

# Curriculum



Nome Name:	Fabrizio
Cognome Surname:	BONANI

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WOS Author ID:	I-5937-2012
Sito WEB WEB site:	n.d.

## **POSIZIONE PROFESSIONALE ATTUALE / CURRENT PROFESSIONAL POSITION:**

Posizione attuale Current position:	In servizio
Qualifica Qualification:	Professore Ordinario (L. 240/10)
Ateneo/Ente/Azienda University/Institution/Company:	Politecnico di TORINO
Nazione Ateneo/Ente/Azienda University/Institution/Company Country:	ITA
Anno inizio Start Year:	2016
Anno fine End Year:	n.d.

## **PRECEDENTI ESPERIENZE LAVORATIVE (ULTIMI 10 ANNI) / PREVIOUS WORK EXPERIENCE ( LAST 10 YEARS):**

### **LINGUE / LANGUAGES:**

Lingua Language:	Inglese
Scrittura Writing:	A1
Comunicazione Communication:	A1

## AREA/SETTORE SCIENTIFICO-DISCIPLINARE / AREA/SECTOR SCIENTIFIC-DISCIPLINARY

Area scientifico-disciplinare Area scientific-disciplinary:	Ingegneria industriale e dell'informazione
Area scientifico-disciplinare codice Area scientific-disciplinary code:	09
Settore scientifico-disciplinare codice Sector scientific-disciplinary code:	-Elettronica
Settore scientifico-disciplinare codice Sector scientific-disciplinary code:	-IINF-01/A

## DESCRIZIONE DEI PRINCIPALI RISULTATI SCIENTIFICI CONSEGUITI NEGLI ULTIMI 10 ANNI (CON ANNESSO ELENCO DI MASSIMO 10 PUBBLICAZIONI) / DESCRIPTION OF THE MAIN SCIENTIFIC RESULTS ACHIEVED IN THE LAST 10 YEARS (WITH ATTACHED LIST OF MAXIMUM 10 PUBLICATIONS):

Descrizione Description:	<p><i>The most important scientific results in the last 10 years can be divided into three categories: 1) the physics-based simulation of semiconductor devices for RF/microwave applications, mainly based on the exploitation of Green's function techniques for the numerically efficient determination of the terminal variable (current or voltage) variations due to spatially distributed perturbations within the device volume due to either local random variations (device electronic noise characterisation), or to local sources of parametric uncertainties (device variability analysis). This work gave rise to 4 publications in the IEEE Trans. On Electron Devices and to one article published in the IEEE Electron Device Letters. 2) the application of nonlinear dynamics mathematical techniques to the study of the stability and of the perturbations of nonlinear circuits and systems, again due to either deterministic or stochastic causes. Such methodologies have been successfully applied to diverse possible applications such as the stability of power amplifiers for microwave applications, the determination of amplitude and phase noise in nonlinear oscillators, and the design of optimized nonlinear energy harvesters. This research topic resulted, among other publications, into 2 papers in Nonlinear Dynamics and one paper in the IEEE Trans. On Circuit and Systems II. 3) the development of an unconventional computation paradigm aimed at overcoming the</i></p>
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	<p><i>von Neumann bottleneck by designing nonlinear dynamical systems implementing the computation and memory functions in the same physical object. Such paradigm, dubbed memcomputing, was experimentally proved by the first implementation of an analog memcomputing machine, resulting in a paper published by the prestigious Science Advances multidisciplinary journal. Another implementation was proposed in a paper published in Nanotechnology.</i></p>
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## **PUBBLICAZIONI / PUBLICATIONS:**

Anno della pubblicazione Year of publication:	2015
Citazione Citation:	Traversa, F. L., RAMELLA, CHIARA, BONANI, Fabrizio, Di Ventra, M. (2015). Memcomputing NP-complete problems in polynomial time using polynomial resources and collective states. SCIENCE ADVANCES, vol. 1, p. e1500031, ISSN: 2375-2548, doi: 10.1126/sciadv.1500031

