CURRICULUM VITAE

FORMATO EUROPEO/EUROPEAN FORMAT

INFORMAZIONI PERSONALI/ PERSONAL INFORMATION

Nome, Cognome/Name, Surname	**Adriano Cola**
Indirizzo/Address Via, numero civico, c.a.p., città, nazione/ House number, street name, postcode, city, country	Via Ferrante d'Aragona 5, 73100, Lecce, Italia
Telefono/Telephone	+39 0832 422511 cell: +39 3384276965
Fax	
E-mail	adriano.cola@le.imm.cnr.it
Sito web/Website	
Nazionalità/Nationality	Italian
Luogo e data di nascita/ Place and Date of birth	La Spezia, Italy, 16 November 1961

ESPERIENZA PROFESSIONALE /WORK EXPERIENCE

Se dipendente CNR indicare:

N. MATRICOLA 478
QUALIFICA: PRIMO RICERCATORE
LIVELLO: II

In ordine di data /Dates (from – to)

2001-present, Staff Senior Scientist, CNR-IMM, Lecce Unit, Italy

1998-2001, Staff Researcher, CNR- IMM, Lecce Unit

1994-1998, Contract Reserch (ex art.23), CNR – IME, Lecce

1995 (3 months), Fellowship at INFN Pisa

1992-1994, Fellowship at Lecce University

1992 (one year) Postdoc at CNRS/LEPES, Grenoble (Fabrication and characterization of epitaxial Silicon/Silicide Schottky Barriers)

1988 (3months) Employed at ITALTEL (modeling queues for telecommunications)

1988 (3 months) Employed at ITALSIEL (software)

Nome e indirizzo del datore di lavoro / Name and address of employer	Consiglio Nazionale delle Ricerche (CNR), Institute of Microelectronics and Microsystems (IMM) Via Monteroni 73100 Lecce (Italy)
Tipo o settore di attività / Type of business or sector	Public National Research
Funzione o posto occupato / Occupation or position held	Senior Scientist (Primo Ricercatore)

Principali mansion e responsabilità / Main activities and responsibilities	Responsible of the Electro-Optic Laboratory, Research in Semiconductor Devices

ISTRUZIONE E FORMAZIONE / EDUCATION AND TRAINING

In ordine di data /Dates (from – to)	**From 1989 to 1991**
Nome e tipo d'istituto di Istruzione	University of Bari (Italy)
Principali materie e competenze professionali apprese / Principal subjects occupational skills covered	Microelectronic processes, electrical characterization of devices and deep levels, modeling of carrier transport.
Certificato o diploma ottenuto /Title of qualification awarded	PhD in Physics; Thesis: *Deep levels induced by deposition processes in GaAs Schottky barriers.*
	From 1980 to 1986
	University of Bari (Italy)
	BSc degree in Physics, : *A numerical procedure for the study of the electrical properties of semiconductors not homogeneous: applications to GaAs*, supervisor: Prof. L. Vasanelli
	Modeling semiconductors transport properties and numerical simulation of electrical properties
	Laurea in Physics, January 1986 (110/110 *cum laude*)

ATTIVITA' DI RICERCA / RESEARCH ACTIVITIES

Attuali campi di ricerca / Research sectors	X-Ray detectors, photodetectors, photovoltaics, nanoelectronics, MEMS, THz devices.

Recenti attività scientifiche/ Recent Scientific Activities.

My main scientific background concerns the transport properties of semiconductor materials and devices, especially radiation detectors, with recent interests in reduced dimensionality systems and organic based devices. In general, I am involved in modeling, and characterization. Development of numerical simulations (for example: charge signal formation in radiation detectors) and advanced characterization techniques (for example: time of flight with pulsed lasers to study charge trapping/collection processes, Pockels effect to investigate the electric field distribution in bulk detectors, photocurrent mapping systems) are part of my on-field activity. I am responsible of the electro-optical test laboratory at CNR/IMM in Lecce.

