **IEEE IMS MTT-S** International Microwave Symposium (2014, 2016) and **TRANSDUCERS** International Conference on Solid-State-Sensors, Actuators and Microsystems (2017, 2019, 2023).

Dr Müller has also developed membrane supported UV photodetectors using advanced nanolithographic and micromachining technologies of GaN/Si.

**Dr. Müller** has obtained very new results in **coupling of SAWs with spin waves**, using a magnetostrictive layer placed between the IDTs of a SAW manufactured on III-Nitrides materials, with resonance frequency in GHz domain and **characterization** of semiconductor devices at **cryogenic temperatures (up to 4 K and respectively 2 K)**, directly on the wafer, in the range of microwaves and millimeter waves and in a magnetic field, for **quantum computing** application (I Zdru, C Nastase, LN Hess, F Ciubotaru, A Nicoloiu, D Vasilache, M Dekkers, M Geilen, C Ciornei, G Boldeiu, A Dinescu, C Adelman, M Weiler, P Pirro, **A Müller, IEEE Electron Device Lett.**, 43(9), **2022**; S Pati Tripathi, S Bonen, A Bharadwaj, T Jager, C Nastase, S Iordănescu, G Boldeiu, M Pășteanu, A Nicoloiu, I Zdru, **A Müller, SP Voinigescu, Characterization and Modeling of Quantum Dot Behavior in FDSOI Devices, IEEE J. Electron Devices Soc.**10, **2022**)

**Dr. Müller has coordinated the IMT group** in the : **FP6** NoE in RF MEMS, AMICOM, (coordinated by LAAS CNRS Toulouse); **FP7 IP projects** SMARTPOWER (2011-2016) (coordinated by Thales TRT France), **ENIAC “SE2A”** (2008-2012) (coordinated by Thales TRT France), “**MERCURE**” (2010-2014) (coordinated by NXP Semiconductie, The Netherlands) and the **H2020 – FET Open project: „CHIRON”** (2018-2022) (coordinated by IMEC, Belgium) – first FET Open project with Romanian partner

**Now he is coordinating the European projects: H2020 – FET Open: „iQubits”** (2019-

2022) (coordinated by AGH Poland); de tip **HORIZON EUROPE – RIA: „NANOMAT”** (2022-2025) (coordinated by Thales TRT, France); **HORIZON EUROPE – EDF: ”AGAMI EURIGAMI”** (2022-2025) (coordinated by UMS GmbH, Germany); „**POWERFLEX”** (2022-2025) (coordinated by Thales TRT, France); „**POWERPACK”** (2022-2025) (coordinated by Thales TRT, France).

**Dr. Müller was coordinator of national projects** in PN I, CEEEX, PN II, STAR and PN III programs, projects obtained as result of a national competition

Dr. Müller has authored/coauthored more than 150 papers in high ranked journals and conferences.

**Invited talks** (selection) **33<sup>rd</sup> EuMC/European Microwave Conference**, Munich, 2003, **35<sup>th</sup> EuMC/European Microwave Conference**, Paris 2005, **International Workshop on MEMS and Nanotechnology Integration**, 2004, Montreux; **CMOS Emerging Technologies Workshop, Research & Business Opportunities Ahead**, 2006, Banff, Alberta, Canada; **NATO Workshop**, St Petersburg, 2010; **HETEC 19<sup>th</sup> European Workshop on Heterostructure Technology**, Fodele, Crete, 2010;  
**Invited Seminar, Center for Wireless Integrated MicroSensing & System, WIMS<sup>2</sup>, Ann Arbor, University, Michigan, USA** June 2, 2016

**Awards:** FP4 European project MEMSWAVE (1998-2001) coordinated by Dr. Muller was nominated between the 10 finalists for the **DESCARTES Prize** of the EC at the 2002 call; “**Tudor Tanasescu**“ award of the Romanian Academy for the scientific activity related to the micromachined microwave devices design and manufacturing – 2002;

#### **Stages abroad**

- A six months (Postdoc) stage at IMEC Leuven (1990-1991)
- A six months stage as directeur de recherché at LAAS – CNRS Toulouse (2003)

#### **Other activities:**

- **Reviewer of journals:** IEEE Electron Dev. Lett., IEEE Trans on El. Dev, JMM., Nanotechnology, Journal of Optics A, Sensors and Actuators A, Semicond. Sci&Techn, etc.
- **FP7 and H2020 evaluator** in the REGPOT, Space and FET calls (2008-2015);
- **Organizer of scientific events:** Micromechanics Europe Workshop MME 2002, CAS IEEE Conference 2001-2015, MEMSWAVE Workshop 1999, 2001, 2016;
  
- **H index: 21 (Google Scholar)**
- **Citations - 1506 (Google Scholar)**