Anno della pubblicazione Year of publication:	2016
Citazione Citation:	DONATI GUERRIERI, Simona, BONANI, Fabrizio, BERTAZZI, FRANCESCO, GHIONE, GIOVANNI (2016). A Unified Approach to the Sensitivity and Variability Physics-Based Modeling of Semiconductor Devices Operated in Dynamic Conditions - Part I: Large-Signal Sensitivity. IEEE TRANSACTIONS ON ELECTRON DEVICES, vol. 63, p. 1195-1201, ISSN: 0018-9383, doi: 10.1109/TED.2016.2517447

Anno della pubblicazione Year of publication:	2017
Citazione Citation:	DONATI GUERRIERI, Simona, PIROLA, Marco, BONANI, FABRIZIO (2017). Concurrent Efficient Evaluation of Small-Change Parameters and Green's Functions for TCAD Device Noise and Variability Analysis. IEEE TRANSACTIONS ON ELECTRON DEVICES, vol. 64, p. 1261-1267, ISSN: 0018-9383, doi: 10.1109/TED.2017.2651168

Anno della pubblicazione Year of publication:	2017
Citazione Citation:	BUGHIO, AHSIN MURTAZA, DONATI GUERRIERI, Simona, BONANI, FABRIZIO, GHIONE, GIOVANNI (2017). Multi-gate FinFET Mixer Variability assessment through physics-based simulation. IEEE ELECTRON DEVICE LETTERS, vol. 38, p. 1004-1007, ISSN: 0741-3106, doi: 10.1109/LED.2017.2717460

Anno della pubblicazione Year of publication:	2019
Citazione	Bonnin, Michele, Traversa, Fabio L., Bonani,

Citazione:	Fabrizio (2019). Colored Noise in Oscillators. Phase-Amplitude Analysis and a Method to Avoid the Itô-Stratonovich Dilemma. IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS. I, REGULAR PAPERS, vol. 66, p. 3917-3927, ISSN: 1549-8328, doi: 10.1109/TCSI.2019.2914398
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Anno della pubblicazione Year of publication:	2020
Citazione Citation:	Bonnin, Michele, Traversa, Fabio L., Bonani, Fabrizio (2020). Analysis of influence of nonlinearities and noise correlation time in a single-DOF energy-harvesting system via power balance description. NONLINEAR DYNAMICS, vol. 100, p. 119-133, ISSN: 0924-090X, doi: 10.1007/s11071-020-05563-0

Anno della pubblicazione Year of publication:	2021
Citazione Citation:	Michele Bonnin, Fabio L. Traversa, Fabrizio Bonani (2021). Leveraging circuit theory and nonlinear dynamics for the efficiency improvement of energy harvesting. NONLINEAR DYNAMICS, vol. 104, p. 367-382, ISSN: 0924-090X, doi: 10.1007/s11071-021-06297-3

Anno della pubblicazione Year of publication:	2021
Citazione Citation:	Catoggio, Eva, Guerrieri, Simona Donati, Bonani, Fabrizio (2021). Efficient TCAD Thermal Analysis of Semiconductor Devices. IEEE TRANSACTIONS ON ELECTRON DEVICES, vol. 68, p. 5462-5468, ISSN: 0018-9383, doi: 10.1109/TED.2021.3076753

Anno della pubblicazione Year of publication:	2023
Citazione Citation:	Caravelli, F., Traversa, F. L., Bonnin, M., Bonani, F. (2023). Projective embedding of dynamical systems: Uniform mean field equations. PHYSICA D-NONLINEAR PHENOMENA, vol. 450, ISSN: 0167-2789, doi: 10.1016/j.physd.2023.133747

Anno della pubblicazione Year of publication:	2024
Citazione Citation:	Bonnin, Michele, Song, Kailing, Traversa, Fabio L., Bonani, Fabrizio (2024). Model order reduction and stochastic averaging for the analysis and design of micro-electro-mechanical systems. NONLINEAR DYNAMICS, vol. 112, p. 3421-3439, ISSN: 0924-090X, doi: 10.1007/s11071-023-09225-9

**DESCRIZIONE DEI PRINCIPALI PROGETTI DI RICERCA E PREMI CONSEGUITI NEGLI ULTIMI 10 ANNI (CON ANNESSO ELENCO DI MASSIMO 10 RISULTATI, INCLUDENDO, A TITOLO DI ESEMPIO, PRINCIPAL INVESTIGATOR O COORDINATORE LOCALE DI**