In these years I have been conducting research activity on x-ray detectors for medical applications, working in collaboration with several italian research groups (Bologna, Pisa, and Napoli) on GaAs detectors fabricated at IMM. I am also working on Cd(Zn)Te detectors for medical and astrophysical applications, leading projects which have been funded by INFN (Nuclear Physics National Institute) , ASI (Italian Space Agency) and MIUR (Italian Minister for University and Research).

In collaboration with the Drexel University of Philadelphia, I participated to the development of photo-detectors of new conception that take advantage of reduced dimensionality quantum regimes in order to improve their performance in terms of speed and sensitivity. I am still actively collaborating with the Drexel University on photodetectors, varactors and nanowires for photovoltaics.

Other research activities are oriented to the investigation of (photo-)electrical properties of nanostructures as Quantum Dots, nanorods, tetrapods, nanowires. Efforts are devoted to study the carrier transport mechanisms in single/ordered nano-structures and to their functionalization to exploit their capabilities for photovoltaics and gas sensing.

The activity on solar cells has been recently oriented to the investigation of Intermediate Band Solar Cells , based on InAs Quatum Dots, and bulk heterojuntion Solar Cells, based on ZnO nanoparticles and polymer blends.

In collaboration with the University of Montpellier, I am presently developing nanodevices for detecting/emitting Terahertz radiation.

I am also involved in the development of capacitive MEMS in III-V technology for RF applications.

Peer Reviewed pubblications (2005-present)

1. *Optical and Electrical Characterization of GaAs-based High Speed and High-Sensitivity Delta Doped Resonant Cavity Enhanced HMSM Photodetector*, Xiying Chen, Bahram Nabet, Xia Zhao, Hung-jen Huang, Adriano Cola, Fabio Quaranta, Antonietta Taurino and Marc Currie, Electron Devices, IEEE Transactions on **52**, Page(s):454 – 464, 2005
2. *Charge Transients Locally Induced by Laser Pulses in CdTe Multi-strip Detectors*, I. Farella, A.Cola, E. Caroli, A. Donati, W. Dusi, G. Ventura, E. Perillo, IEEE Trans. on Nucl. Science Volume **52**, Page(s):1968 – 1974, 2005
3. *High Speed Heterostructure MSM Photodetectors*, A. Cola, B. Nabet, X. Chen, and F. Quaranta, Acta Physica Polonica A ,**107**, pag.14, 2005
4. *Photoelectrical Properties of 1.3 μm Emitting InAs Quantum Dots in InGaAs Matrix*, A. Persano, A. Cola, L. Vasanelli, A. Convertino, G. Leo, L. Cerri, M. C. Frassanito, and S. Viticoli, Acta Pysica Polonica A, **107**, p.381, 2005
5. *Electric field distribution and charge transport properties in diode-like CdTe X-ray detectors,* A. Cola, I. Farella, A. M. Mancini, W. Dusi, E. Perillo, Nuclear Instruments & Methods in Physics Research, Section A, **568**, p.406, 2006
6. *Investigation of the electric field distribution in X-ray detectors by Pockels effect,* A Cola, I Farella, N Auricchio, Journal of Optics A: Pure and Applied Optics **8**, p.467, 2006
7. *An Optically Modulated High Sensitivity Heterostructure Varactor*, X. Zhao, A. Cola, A Tersigni, F. Quaranta, E. Gallo, J. Spanier, and B. Nabet, IEEE Electron Dev. Lett., **27**, p.710, 2006
8. *Investigation on the performances of multiple microstrip CdTe detectors,* A. Raulo, N. Auricchio, A. Cola, A. Donati, W. Dusi, V. Gostilo, G. Landini, E. Perillo, P. Siffert, M. Sowinska, and G. Ventura, Nucl. Instrum. And Meth. A **573**, p.389, 2007
9. *Electric Field Properties of CdTe Schottky Detectors*, A. Cola, I. Farella, A. M. Mancini, A. Donati IEEE-TNS Vol.**54** p.868, 2007
10. *Electronic structure of double stacked InAs/GaAs quantum dots: experiment and theory*, A. Persano, M. Lomascolo, A. Cola, A. Convertino, G. Leo, L. Cerri, A. Vasanelli, and L. Vasanelli J. Appl. Phys. **102** p.94314, 2007
11. *Spectroscopic response of a CdZnTe multiple electrode detector,* L. Abbene, S. Del Sordo,F. Fauci, G. Gerardi, A. La Manna, G. Raso, A. Cola, E. Perillo, A. Raulo, V. Gostilo, S. Stumbo, Nucl. Instrum. And Meth. A 583, p.324, 2007
12. *Role of defect states on electrical and optical properties in CdSe nanorod thin films*, Creti A., Persano A., Leo G., Cola A., Manna L., Lomascolo M. Physica E **40**, 2063, 2008
13. *Carrier Escape Dynamics in InAs Quantum Dots investigated by Current Transient Response to Quasi-resonant Excitation*, A. Cola, A. Persano, M. Currie, A. Convertino, M. Lomascolo, B. Nabet, Physica E, **40**, 2119, 2008

