Curriculum Vitae

Giuseppe Abreu, D.Eng
Senior Member, IEEE

Centre for Wireless Communications
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Current Position

2006 - Present

Adjunct Professor (Docent)
Faculty of Technology, University of Oulu, Oulu, Finland
I currently serve as a Docent on "*Statistical Signal Processing and Communication Theory for Multidimensional and Distributed Wireless Systems*." In this role I lead an externally-funded research program centered on a vision of future, sustainable, advanced wireless communications systems, acting as **Principle Investigator** in various projects of pan-european scale (PULSERS I, PULSERS II, EUWB, EARTH). On communication theory, my interests include **analysis of cooperative** systems including distributed space-time coded schemes, **network performance** metrics and fundamental limits, **optimization** tools, **channel models** and statistics, as well as **characterization of fundamental functions**. On communication systems and algorithms, some of my research interests are **opportunistic and autonomous** schemes, **relaying and cooperation** mechanisms, **positioning and cognitive** algorithms, as well as **network clusterization and discovery**, amongst other.

Senior Services to the Profession

2009 - Present

Editor: *IEEE Transactions on Wireless Communications*
Voting Member: *IEEE Communication Theory Technical Committee*
Senior Member of IEEE: *Communication and Signal Processing Societies*

Evaluations for Full Professorship Positions

2009 — Short-listed in **2-nd place** for the position "*Professor of Wireless Communications*" (**full professorsip**)
University of Oulu, Oulu, Finland

2008 — Short-listed in **3-nd place** for the position "*Professor of Communications*" (**full professorsip**)
Tampere University of Technology, Finland

Cumulative Publication Record

by Dec. 2009

Journal Articles: 19 published, 1 in press
Conference Papers: 93 published, 4 accepted(invited), 2 submitted
*Nomination for **Best Paper Award** at *IEEE Asilomar Conference on Signals, Systems and Computers* 2009
Books and Chapters: 3 published chapters
Patents: 2 registered (international)

Research Funding and Leadership

2010 - 2012
±€800,000

EU FP7 Integrated Project EARTH
- Role: Founder
- Topic: Energy efficient wireless (cellular) technologies beyond LTE-Advanced (PHY and Network layers)
- Partners: Ericson, Alcatel-Lucent, DoCoMo, Telecom Italia, Interuniversity Microelectronics Centre, CEA-Leti, University of Surrey, Technische Universität Dresden, Intituto Superior Técnico de Lisboa.

2009 - 2011
±€700,000

EU FP7 Integrated Project EUWB
*- Role: Founder, **Principal Investigator** and Workpackage Leader*
- Topic: Multihop networks with localization capabilities (PHY, Network and Application layers)
- Partners: Bosch, Philips, Thales, TES Electric, EADS, Wisair, Telefónica, CEA-Leti, Università di Bologna, Universidad de Zaragoza, Universität Duisburg-Essen, Libniz Universität Hannover, Technische Universität Ilmenau.

2007 - 2013
±€120,000

GETA Grant - Funding for one PhD student
- Role: Thesis supervisor
- Topic: Random matrices with application to tracking algorithms

2006 - 2011
±€120,000

INFOTECH Grant - Funding for one PhD student
- Role: Thesis supervisor
- Topic: Multivariate optimization theory applied to network localization

2006 - 2008
±€900,000

EU FP6 Integrated Project PULSERS Phase II
*- Role: Founder, **Principal Investigator** and Workpackage Leader*
- Topic: Autonomous communication systems using ultra-wideband technology (complete system + demonstration)
- Partners: Bosch, Philips, Thales, TES Electric, EADS, Wisair, Telefónica, CEA-Leti, Università di Bologna, Universidad de Zaragoza, Universität Duisburg-Essen, Libniz Universität Hannover, Technische Universität Ilmenau

PhD Students Graduated or Under Supervision (since Docentship)

exp. grad. 2013 — Markus Wehner, PhD Candidate, HTW Dresden (with Prof. Sven Zeisberg)
Research Area: "*Anchor-free Localization Algorithms for Industrial Networks*"

exp. grad. 2012 — Pedro Nardelli, PhD Candidate, University of Oulu
Research Area: "*Stochastic Geometry and Information Theory of Wireless Networks*"

exp. grad. 2012 — Qiang Xue, PhD Candidate, University of Oulu
Research Area: "*Information Theory and Opportunistic Cooperative Networks*"

exp. grad. 2011 — Wensheng Zhang, PhD Candidate, Keio University (with Prof. Yukitoshi Sanada)
Research Area: "*Spectrum Sensing for Cognitive Radio*"

exp. grad. 2011 — Carlos Lima, PhD Candidate, University of Oulu
Research Area: "*Game Theory, Stochastic Geometry and Wireless Autonomic Networking*"

exp. grad. 2011 — Golaleh Rahmatollahi, PhD Candidate, Universität Hannover (with Prof. Markus Fidler)
Research Area: "*Cross-layer Optimization of Heterogeneous Networks*"

exp. grad. 2011 — Davide Macagnano, PhD Candidate, University of Oulu
Research Area: "*Estimation Theory, Wavelets and Tracking Algorithms*"