**PROGETTI DI RICERCA COMPETITIVI NAZIONALI O INTERNAZIONALI, SIGNIFICATIVI PREMI CONSEGUITI PER LA PROPRIA ATTIVITÀ DI RICERCA)/ DESCRIPTION OF THE MAIN RESEARCH PROJECTS AND AWARDS AWARDED IN THE LAST 10 YEARS (WITH ATTACHED LIST OF MAXIMUM 10 ACHIEVEMENTS, INCLUDING, FOR EXAMPLE, PRINCIPAL INVESTIGATOR OR LOCAL COORDINATOR OF NATIONAL OR INTERNATIONAL COMPETITIVE RESEARCH PROJECTS, SIGNIFICANT AWARDS AWARDED FOR YOUR RESEARCH ACTIVITY):**

Descrizione Description:	<i>The candidate was local PI for a couple of TEMPUS European projects coordinated by the Grenoble Ecole de Management (France), involving several Universities and companies in north African countries (Tunisia, Algeria, Morocco): "FEFEDI - Filière d'Expertise maghrébine de Formation en Entrepreneuriat et en Développement International" e "Création d'un environnement pour l'émergence de pôles régionaux de formation, d'innovation et de recherche au Maghreb - PORFIRE".</i>
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Descrizione Description:	Principal investigator for the TEMPUS project FEFEDI - Filière d'Expertise maghrébine de Formation en Entrepreneuriat et en Développement International
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Descrizione Description:	Principal investigator for the TEMPUS project PORFIRE - Création d'un environnement pour l'émergence de pôles régionaux de formation, d'innovation et de recherche au Maghreb
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**DESCRIZIONE DEI PRINCIPALI RISULTATI CONSEGUITI NEGLI ULTIMI 10 ANNI IN TERMINI DI SVILUPPO DI RETI E RELAZIONI SCIENTIFICHE NAZIONALI E INTERNAZIONALI (CON ANNESSO ELENCO DI MASSIMO 5 RISULTATI, INCLUDENDO, A TITOLO DI ESEMPIO, PARTECIPAZIONE O ORGANIZZAZIONE DI CONVEGNI NAZIONALI E INTERNAZIONALI; CONTRIBUTI A CONSORZI DI RICERCA) / DESCRIPTION OF THE MAIN RESULTS ACHIEVED IN THE LAST 10 YEARS IN TERMS OF DEVELOPMENT OF NATIONAL AND INTERNATIONAL SCIENTIFIC NETWORKS AND RELATIONS (WITH ATTACHED LIST OF MAXIMUM 5 RESULTS, INCLUDING, FOR EXAMPLE, PARTICIPATION OR ORGANIZATION OF NATIONAL AND INTERNATIONAL CONFERENCES; CONTRIBUTIONS TO RESEARCH CONSORTIA):**

