

# GIUSEPPE CURRO'

## PERSONAL INFORMATION

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- **Born:** 08.07.1966 Messina, Italy
- **address:** via Nuove Scuole 27, Torre Faro, 98164 – MESSINA, Italy

## EDUCATION

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- **Laurea degree in Physics** on 14/06/1990 scored 110/110 cum laude at the Faculty of Mathematical, Physical and Natural Sciences of the University of Messina, Italy.

## LANGUAGES

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- Italian ,native
- English, fluently written and spoken

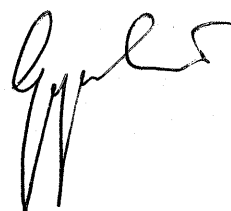
## PROFESSIONAL

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| 1989 - 1990  | Research Fellow at the L'Interdisciplinary Research Centre in Surface Science of the University of Liverpool, UK.      |
| 1991 - 1993  | Research fellow at the Istituto di Struttura della Materia of the University of Messina, Italy                         |
| 1993 – 1994  | Research fellow at the Institut fuer Physikalische Chemie of the University of Bonn, Germany                           |
| 1994 – today | Research Group Leader within the IPG R&D Division of ST Microelectronics s.r.l., Catania, Italy                        |
| 2006 – today | Presidente of ANM Research s.r.l. operatine in the field of technological and industrial R&D of advanced nanomaterials |

## PROFESSIONAL EXPERIENCES

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His expertise, mainly spanning experimental research and technology development, has been acquired in the last two decades spent in ST Microelectronics. The key expertises regard the development and characterisation of structures and processes in Microelectronics, with special attention to the study of the physical and electrical mechanisms involved in the main materials used in discrete power devices, and related reliability issues.

As a matter of facts he has developed a vast and deep expertise in carrier transport properties of insulating materials and semiconductors used in microelectronics, but also in the field of physics and chemistry of thin films and surfaces. The topics faced in the past and current activities, just to mention the most important, are:

- a) Optical and electronic properties of carbon based films and coatings
- b) Electronic properties of silicides and metallic alloy surfaces
- c) Electronic properties of metal clusters deposited on solid surfaces
- d) Photoemission Electron Spectroscopy, Auger spectroscopy and Energy Loss spectroscopy on solid surfaces and films
- e) SEM/EDX Microscopy, AFM
- f) Transport properties in dielectric and semiconductor thin films
- g) Physical failure mechanisms of structures and active layers in microelectronic devices
- h) Process development and integration in discrete microelectronic technologies
- i) Electrical characterisation of structures and layers in microelectronics
- j) Surface chemical and passivation processes
- k) Advanced design and engineering of discrete devices in microelectronics

Moreover, a deep expertise has been developed about processes and strategies of industrial development in the field of advanced microelectronics, about standardisation procedures, qualification and evaluation of commercial technologies.

A part of the R&D activities have been carried on in the frame of national (FAR, PIA, MADESS) and international (ESA) funded projects. Many activities have been and are performed in close collaboration with the University, with Research Centers and R&D companies:

- Department of Physics of Milan Politechnic, Italy
- Interdisciplinary Research Center in Surface Science, University of Liverpool, UK
- Institut fuer Physikalische Chemie, University of Bonn, Germany
- Department of Physics of Matter and Electronic Engineering, University of Messina, Italy
- Department of Physics and Department of Chemistry, University of Catania, Italy
- Consorzio Catania Ricerche, Italy
- DAEIMI Department, University of Cassino, Italy
- Italian National Council of Research (CNR)
- ESTEC (ESA Technologies), Holland
- CNES (Centre Nationale Etudes Spatiale), France

### **EDUCATIONAL EXPERIENCES:**

- teacher in the training course FIO2008 (ILO Messina, Italy, 2008): “Academic Spin-offs in the field of Technological R&D”
- teacher in the training course SICILAB 2008-2009 (Catania, Italy, 2009) : “Technologies for Silicon power MOSFETs technologies”
- teacher in the training course “Energetics of buildings, Photovoltaic plants, energy production from bio-masses”, PROF 1st and 2nd level (Messina, Italy, 2010)
- Supervisor of two graduation theses in the field of Microelectronics (1999, 2004)