exp. grad. 2011 — Giuseppe Destino, PhD Candidate, University of Oulu
Research Area: "*Multivariate Optimization and Localization Algorithms*"

exp. grad. 2010 — Stefano Severi, PhD Candidate, Università degli Studi di Bologna
Research Area: "*Bayesian Theory, Graphs and Localization Algorithms*"

graduated 2009 — Gabriel Villardi, PhD, Yokohama National University (with Prof. Ryuji Kohno)
Thesis: "*Distributed Space-Time Block Codes under Time-Selective Fading Channels*"

graduated 2007 — Tadatomo Sato, PhD, Yokohama National University (with Prof. Ryuji Kohno)
Thesis: "*Beamforming and Calibration in Antenna Arrays for Reliable Wireless Systems*"

Research Network & International Exchange

Apr. - Jun. 2010 — Visit to **Keio University**, Japan - Prof. Yukitoshi Sanada

Nov. 2009 — Visit to **Katholieke Universiteit Leuven**, Belgium - Prof. Sabine van Huffel

Nov. 2009 — Visit to **Stanford University**, U.S.A. - Prof. John Cioffi

Sep. 2009 — Visit by Mr. Markus Wehner, **HTW Dresden**, Germany

May 2009 — Visit to **Lebniz Universität Hannover**, Germany - Prof. Thomas Kaiser

Jan. - Mar. 2009 — Visit by Mrs. Golaleh Rahmatolahi - **Lebniz Universität Hannover**, Germany

Dec. 2008 — Visit to **Technische Universität Dresden**, Germany - Prof. Gerhard Fettweis

Dec. 2008 — Visit by Mr. Behrouz Maham - **University of Oslo UNIK**, Norway

Sep. 08 - Jul. 09 — Visit by Mr. Stefano Severi - **Università degli Studi di Bologna**, Italy

Oct. 2008 — Visit to **Rice University**, U.S.A. - Prof. Behnaam Aazhang

Sep. 2008 — Visit to **Yokohama National University**, Japan - Prof. Ryuji Kohno

Nov. 2007 — Visit to **University of York**, U.K. - Prof. Rodrigo de Lamare

Oct. 2007 — Visit to **Rice University**, U.S.A. - Prof. Behnaam Aazhang

Aug. 2007 — Visit by Mr. Gabriel Villardi - **Yokohama National University**, Japan

Jan. 2007 — Visit to **Statistical and Applied Mathematical Sciences Institute**, U.S.A - Prof. Paul Flikkema

Nov. 2006 — Visit to **Yokohama National University**, Japan - Prof. Ryuji Kohno

Oct. - Dec. 2006 — Visit by Mr. Flavio Esposito - **Boston University**, U.S.A.

Sep. 2006 — Visit by Prof. Merouane Debbah - **Institute Eurecom**, France

Jun. 2006 — Visit by Prof. Paul Flikkema - **Northern Arizona University**, U.S.A.

Organizational Activities

2011 — **TPC Co-Chair** - *IEEE Communication Theory Workshop* (CTW)

2010 — **TPC Co-Chair** - *IEEE Workshop on Positioning, Navigation and Comm.* (WPNC)
TPC Member - *IEEE International Conference on Communications* (ICC)
TPC Member - *IEEE Global Conference on Communications* (Globecom)
TPC Member - *IEEE Personal Indoor Mobile Radio Communications* (PIMRC)
TPC Member - *IEEE International Telecommunications Symposium* (ITS)
TPC Member - *Workshop on Wireless Personal Mobile Communications* (WPMC)

2009 — **TPC Member** - *IEEE Int. Workshop on Comm. and Mobile Computing* (IWCMC)
TPC Member and Track Chair - *IEEE Workshop on Positioning, Navigation and Comm.* (WPNC)
Session Chair - *IEEE International Conference on Communications* (ICC)

2008 — **Session Chair** - *IEEE Wireless Communication and Networks Conference* (WCNC)
Session Chair - *International Workshop on Medical ICT* (IWMICT)

2007 — **TPC Member** - *IEEE Personal Indoor Mobile Radio Communications* (PIMRC)
Session Chair - *International Symposium on Medical Information and Communication Technology* (ISMICT)

2006 — **TPC Member** - *IEEE Personal Indoor Mobile Radio Communications* (PIMRC)
TPC Member - *IEEE International Conference on Ultra-Wideband* (ICU)

2005 — **Session Chair** - *IEEE Personal Indoor Mobile Radio Communications* (PIMRC)
Session Chair - *IEEE Asilomar Conf. on Signals, Systems and Comp.* (ASILOMAR)
Session Chair - *IST Mobile Summit, Dresden, Germany*

Previous Positions

2004 - 2006 **Senior Research Scientist (Post-Doc)**

Center for Wireless Communications, University of Oulu, Oulu, Finland

I joined the Centre for Wireless Communications (CWC) immediately after concluding PhD studies in Japan. From April 2004 to November 2005, I conducted independent research on topics ranging from **Wavelets** to **Space Time Coding**, and managed the EU project PULSERS Phase I, assisting with advising PhD students. In December 2005, I assumed full leadership of the project within the University of Oulu and became a Workpackage Leader and Steering Board Member. As a result of my strong academic output and leadership demonstrated in that period, I was appointed a Senior Lecturer on June 2006 (see Letter of Appointment attached).