14. *Charge carrier Transport in this films of colloidal CdSe Quantum Rods,* A. Persano, G. Leo, L. Manna, A. Cola, J. Appl. Phys. 104, 074306, 2008
15. *Time Response of Two-Dimensional Gas-Based Vertical Field Metal-Semiconductor-Metal Photodetectors,* X.Zhao, M. Currie, A. Cola, F. Quaranta, E. Gallo, J. Spanier, B. Nabet, IEEE Trans. On Electron Dev., **55**, 1762, 2008
16. *The polarization mechanism in CdTe Schottky detectors* A. Cola and I. Farella, Appl. Phys. Lett. **94**, 102113, 2009
17. *Study on Instability Phenomena in CdTe Diode-like Detectors,* I. Farella, G. Montagna, A.M. Mancini, and A.Cola, IEEE Trans. On Nucl. Science, 56, 1736, 2009
18. *Photoconduction Properties in Aligned Assemblies of Colloidal CdSe/CdS Nanorods*, Anna Persano, Milena De Giorgi, Angela Fiore, Roberto Cingolani, Liberato Manna, Adriano Cola and Roman Krahne, ACS NANO, **4,** pp 1646–1652, 2010
19. Single Layer InAs Quantum Dots for High-Performance Planar Photodetectors Near 1.3 μm, A. Persano, B. Nabet, M. Currie, *Senior Member, IEEE,* A. Convertino, G. Leo, and A. Cola, IEEE Trans on Electron Devices, **57**, 1237-1242, 2010.
20. Transport and Charging Mechanisms in Ta_2O_5 Thin Films for Capacitive RF MEMS Switches Application A. Persano, F. Quaranta, M. C. Martucci, P. Cretì, P. Siciliano and A. Cola, J. Appl. Phys, 107, 114502, 2010
21. On direct-writing methods for electrically contacting GaAs and Ge nanowire devices. Guannan Chen, Eric M. Gallo, Joan Burger, Bahram Nabet, Jonathan E. Spanier, Adriano Cola, Paola Prete and Nicola Lovergine, Appl. Phys. Lett. **96**, 223107, 2010
22. Phototransport in networks of tetrapod-shaped colloidal semiconductor nanocrystals, Isabella R. Franchini, Adriano Cola, Aurora Rizzo, Rosanna Mastria, Anna Persano, Roman Krahne, Alessandro Genovese, Andrea Falqui, Dmitry Baranov, Giuseppe Gigli and Liberato Manna, Nanoscale **2**, 2171, 2010
23. *Electrical and optical properties of ITO and ITO/Cr-doped ITO films*, A.P. Caricato, M. Cesaria, A. Luches, M. Martino, G. Maruccio, D. Valerini, M. Catalano, A. Cola, M.G. Manera, M. Lomascolo, A. Taurino, R. Rella Appl Phys. A, Mat. Science and Processing, **753**, 2010
24. *Capacitive RF MEMS Switches with Tantalum-Based Materials*, Anna Persano, Adriano Cola, Giorgio De Angelis, Romolo Marcelli, Member, IEEE, Pietro Siciliano,and Fabio Quaranta, Journal of Microelectromechanical Systems, **20**, 355, 2011
25. Spectroscopic response of CZT detectors obtained by the boron encapsulated vertical Bridgman method, N. Auricchio, L. Marchini, E. Caroli, A. Cola, I. Farella, A. Donati, A. Zappettini, *Trans on Nucl. Science*, **58** p.552, 2011