### **EXPERIENCES OF R&D DESIGN AND MANAGEMENT:**

- 2005: preliminary and executive Industrial R&D project submitted for funding the constitution of an academic spin-off with Italian State funds (DlG 297/99)
- 2007: conception and realization of a technological R&D project submitted to FP7 NMP 2008 call.
- 2008-2009: conception and realization of two technological&industrial R&D projects submitted to PO-FESR calls (Sicily 2007-2013)
- 2009: conception and realization of a technological R&D project submitted to FP7 NMP 2009 call.
- Design and technical-scientific management of a project funded by ESA (European Space Agency) aimed at the development and qualification of radiation hardened poerMOSFETs for Telecom Satellite application (Galileo Project), Catania, Italy, 2003-2008
- Design and management of several development projects for advanced poerMOSFET technologies in ST Microelectronics, Catania, Italy, 1996-today.

### **EXPERIENCES OF COMPANY MANAGEMENT:**

- 2006-today: associate and co-founder of an high-tech spin-off company operatine in the field of industrial R&D for innovative nanomaterials.. As President and CEO of the company A.N.M. Research s.r.l. (Italy), he has managed and still manages all the technological development activities, economical and financial activities, planning and business policy activities.
- 2010-today, Scientific and industrial advisor of the *Centro Siciliano di Ricerche sull’Ambiente e Fisica atmosferica (CSRAFA)*, Messina, Italy.

### **EXPERIENCES OF INDUSTRIAL R&D MANAGEMENT:**

- 1999-today, in ST Microelectronics S.r.l., Catania (Italy), he manages industrial R&D projects in the field of advanced technologies for discrete poer devices, with special attention to innovative materials and structures, and reliability. He leads a team of professionals skilled in Design, Characterisation and Process Development.
- 2006-today, in A.N.M. Research S.r.l., Messina (Italy), he manages projects for the research and development of advanced technologies for industrial production of innovative nanostructured materials.

### **OTHER PROFESSIONAL EXPERIENCES:**

- Session chairman al “21st European Symposium on Reliability of Electron Devices, Failure Physics and Analysis” ESREF, Gaeta 11-15 ottobre 2010