Descrizione	<i>The candidate is a member (former vice-chair and</i>
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Description:	<i>chair) of the IEEE Microwave Theory and Technology Society Technical Committee on Microwave Low-Noise Techniques (MTT-11) since 2003, and a member of the Technical Program Review Committee of the IEEE International Microwave Symposium (IMS) since 2013. He is also a member of the International Advisory Committee of the International Conference on Noise and Fluctuations (ICNF) since 2017. He is member of the Italian Centro Interuniversitario di Ingegneria delle Microonde per Applicazioni Spaziali, Senior Member of the IEEE and member of the European Microwave Association (EuMA).</i>
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Descrizione Description:	Member of the Technical Program Review Committee of the IEEE International Microwave Symposium (IMS)
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Descrizione Description:	Member of the International Advisory Committee of the International Conference on Noise and Fluctuations (ICNF)
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Descrizione Description:	Member of Centro Interuniversitario di Ingegneria delle Microonde per Applicazioni Spaziali (MECSA)
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Descrizione Description:	IEEE Senior Member
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Descrizione Description:	Member of the European Microwave Association (EuMA)
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**DESCRIZIONE DEI PRINCIPALI RISULTATI CONSEGUITI NEGLI ULTIMI 10 ANNI IN TERMINI DI SUPPORTO ALLA COMUNITÀ SCIENTIFICA (CON ANNESSO ELENCO DI MASSIMO 5 RISULTATI, INCLUDENDO, A TITOLO DI ESEMPIO, RESPONSABILITÀ DI DIREZIONE DI COMITATI EDITORIALI; INCARICHI DI VALUTAZIONE DELLA RICERCA PRESSO ISTITUZIONI NAZIONALI O INTERNAZIONALI; RESPONSABILITÀ ISTITUZIONALI ALL'INTERNO DELL'ISTITUZIONE DI APPARTENENZA O DI ALTRE ISTITUZIONI) / DESCRIPTION OF THE MAIN RESULTS ACHIEVED IN THE LAST 10 YEARS IN TERMS OF SUPPORT TO THE SCIENTIFIC COMMUNITY (WITH ATTACHED LIST OF MAXIMUM 5 RESULTS, INCLUDING, FOR EXAMPLE, MANAGEMENT RESPONSIBILITIES OF EDITORIAL COMMITTEES; RESEARCH EVALUATION ROLES AT NATIONAL OR INTERNATIONAL INSTITUTIONS; INSTITUTIONAL**

**RESPONSIBILITIES WITHIN THE INSTITUTION OF AFFILIATION OR OTHER INSTITUTIONS):**

Descrizione Description:	<i>The candidate has served as Associate Editor in the editorial board of the IEEE Transactions on Computer Aided Design of Integrated Circuits and Systems (former), of the IEEE Transactions on Microwave Theory &amp; Techniques (current), of the IEEE Transactions on Electron Devices (current), and of the Open Access journal Memories - Materials, Devices, Circuits and Systems (Elsevier, current). He also was Guest Editor for a Special Issue in the IEEE Trans. On Electron Devices and for a Special Issue in the IEEE Microwave Magazine.</i>
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Descrizione Description:	Associate Editor, IEEE Transactions on Computer Aided Design of Integrated Circuits and Systems
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Descrizione Description:	Associate Editor, IEEE Transactions on Microwave Theory & Techniques
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Descrizione Description:	Associate Editor, IEEE Transactions on Electron Devices
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Descrizione Description:	Associate Editor, Memories - Materials, Devices, Circuits and Systems
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Descrizione Description:	Guest Editor, IEEE Transactions on Electron Devices
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**DESCRIZIONE DEI PRINCIPALI RISULTATI CONSEGUITI NEGLI ULTIMI 10 ANNI IN TERMINI VALORIZZAZIONE DELLE CONOSCENZE (CON ANNESSO ELENCO DI MASSIMO 3 RISULTATI, RELATIVI ALLA PARTECIPAZIONE DEL CANDIDATO ALLE ATTIVITÀ DI VALORIZZAZIONE DELLE CONOSCENZE) / DESCRIPTION OF THE MAIN RESULTS ACHIEVED IN THE LAST 10 YEARS IN TERMS OF KNOWLEDGE VALORIZATION (WITH ATTACHED LIST OF MAXIMUM 3 RESULTS, RELATING TO THE CANDIDATE'S PARTICIPATION IN KNOWLEDGE VALORIZATION ACTIVITIES):**

Descrizione Description:	<i>With reference to the knowledge valorisation activities according to Art. 9, paragraph 5 of the call for participation VQR 2020-2024, the candidate was active in the field of sustainability through the organization, as Scientific Coordinator, of the Sino-Italian Campus of Engineering and Innovation, a joint school</i>
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	<i>initiative together with Tongji University (Shanghai, China).</i>
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Descrizione Description:	Member of the Joint Management Committee of the Sino-Italian Campus of Engineering and Innovation (SICEI) initiative
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Descrizione Description:	Lecturer in the 2022 Shanghai Summer School "Shaping the Community of the Future through a Sustainable Campus"
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**Informazioni aggiornate alla data di candidatura 27-05-2025**

**Fabrizio BONANI**

*Il presente curriculum costituisce allegato e parte integrante dell'incarico sottoscritto*