26. *Ta_2O_5 Thin films for Capacitive RF MEMS Switches*, A. Persano, F. Quaranta, A. Cola, A. Taurino, G. De Angelis, R. Marcelli, and P. Siciliano, Journal of Sensors Volume 2010, Article ID 487061, 2010
27. *Polarization Anisotropy of Individual Core/Shell GaAs/AlGaAs Nanowires by Photocurrent Spectroscopy* Anna Persano, Bahram Nabet, Antonietta Taurino, Paola Prete, Nico Lovergine, and Adriano Cola, Appl. Phys. Lett. **98**, 153106, 2011
28. La0.*7Sr0.3MnO3 thin films deposited by pulsed laser ablation for spintronic applications*, M Martino, M Cesaria, AP Caricato, G Maruccio, A Cola, I Farella physica status solidi (a) 208, 1817, 2011
29. *LT-GaAs Heterojunction MSM Photodetectors Improve Speed and Efficiency* Marc Currie, Fabio Quaranta, Adriano Cola, Eric M. Gallo, and Bahram Nabet, *Appl- Phys. Lett.* **99**, 203502, 2011
30. *Reliability Enhancement by Suitable Actuation Waveforms for Capacitive RF MEMS Switches in III–V Technology*, Anna Persano, Augusto Tazzoli, Adriano Cola, Pietro Siciliano, Gaudenzio Meneghesso, and Fabio Quaranta *J. Microelectromech. Systems*, **99** p.1-6, 2012
31. Photocurrent properties of single GaAs/AlGaAs Core/Shell Nanowires with Schottky contacts, A Persano, A Taurino, P Prete, N Lovergine, B Nabet, A Cola, Nanotechnology 23 (46), 465701, 2012
32. A highly tunable heterostructure metal-semiconductor-metal capacitor utilizing embedded 2-dimensional charge, P Dianat, RW Prusak, E Galo, A Cola, A Persano, F Quaranta, B Nabet, Applied Physics Letters 100 (15), 153505, 2012
33. *Charge Transients by Variable Wavelength Optical Pulses in CdTe Nuclear Detectors,* A. Cola, I.Farella, M.Anni, and C. Martucci, IEEE Trans. On Nucl. Sci. **59**, p.1569, 2012
34. *Performance Enhancement of a GaAs Detector with a VerticalField and an Embedded Thin Low-Temperature Grown Layer* M Currie, P Dianat, A Persano, MC Martucci, F Quaranta, A Cola, B Nabet, Sensors **13** (2), 2475-2483,2013
35. *Electric fields and dominant carrier transport mechanisms in CdTe Schottky detectors* A Cola, I Farella, Applied Physics Letters **102** (11), 113502-113502-4, 2013
36. *High speed photodetectors based on a two-dimensional electron/hole gas heterostructure* EM Gallo, A Cola, F Quaranta, JE Spanier Applied Physics Letters **102** (16), 161108-161108-4, 2013
37. *Optimization of electron beam induced deposition process for the fabrication of diode-like Pt/SiO2/W devices* A Taurino, I Farella, A Cola, M Lomascolo, F Quaranta, M Catalano, Journal of Vacuum Science & Technology B: Microelectronics and Nanometer Structures, **31**, 041805-8, 2013
38. *Optical and electrical properties of polycarbonate layers implanted by high energy Cu ions*,