## Articles published on international journals:

- A new test methodology for an exhaustive study of single-event-effects on power MOSFETs  
Microelectronics Reliability, Volume 51, Issues 9–11, September–November 2011, Pages 1995–1998  
G. Busatto, D. Bisello, G. Currò, P. Giubilato, F. Iannuzzo, S. Mattiazzo, D. Pantano, A. Sanseverino, L. Silvestrin, M. Tessaro, F. Velardi, J. Wyss
- Interface states and traps in thin N<sub>2</sub>O-grown oxynitride/oxide di-layer for PowerMOSFET devices  
Microelectronics Reliability, Volume 47, Issues 4–5, April–May 2007, Pages 819–821  
Giuseppe Currò, Marco Camalleri, Denise Cali, Francesca Monforte, Fortunato Neri
- Growth process and chemical characterization of an ultrathin phosphate film grafted onto Al-alloy metallization surfaces relevant to microelectronic devices reliability  
Microelectronics Reliability, Volume 42, Issues 9–11, September–November 2002, Pages 1659–1662  
G. Curro, R. Greco, A. Scandurra
- CO sensing devices based on indium oxide nanoparticles prepared by laser ablation in water  
Thin Solid Films, Volume 520, Issue 3, 30 November 2011, Pages 922–926  
N. Donato, F. Neri, G. Neri, M. Latino, F. Barreca, S. Spadaro, I. Pisagatti, G. Currò
- Reliability of Medium Blocking Voltage Power VDMOSFET in Radiation Environment  
Microelectronics Reliability, Volume 43, Issues 9–11, September–November 2003, Pages 1847–1851  
F. Velardi, F. Iannuzzo, G. Busatto, J. Wyss, A. Sanseverino, A. Candelori, G. Currò, A. Cascio, F. Frisina
- Electronic properties of ion implanted hydrogenated amorphous carbon  
Journal of Electron Spectroscopy and Related Phenomena, Volume 72, 31 March 1995, Pages 89–95  
G. Currò, G. Mondio, F. Neri, G. Foti, G. Compagnini
- Total ionizing dose reliability of thin SiO<sub>2</sub> in PowerMOSFET devices  
Microelectronics Reliability, Volume 47, Issues 4–5, April–May 2007, Pages 815–818  
A. Cascio, G. Currò, A. Cavagnoli
- Carrier trapping in thin N<sub>2</sub>O-grown oxynitride/oxide di-layer for PowerMOSFET devices  
Microelectronics Reliability, Volume 47, Issues 4–5, April–May 2007, Pages 798–801  
Giuseppe Currò, Marco Camalleri, Denise Cali, Francesca Monforte, Fortunato Neri
- Preparation of luminescent and optical limiting silicon nanostructures by nanosecond-pulsed laser ablation in liquids  
Materials Chemistry and Physics, Volume 130, Issues 1–2, 17 October 2011, Pages 418–424  
E. Fazio, F. Barreca, S. Spadaro, G. Currò, F. Neri
- Synthesis of PMA stabilized silver nanoparticles by chemical reduction process under a two-step UV irradiation  
Applied Surface Science, Volume 256, Issue 12, 1 April 2010, Pages 3812–3816  
D. Spadaro, E. Barletta, F. Barreca, G. Currò, F. Neri
- An investigation of the unoccupied p-symmetry states in Ag- and Pd-containing systems via  $I \rightarrow (I - 1)$  high resolution near-edge X-ray absorption spectroscopy  
Physica B: Condensed Matter, Volumes 208–209, 1 March 1995, Pages 278–280  
L. Duó, R. Cosso, G. Currò, S. D'Addato, D.A. Gregory, P. Unsworth, P. Weightman, M. Sancrotti
- Evaluation of the generation mechanisms at surface and in the bulk of the silicon by current transient technique  
Microelectronics Reliability, Volume 47, Issues 4–5, April–May 2007, Pages 810–814  
Giacomo Barletta, Giuseppe Currò
- PMA capped silver nanoparticles produced by UV-enhanced chemical process  
Applied Surface Science, Volume 255, Issue 20, 30 July 2009, Pages 8403–8408  
D. Spadaro, E. Barletta, F. Barreca, G. Currò, F. Neri
- Small size TiO<sub>2</sub> nanoparticles prepared by laser ablation in water  
Applied Surface Science, Volume 256, Issue 21, 15 August 2010, Pages 6408–6412  
F. Barreca, N. Acacia, E. Barletta, D. Spadaro, G. Currò, F. Neri
- Experimental study of power MOSFET's gate damage in radiation environment  
Microelectronics Reliability, Volume 46, Issues 9–11, September–November 2006, Pages 1854–1857  
G. Busatto, F. Iannuzzo, A. Porzio, A. Sanseverino, F. Velardi, G. Currò

Experimental study about gate oxide damages in patterned MOS capacitor irradiated with heavy ions  
Microelectronics Reliability, Volume 49, Issues 9–11, September–November 2009, Pages 1033-1037  
G. Busatto, G. Currò, F. Iannuzzo, A. Porzio, A. Sanseverino, F. Velardi

Experimental and Numerical investigation about SEB/SEGR of Power MOSFET  
Microelectronics Reliability, Volume 45, Issues 9–11, September–November 2005, Pages 1711-1716  
G. Busatto, A. Porzio, F. Velardi, F. Iannuzzo, A. Sanseverino, G. Currò

Laser ablation synthesis of indium oxide nanoparticles in water  
Applied Surface Science, Volume 256, Issue 22, 1 September 2010, Pages 6918-6922  
N. Acacia, F. Barreca, E. Barletta, D. Spadaro, G. Currò, F. Neri

Nitrogen bonding configurations near the oxynitride/silicon interface after oxynitridation in N<sub>2</sub>O ambient of a thin SiO<sub>2</sub> gate  
Microelectronics Reliability, Volume 47, Issues 4–5, April–May 2007, Pages 822-824  
F. Monforte, M. Camalleri, D. Cali, G. Currò, E. Fazio, F. Neri

