Giuseppe Iannaccone

Curriculum vitae – 30 December 2015

Birth date, place, citizenship:	28 April 1968, Avellino (Italy), Italian
Home Address:	Via Armando Diaz 4, 56123 Pisa, Italy
Work Address:	Dipartimento di Ingegneria dell'Informazione, Università di Pisa, Via G. Caruso 16, I-56122 Pisa, Italy, phone: +39 050 2217677, mobile +39 366 6709149, e-mail: giuseppe.iannaccone@unipi.it ,

Employment

2012 – present: Full Professor of Electrical Engineering at the University of Pisa
2001 – 2012: Associate Professor of Electrical Engineering at the University of Pisa.
1996 – 2000: Assistant Professor of Electrical Engineering at the University of Pisa.
1996 : Permanent position as Research Scientist at the Italian National Research Council.

Education

1996: Ph.D. in Electrical Engineering from the University of Pisa with a thesis on "Transport and noise phenomena in quantum effect devices", advisor Prof. Bruno Pellegrini.
1992: "Laurea" summa cum laude in Electrical Engineering (MSEE) from the University of Pisa with a thesis on "Transport phenomena and modeling of resonant tunneling diodes"

Awards

2015 Fellow of the American Physical Society (APS) for "*contributions to the theory of quantum transport and noise in mesoscopic and nanoelectronic devices and to their application in electronics*" (Sep. 2015)
2014 Fellow of the Institute of Electrical and Electronics Engineers (IEEE) for "*contributions to modeling of transport and noise in nanoelectronic devices*" (Nov. 2014)

Selected Research highlights:

- Quantum transport and noise in nanoelectronic and mesoscopic devices.
- Discovery of the enhanced shot noise phenomenon in resonant tunnelling diodes (PRL paper in 1998)
- Co-inventor of the lateral heterostructure field-effect transistor (Patent Application WO 2013080237, presented at IEDM 2011, published on ACS NANO 2012).
- Modeling of transport and noise in nanoscale devices based on graphene and two-dimensional materials
- Development of models and methods for semiconductor device modeling
- Core developer of the atomistic device simulator NanoTCAD ViDES, released as open source on htpp://vides.nanotcad.com, used in 70+ publications (half of which without us developers as co-authors)
- Design of nanopower electronic circuits for RFID transponders and implantable systems.
- **170+** papers in peer-reviewed journals, and **120+** paper in proceedings of International Conferences.
- **2500+** citations according to ISI Web of Science, December 2015, h factor **25**
- **3000+** citations according to Scopus, December 2015, h factor **25**.
- **8300+** citations according to Google scholar, December 2015 (h factor **35**) [**4500+** (h **32**) excluding reports in high-energy physics collaborations]
- **20** invited talks at conferences (personally given) and invited lectures at international advanced schools.

Teaching activity:

2015 -	Electronic Systems (30 lecture hours) for the MS curriculum in Computer Engineering
2001 to present	Electronics (12 Credits = 120 lecture hours) for the BSEE curriculum
2011 to present:	Power electronics (6 CFU = 60 lecture hours) for MSEE curriculum
2004 to 2010:	Electronic Infrastructures (6 CFU = 50 lecture hours) for MSEE curriculum
2002 and 2003:	Instrumentation and Measurements (50 lecture hours) for the MSEE curriculum
1996-2001:	Lecture series of Analog Electronics, Nanoelectronics, Computational Electronics

245+ Video lectures on YouTube channel (live from classes in 2013-2015): https://goo.gl/nADp1c

Services and Technology Transfer:
- President of the University of Pisa Technical Committee for Patents (member from 2006).
- Board Member of the Inter-University Nanoelectronics Team IUNET

Graduated PhD students:
G. I. has supervised to their degree several Ph.D. students, that now have R&D positions in Academia or in Industry. Their names and current positions are listed below.
- Dr. Marco Pala, Ph.D. 2004. Permanent Senior Researcher at CNRS-IMEP in Grenoble, France.
- Dr. Gianluca Fiori, Ph.D. 2005. Assistant Professor (Tenured) of Electronics at the Univ. Pisa
- Dr. Gilberto Curatola, Ph.D. 2005. Principal Scientist at Infineon, Villach, Austria
- Dr. Luca Perniola, Ph.D. 2005. Head of the semiconductor memory lab, CEA-LETI, Grenoble, France.
- Dr. Giuseppe De Vita, Ph.D. 2007. Senior Designer at Marvell Semiconductor, Pavia, Italy
- Dr. Stefano Stanzione, Ph.D. 2010. Researcher at Holst Center, Eindhoven, Netherlands.
- Dr. Martina Cheli, Ph.D. 2011, Systems analyst at IDS S.p.A., Pisa, Italy
- Dr. Alessandro Betti, Ph.D. 2011, Systems engineer at ISART, Pisa, Italy
- Dr. Valentina Bonfiglio, Ph.D. 2012, PostDoc Researcher at the University of Florence, Italy.
- Dr. Luca Niccolini, Ph.D. 2012, Software Developer at Facebook, Menlo Park, Usa
- Dr. Luca Magnelli, Ph.D. 2012, Senior Designer at Intel Mobile Communications, Linz, Austria
- Dr. Francesca Cucchi, Ph.D. 2013, Designer at Microtest s.p.a, Lucca, Italy
- Dr. Elisa Spanò, Ph.D. 2014, Senior Security Designer at YogiTech s.p.a., Pisa, Italy