V.Resta, L.Calcagnile, G. Quarta, L. Maruccio, A.Cola, I.Farella, G. Giancane, L. Valli, Nucl. Instrum. And Methods Section B: Beam Interactions with Materials and Atoms, **312**, p.42-47 (2013)

39. *Electric Field and Current Transport Mechanisms in Schottky CdTe X-ray Detectors under Perturbing Optical Radiation*, A Cola, I Farella, Sensors **13** (7), 9414-9434, 2013
40. *On the spatial inhomogeneity of charge generation and collection in inverted all polymer solar cells*, Perulli, S Lattante, A Persano, A Cola, M Di Giulio, M Anni Applied Physics Letters **103** (5), 053305-053305-4, 2013
41. *New configuration of metallic photocathodes prepared by pulsed laser deposition* A Lorusso, A Cola, F Gontad, I Koutselas, M Panareo, NA Vainos, A Perrone , Nucl. Instrum & Meth. A **724**, 1 October 2013, Pages 72–75, 2013
42. *An unconventional hybrid variable capacitor with a two-dimensional electron gas*, P. Dianat, R.W. Prusak, A. Persano, F. Quaranta, A. Cola and B. Nabet, *IEEE Trans. Electron Devices*, **61**, 445-451 2014
43. *High-Speed High-Sensitivity Optoelectronic Device with Bilayer Electron and Hole Charge Plasma*, B. Nabet, M. Currie, P. Dianat, F. Quaranta and A. Cola, ACS Photonics, **1**, p.560-569, 2014
44. *An original method to evaluate the transport parameters and reconstruct the electric field in solid-state photodetectors* A. Santi, M. Zanichelli, G. Piacentini, M. Pavesi, A. Cola and I. Farella, Appl. Phys.Lett. **104**, 193503, 2014
45. *Non-conventional photocathodes based on Cu thin films deposited on Y substrate by sputtering* A Perrone, M D'Elia, F Gontad, M Di Giulio, G Maruccio, A Cola, NE Stankova, DG Kovacheva, E Broitman, Nucl. Instrum & Meth. A, Volume **752**, Pages 27–32, 2014
46. *Comparative study of metal and non-metal ion implantation in polymers: Optical and electrical properties* V Resta, G Quarta, I Farella, L Maruccio, A Cola, L Calcagnile Nuclear Instruments and Methods in Physics Research Section B: **331**, p.168-171, 2014
47. On the transmission of terahertz radiation through silicon-based structures, A Persano, J Torres, VV Korotyeyev, YM Lyaschuk, P Nouvel, L Francioso, Journal of Applied Physics **116** (4), 044504, 2014
48. *CdTe X-Ray detectors under strong optical irradiation*, A. Cola, I. Farella, Appl. Phys. Lett. **105**, 203501, 2014
49. *Study of spatial inhomogeneity in inverted all ‐polymer solar cells: Effect of solvent and annealing*, A Perulli, S Lattante, A Persano, A Cola, M Di Giulio, M Anni Journal of Polymer Science Part B: Polymer Physics **53** (11), 804-813 2015
50. *Anomalous capacitance enhancement triggered by light* P Dianat, A Persano, F Quaranta, A Cola, B Nabet Selected Topics in Quantum Electronics, IEEE Journal of 21 (4), 1-5, 2015
51. *On the electrostatic actuation of capacitive RF MEMS switches on GaAs substrate* A Persano, F Quaranta, MC Martucci, P Siciliano, A Cola Sensors and Actuators A: Physical **232**, 202-207, 2015
52. *Role of charge separation on two-step two photon absorption in InAs/GaAs quantum dot intermediate band solar cells*, A Creti, V Tasco, A Cola, G Montagna, I Tarantini, A Salhi, A Al-Muhanna, A Passaseo, M Lomascolo, Appl. Phys. Lett. 108 (6) p.063901, 2016
53. *Subgap time of flight: A spectroscopic study of deep levels in semi-insulating CdTe: Cl*, J Pousset, I Farella, S Gambino, A Cola, J. Appl. Phys. 119 (10) p.105701, 2016