Junction leakage current degradation under high temperature reverse-bias stress induced by band-defect-band tunnelling in power VDMOS  
Microelectronics Reliability, Volume 45, Issues 5–6, May–June 2005, Pages 994-999  
Giacomo Barletta, Giuseppe Currò

Experimental evidence of "latent gate oxide damages" in medium voltage power MOSFET as a result of heavy ions exposure  
Microelectronics Reliability, Volume 48, Issues 8–9, August–September 2008, Pages 1306-1309  
G. Busatto, G. Currò, F. Iannuzzo, A. Porzio, A. Sanseverino, F. Velardi

Experimental study and numerical investigation on the formation of single event gate damages induced on medium voltage power MOSFET  
Microelectronics Reliability, Volume 50, Issues 9–11, September–November 2010, Pages 1842-1847  
G. Busatto, G. Currò, F. Iannuzzo, A. Porzio, A. Sanseverino, F. Velardi

Correlations between structural and electrical properties of nitrated SiO<sub>x</sub> thin films used as power metal oxide semiconductor field effect transistor gate dielectric  
Fazio, E.; Neri, F.; Camalleri, G. Curro M.; Cali, D.;  
Applied Physics Letters  
Volume: 93 , Issue: 18

A 3-D simulation study about Single Event Gate damage in medium voltage power MOSFET  
Porzio, A.; Velardi, F.; Busatto, G.; Iannuzzo, F.; Sanseverino, A.; Curro, G.;  
Radiation and Its Effects on Components and Systems (RADECS), 2008 European Conference on  
Publication Year: 2008 , Page(s): 209 - 212

The role of the charge generated during heavy ion irradiation in the gate damage of medium voltage power MOSFET  
Busatto, G.; Curro, G.; Iannuzzo, F.; Porzio, A.; Sanseverino, A.; Velardi, F.;  
Radiation and Its Effects on Components and Systems (RADECS), 2009 European Conference on  
Publication Year: 2009 , Page(s): 102 - 105

Heavy-Ion Induced Single Event Gate Damage in Medium Voltage Power MOSFETs  
Busatto, G.; Curro, G.; Iannuzzo, F.; Porzio, A.; Sanseverino, A.; Velardi, F.;  
Nuclear Science, IEEE Transactions on  
Volume: 56 , Issue: 6 , Part: 2  
Publication Year: 2009 , Page(s): 3573 - 3581

Experimental and 3D Simulation Study on the Role of the Parasitic BJT Activation in SEB/SEGR of Power MOSFET  
Porzio, A.; Busatto, G.; Velardi, F.; Iannuzzo, F.; Sanseverino, A.; Curro, G.;  
Radiation and Its Effects on Components and Systems, 2005. RADECS 2005. 8th European Conference on  
Publication Year: 2005 , Page(s): PC23-1 - PC23-8  
IEEE CONFERENCES

Effect of the epitaxial layer features on the reliability of medium blocking voltage power VDMOSFET during heavy ION exposure  
Velardi, F.; Iannuzzo, F.; Busatto, G.; Wyss, J.; Sanseverino, A.; Candelori, A.; Curro, G.; Cascio, A.; Frisina, F.; Cavagnoli, A.;

Radiation and Its Effects on Components and Systems, 2003. RADECS 2003. Proceedings of the 7th European Conference on  
Publication Year: 2003 , Page(s): 321 - 325

Electrical Correlation of Double-Diffused Metal–Oxide–Semiconductor Transistors Exposed to Gamma Photons, Protons, and Hot Carriers  
Palumbo, F.; Faigon, A.; Curro, G.;  
Electron Devices, IEEE Transactions on  
Volume: 58 , Issue: 5  
Publication Year: 2011 , Page(s): 1476 - 1482

F. Barreca, S. Spadaro, G. Currò, N. Acacia, F. Neri, N. Donato, M. Latino and G. Neri  
Gas Sensing Properties of Indium Oxide Nanoparticles Prepared by Laser Ablation in Water  
Lecture Notes in Electrical Engineering 91, 113-117 (2011)