Management and Coordination of research groups and projects
Consortium Coordinator of the following Projects
- European Project NANOTCAD (FP5 - V Framework Programme) [2000-2003]
- European Project DEWINT (European Science Foundation & FP6) [2007-2010]
- National Project PRIN 2004 (Italian Ministry of University and Research "Advanced architectures and models for nanoMOSFETs" [2005-2006]

Principal Investigator for the following 12 coordinated projects:
- 7 EC Framework Programme Projects:
  - FinFLASH (FP6) [2005-2007], SINANO (FP6) [2004-2007], Partner University of Pisa,
  - PullNano (FP6),[2006-2009], Nanosil (FP6) [2008-2010], STEEPER (FP7)[2010-2013], Partner IUNET-Pisa
  - GRADE (FP7)[2012-2014], Partner IUNET
- 5 ENIAC Joing Undertaking Projects (with partner IUNET-PISA):
  - MODERN [2009-2012], ERG [2011-2013], E2SG [2012-2014], LAB4MEMS [2013:2015], LAB4MEMS2 [2014-2016]
- 1 PRIN MIUR Project 2001 "Single Electron Devices" [2002-2003]
- 1 FIRB Project "Advanced technologies for the development of high-density non-volatile memories"
- 1 MISE FAR Project "CleverHome" [2012-2014]

Principal Investigator of 8 research grants awarded from private organizations, including semiconductor corporations such as NXP, Dialog Semiconductors, Infineon.

Activity in peer review journals and conferences committees
- Member of the tecnical program committee of 7 international conferences, among which
  - IEDM International Electron Device Meeting (2007, 2008)
  - ESSDERC European Solid-State Device Research Conference (from 2004 to today)
  - IMW International Memory Workshop (previously Joint ICMTD/NMVSW: 2005, 2008-2012)
  - IWCE International Workshop on Computational Electronics (2006, 2009, 2010)
- Regular peer review activity for: IEEE Electron Device Letters, IEEE Transactions on Electron Devices, IEEE Transactions on Nanotechnology, IEEE J. Solid State Circuits, IEEE Transactions of Circuits and Systems I, IEEE Microwave Theory and Techniques, Solid State Electronics, Physical Review Letters, Physical Review B, Appl. Phys. Lett., Journal of Applied Physics.
- Reviewer of Research Proposal for Italian Ministry of University and Research (from 2000), Ministry of Economic Development (2013), ENIAC JU (2012-2014), Horizon 2020 (2014), Science Foundation Ireland (from 2004), Research Grants Council Hong Kong (from 2005), Austrian Science Foundation

(from 2007), ANR France (from 2007), Swiss National Science Foundation (2012),

Detailed description of research and management activities

Research highlights:

- Discovery of enhanced shot noise in resonant tunneling diodes due to a feedback mechanism in quantum transport.
- Discovery of a general relation between dwell time and density of states in quantum transport
- Development of a theory of enhanced and suppressed shot noise in electron devices including resonant tunneling devices, MOS capacitors, and 2D and 1D nanoscale transistors.
- Core developer and of the atomistic device simulator NanoTCAD Vides, released as open source license to the nanoelectronics community, and now adopted by several research groups worldwide (70+ published papers on results from NanoTCAD)
- Development of a physics-based model for transistors in a transport regime intermediate between diffusive and ballistic transport.
- Co-inventor of the bilayer graphene tunnel FET (Featured in IEEE Spectrum, April 2012)
- Co-inventor of the graphene-based lateral heterostructure FET (Patent Application WO 2013080237, presented at IEDM 2011, published on ACS NANO 2012).