ULTERIORI INFORMAZIONI / ADDITIONAL INFORMATION

I have directed the following bilateral projects: CNR-CNRS (1997-2000) on diamond gas sensors; CNR-CSIRO (2004-2006) on nano-lithography for new electro-optical devices; CNR-CNRS (2010-2011) on THz detection based on plasma waves in microelectronic devices.
I have been responsible for the CNR of the FISR (MIUR) project for the development of optical nanodevices operating with few photons (2203-2006).

I have directed **contracts** for

- Radiation Watch (UK) and Siemens (Germany) for advanced characterization tests of X-Ray radiation detectors (2007-2008);
- Siemens for modeling and numerically simulate the behaviour of semiconductor compound based nuclear detectors for medical applications (2010-2012)

Long term Visits

- 1995 at INFN in Pisa on nuclear detectors (3 months).
- 2001 fall term as Visiting Scientist at Drexel University (3 months).

Teaching & Supervisor

I have been tutoring several students, post-graduated and Phd students. I have been teaching courses on electronic devices within Phd programs (Lecce, Palermo), PON projects (Lecce) and specializations schools (Pisa).
I have been member in PhD committees:

Dr. Amro Anwar Seddik , Drexel Univ., Philadelphia 2001
Dr. Xia Zhao, Drexel University, Philadelphia 2006
Dr. Giulio Sabatini, Univ. Montpellier 2009
Dr. Qian Zheng, Univesidad Autonoma de Madrid, 2012 (external member)
Dr. Carlo Daher, Univ. Montpellier 2015

I've been member of the commission for the Habilitation à Diriger les Recherches of Dr. Jeremy Torres, Univ. Montpellier 2011

I have given talks, mainly concerning semiconductor X-Ray detectors, in italian Universities (Firenze, Bologna, Modena, Pisa, Bari) and foreign ones (Drexel in USA, Surray in UK, IES in Montpellier France, USP in Brasil, Northwestern Polytechnical University, Xi'an in China, LETI in Grenoble) .In 2001, I thought a course on "Electronic devices" at Drexel University, where I was Visiting Scientist.

Referee activity

I am reviewer (uneven) for the following scientific Journals : Nanotechnology, Journal of Applied Physics, IEEE-Trans. on Nuclear Science, Solid-State Electronics, Solid State Communications, Physica Status-Solidi, Journal of Phys. D: Appl. Phys, Nuclear Instrum. and Methods A, International Journal of Electronics, The Japan Society of Applied Physics, Japan Journal of Applied Physics, Adv. Energy Materials, Adv. Functional Materials, Appl. Phys. Letters, The Journal of Physical Chemistry, Materials Science in Semiconductor Processing, ACS NANO, Journal of Alloys and Compounds, Applied Physics A, Semiconductor Science and Technology, Journal of Optics, Applied Physics Express, Journal of Material Science, Measurements Science and Technology .

I have been referee (research projects) for Piemonte Region in 2006 (Industrial Research call) , for the FP7 in 2010 (Health), For Horizon 2020 in 2014 (FETOPEN-RIA), for MIUR (italian Minister for university and research) in 2014 (SIR projects) and for the Slovak Research and Development Academy in 2010. I'm also reviewer for MIUR/ANVUR within the research centres/universities current evaluation process.

Publications & Talks

I am coauthor of about 120 referred papers on International Journals and about 140 talks given in National/International Conferences/Workshops.