F. Barreca, N. Acacia, S. Spadaro, G. Currò, F. Neri  
Tungsten trioxide (WO<sub>3</sub>-x) nanoparticles prepared by pulsed laser ablation in water  
Materials Chemistry and Physics 127, 197–202 (2011)

F. Barreca, E. Barletta, D. Spadaro, S. Spadaro, G. Currò, S. Trusso, F. Neri  
Effects of the plasma expansion dynamics and of the laser fluence on CN<sub>x</sub> thin films deposited by laser ablation  
Radiation Effects & Defects in Solids 165, 809-814 (2010)

N. Acacia, F. Barreca, E. Barletta, D. Spadaro, G. Currò, F. Neri  
Laser ablation synthesis of indium oxide nanoparticles in water  
Radiation Effects & Defects in Solids 165, 688-692 (2010)

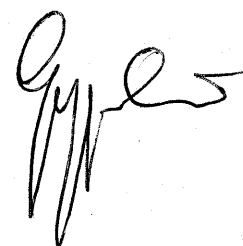
F. Barreca, N. Acacia, E. Barletta, D. Spadaro, G. Currò, F. Neri  
Titanium oxide nanoparticles prepared by laser ablation in water  
Radiation Effects & Defects in Solids 165, 573-578 (2010)

E. Fazio, F. Monforte, F. Neri, F. Bonsignore, G. Currò, M. Camalleri, D. Cali  
"Reoxidation process effects on the nitrogen bonding configurations in SiON Power MOSFET dielectric gate"  
Journal of the Electrochemical Society 155, G134-G139 (2008)

E. Fazio, F. Monforte, F. Neri, F. Bonsignore, G. Currò, M. Camalleri, D. Cali  
"Nitrogen bonding configurations of SiON thin films in Power MOSFET gate interfaces"  
Journal of the Electrochemical Society 155, G1-G7 (2008)

### **Patents and Applications:**

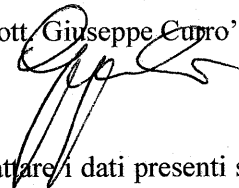
1. MOS device resistant to ionizing radiation, 24/02/2011, US8187943
2. Process and method for manufacturing a MOS device with intercell ion implant using one or more parallel enrichment windows, 17/04/2012, US8158463
3. MOS device resistant to ionizing radiation, 07/09/2010, US7791147
4. Manufacturing method for a power device having an auto-aligned double thickness gate layer and corresponding device, 18/03/2008, US7344966
5. Fabrication process of a trench gate power MOS transistor with scaled channel, 03/05/2005, US6887760
6. Moisture corrosion inhibitor layer for Al-alloy metallization layers, particularly for electronic devices and corresponding manufacturing method, 13/07/2004, US6762123
7. Moisture corrosion inhibitor layer for Al-alloy metallization layers, particularly for electronic devices and corresponding manufacturing method, 25/02/2003, US6525404
8. Process for realizing a channel scaled and small body gradient VDMOS for high current densities and low driving voltages, 09/10/2003, US20030190787



Il sottoscritto CURRO' GIUSEPPE, nato a Messina il 08.07.1966 e ivi residente in via Nuove Scuole 27, Torre Faro, ai sensi dell'art. 38 comma 3° e per gli effetti di cui agli artt. 47 e 76 del D.P.R. n. 445 del 28.12.2000, consapevole delle responsabilità penali cui può andare incontro in caso di dichiarazioni mendaci o di esibizione di atto falso o contenente dati non più rispondenti a verità, dichiara che tutte le notizie fornite nel presente curriculum professionale corrispondono al vero.

Messina, li 18/2/2011.

dott. Giuseppe Curro'



Il sottoscritto CURRO' GIUSEPPE, ai sensi del D. lgs. 196/03, autorizza a trattare i dati presenti sul CV per la valutazione del profilo professionale.

Messina, li 18/2/2011.

dott. Giuseppe Curro'