Research Consortium Coordination

- April 2000 - June 2003 coordinator of the EC project **NANOTCAD** (NANOTechnology Computer Aided Design – EU Contract IST-1999-10828 – V Framework Programme). The project had duration of three years and involved six European partners: University of Pisa, University of Würzburg (Germany), National Microelectronics Research Council (Cork, Ireland), Max-Planck Institute Stuttgart (Germany), Technical University of Vienna (Austria), Technical University of Zürich (Switzerland). The main aim of the project has been the development of a software package for the simulation and design of nanoscale electron devices.
- October 2006 – October 2009 coordinator of the European Science Foundation Project **DEWINT** (Device Electronics based on nanowires and nanotubes - Contract ERAS-CT-2003-980409), awarded to a consortium of four European universities and research centers (Cambridge University, Sheffield University, Technical University Vienna, Italian CNR), from funds from the European Commission and National Research Agencies.
- January 2005 - December 2006, G.I. is awarded a PRIN (Project of major national interest) grant from the Italian Ministry of Education and Research, as coordinator of a national consortium of 5 universities. The project aims at the development of simulation methods and tools for nanoscale transistors.

Principal Investigator of research projects

- January 2004 - February 2007 participates to the SINANO (Silicon Nanodevices) Network of Excellence, funded by the European Union in the sixth Framework programme, as scientific responsible for the University of Pisa research group.
- June 2005 - August 2007 is principal investigator for the research group in Pisa of the FP6 EU STREP Project “FinFlash – FinFET Based Flash Memories”. 7 Research groups from industry and academia are involved in the project.
- June 2006 – October 2008: P.I. for IUNET consortium (Pisa unit) of the FP7 Integrated Project PULLNANO “PULLing the limits of NANOcmos electronics”, including 35 partners.
- January 2008 – Dec 2010 is P.I for IUNET-Pisa of the FP7 Network of Excellence NANOSIL, “Silicon-based nanostructures and nanodevices for long term nanoelectronics applications”, including 28 European Partners.
- March 2009 - Feb 2012: is P.I for IUNET-Pisa in the JTI-ENIAC Consortium Project MODERN, dedicated to variability in semiconductor tecnology.
- June 2010 - May 2013: P.I. for IUNET-Pisa in the FP7 Strep Project STEEPER dedicated to ultralow power

transistors.

- October 2012 - September 2015: P.I. for IUNET in the FP7 Strep Project GRADE dedicated to graphene transistor for THz applications.
- January 2013 – December 2015: P.I. for IUNET-Pisa in the ENIAC Consortium Project LAB4MEMS and LAB4MEMS2, dedicated to pilot lines for MEMS products
- September 2001 – August 2003: P.I. of a grant from Fondazione Ente Cassa di Risparmio di Pisa (Pisa Savings Bank Foundation), for the development of a CAD for the simulation of nanoscale MOSFETs.
- January 2002 – December 2003: P.I. of a research project on Semiconductor Single Electron Devices granted from the Italian Ministry of University.
- October 2011 – September 2014: P.I. of the CleverHome research project funded by the Ministry for Economic Development for Wireless Sensor Networks for Home Automation.
- October 2002 – September 2005: P.I. of a three-year project aimed at the development of codes for the simulations of quantum effect devices funded by SILVACO International based in Santa Clara, California.
- October 2005 – September 2007: P.I. of a grant from the Fondazione Ente Cassa di Risparmio di Pisa and from the Cassa di Risparmio di Lucca, Pisa, Livorno of Pisa for the development of RFID transponders for the secure identification of objects based on unclonable hardware authentication circuitry (the "nanokeys").
- September 2008 – August 2009: P.I. of two projects from ENEL S.p.A. for a study of electronic infrastructures for energy conservation and for wireless monitoring of vital signs of patients.
- January 2008: two-year grant from NXP Semiconductors for the study of device variability in FinFETs.
- Nov. 2013 – Nov. 2016: three year grant from Dialog Semiconductor on the exploration of nano power electronics systems for portable applications
- Dec. 2015 – Dec. 2018: three-year grant from Infineon Technologies AG on the simulations of performance and reliability of GaN transistors for power electronics.

Awards

- Fellow of the American Physical Society (APS) for "*contributions to the theory of quantum transport and noise in mesoscopic and nanoelectronic devices and to their application in electronics*" (September 2015)
- Fellow of the Institute of Electronics and Electrical Engineers (IEEE) for "contributions to modeling of transport and noise in nanoelectronic devices" (November 2014).
- "Mariponave Sabre" from the Italian Navy, as he ranked 1st after the Training course among 416 graduate Officers (1992).
- Texas Instruments award for Tesi di Laurea (Master Thesis) on "Transport phenomena and modeling of resonant tunneling devices. (1992)
- Three-year fellowship "Ing. P. Liguori" as undergraduate student 1988-1990.

Miscellaneaous information

- May 1992: G.I. passed the examination as a Professional Engineer.
- Regular referee for , Nature Nano., Nature Comm., Phys. Rev. Lett., Phys. Rev. B, J. Appl. Phys., IEEE Electron Device Lett., Solid State Electronics, Nanotechnology, IEEE Trans. Nanotechnology, IEEE Trans. Electron Devices, IEEE J. Solid State Circuits, IEEE Trans. Microwave Theory and Techniques, IEEE Trans. Circuits and Systems II, Fluct. Noise LettersReviewer of research proposals for the European Commission, Italian Ministry of University and Research, Science Foundation Ireland, Research Grants Council (RGC) of Hong Kong, Austrian Science Fund, ANR France.
- From August to October 1994, and again from March to April 1996, he was at the Institute of Microstructural Sciences of the National Research Council in Ottawa, Canada, as a visiting scientist doing research on mesoscopic devices.
- In August 1997 he spent a month as a visiting scholar at the Computational Electronics Group of the Beckman Institute, University of Illinois at Urbana-Champaign, USA, for a research activity on quantum-dot Flash EEPROMs.
- G.I. Served on the Technical Program committee of the following conferences:

- IEDM International Electron Devices Meeting (2007-2008)
- ESSDERC European Solid-state Device Conference(2004-2013)
- IWCE International Workshop on Computational Electronics (2006,2009)
- IMW International Memory Meeting (previously ICMTD/NVSMW)(2005,2008,2009,2010)
- SISPAD (2010), ENS European Nano Systems (2004-2007)
- Transalpine conference on Nanosciences and Nanotechnologies (2008)
- Noise and Information in nanoelectronics (2003-2007)

Summary of Bibliometric data (30 Dec 2015)

Peer Reviewed Journal Papers: *170+*

Peer-Reviewed Conference Proceedings *120+*

Source	**Number of Docs**	**Total citations**	**highest n. of cit.**	***h* factor**
ISI Web of Science	229	2577	181	25
Scopus	254	3014	266	25
Google Scholar*	308 (317)	4565 (8386)	376 (1043)	32 (35)

*the number in ( ) includes technical reports with high-energy physics collaborations (large n. of authors).

10 Selected Publications (all publications available at www.iannaccone.org)

- G. Iannaccone, G. Lombardi, M. Macucci, B. Pellegrini "Enhanced shot noise in resonant tunneling", Phys. Rev. Lett. **80**, 1054 (1998).
- M. G. Pala, G. Iannaccone, "Effect of Dephasing on the Current Statistics of Mesoscopic Devices", Phys. Rev. Lett. **93**, pp. 256803-1-256803-4, 2004.
- G. Mugnaini, G. Iannaccone, "Physics-based compact model of nanoscale MOSFETs - Part I: Transition from drift-diffusion to ballistic transport", IEEE Trans. Electron Devices vol. **52**, pp. 1795-1801, 2005, ibidem "Part II: Effects of degeneracy on transport", vol. **52**, pp. 1802-1806, 2005.
- G. De Vita, G. Iannaccone, "Design criteria for the RF section of UHF and I microwave passive RFID transponders", IEEE Trans. Microwave Theory and Techniques **53**, pp. 2978-2990, 2005.
- G. Fiori, G. Iannaccone, "Simulation of Graphene Nanoribbon Field-Effect Transistors", IEEE Electron Device Letters Vol. 28, n. 8, pp. 760 – 762, 2007.
- G. De Vita, G. Iannaccone, "A Sub-1-V, 10 ppm/ ^{o}C, Nanopower Voltage Reference Generator", IEEE Journal of Solid-State Circuits, Vol.42, n. 7, pp. 1536-1542, 2007.
- G. Fiori, G. Iannaccone, "Ultralow-Voltage Bilayer Graphene Tunnel FET", IEEE Electron Device Letters, Vol. 30, n. 10, pp. 1096-1098 (2009)**.**
- G. Fiori, A. Betti, S. Bruzzone, G. Iannaccone, "Lateral Graphene-hBCN Heterostructures as a Platform for Fully Two-Dimensional Transistors", ACS NANO Vol. 6 n. 3, pp. 2642-2648, 2012.
- G. Fiori, G. Iannaccone, "Multiscale modeling for graphene-based nanoscale transistors", Proceedings of the IEEE, v. 101, n. 7, pp. 1653-1669, 2013.
- G. Fiori, F. Bonaccorso, G. Iannaccone, T. Palacios, D. Neumaier, A. Seabaugh, S. K. Banerjee, L. Colombo, "Electronics based on two-dimensional materials", Nature Nanotechnology v. 9 n. 10 pp. 768-779, 2014.

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