Research Leadership

EU FP6 Integrated Project PULSERS Phase I

*- Role: **Principal Investigator** and Workpackage Leader*

- Topic: Foundations of ultra-wideband systems (coding, modulation, multiple access + transceiver chipset)

- Partners: ST Microelectionics, Mitsubishi, Robotiker, Philips, Thales, TES Electric, EADS, Wisair, Sennheiser, Freescale, Telefónica, VTT Finland, CEA-Leti, Università degli Studi di Roma, Universidad de Zaragoza, Universität Karlsruhe, Technische Universität Ilmenau, Technische Universität Dresden

Publication Output in the Period

April 04 - May 06 **Journal Articles**: 5 published articles
Conference Papers: 15 published articles

2001 - 2002 **Lecturer** (in parallel with Doctoral studies)

Yokohama National University, Yokohama, Japan

In parallel to Doctoral studies, I was a contracted Lecturer at the Division of Physics, Electrical and Computer Engineering of the Yokohama National University, Japan, in which position I taught the course "*Laboratory on Information Systems and Computer Science*". The corse included both classroom lectures and laboratory and focused on using C++ to model and solve various problems in Electrical Engineering. For more details, see **Teaching Portfolio & Plan** attached.

1999 - 2002 **Research Scientist** (in parallel with Master's and Doctoral studies)

Computer Science Laboratory, Sony Corporation, Tokyo, Japan

In parallel with postgraduate studies, I held a part-time research position at the Advanced Telecommunications Laboratory of Sony Corporation in Tokyo Japan where I conducted research on algorithms for **adaptive antenna array** systems and filters, with application both to **indoor communications** and **multi-antenna cellular systems** based on SDMA. Such a joint academic/industrial experience contributed to my receiving of the *Best Foreign Student Master's Thesis in Japan* in the year 2000, awarded by Tokyo University's Uenohara Foundation (see **Awards & Honors** section below). I also produced 2 international patents for Sony Corporation in that period.

1996 - 1997 **Telecommunications Engineer**

Telenge Telecommunications & Engineering Ltd., Salvador, Bahia, Brazil
Detelba Telecommunications, Salvador, Bahia, Brazil

Right after graduating from engineering school, I worked as an Engineer at a couple of companies which installed and maintained telecommunications systems across the 3.5-million-strong metropolitan area of my home town of Salvador da Bahia. In that position I dimensioned and supervised the installation of various telecommunications systems ranging from **microwave** and **optical fiber-based** backbones for **cellular systems**, to PCM-multiplex stations for wireline telephony. This experience, contrasted with my deep and early interest in mathematics (see Education) gave me an understanding of the difference between practice and theory, and a long-lasting appreciation for the distinct but equally important roles of academia and industry.

1992 - 1995 **Research and Teaching Assistant** (in parallel with undergraduate studies)

Universidade Federal da Bahia, Salvador, Bahia, Brazil
Carl von Ossietzky Universität Oldenburg, Oldenburg, Germany

In parallel to undergraduate studies I was a research and teaching assistant, first with the Department of Mathematics and Statistics, then with the Department of Electrical Engineering – both at the Universidade Federal da Bahia, Brazil – and later with the Department of Physiscs at the Karl von Ossietsky Universität Oldenburg, Germany. The research assistantship in Mathematics gravitated around areas such as **computational algebra** and **complex function analysis**. In engineering, I worked on research projects on **control and communications**, developing system simulators with **error correcting codes** and **control algorithms**. And in physics, I worked on **gravitational models** to predict the output of photovoltaic systems. The positions in Mathematics and Engineering were supported by the highly competitive Program for Scientific Initiation, maintained by the Brazilian government to attract young talents to scientific carriers. The position in Physics was funded by 1 of only 2 scholarships granted by the Carl Duisberg Gesellschaft, from Germany, to entire country at the time and in that area of activity. The early contact with research and scholars of the highest caliber bred in me the never-ending scientific curiosity and excitement I so value in the academic carrier.

Education

March 2004 **D.Eng – Physics, Electrical and Computer Engineering**
Yokohama National University, Yokohama, Japan
- Thesis Title: "*Orthogonal Designs for Advanced Wireless Communications*"
My Doctoral research was tailored to establishing foundations for a long career in academia on the area of wireless communications. Facilitated by a background on both mathematics and engineering, I focused on a mathematical feature (*orthogonality*) and its relation to several problems encountered in wireless communications, instead of focusing on a specific problem alone. The research work was conducted with aim at gaining expertise in the three fundamental "physical" domains of a wireless system, namely, the Medium (including waveforms, channel models etc.), the Radio (including signal processing, modulation, coding, etc.), and their interface, the Antennas. Consequently, the Thesis was written in three parts. The first was dedicated to *Orthogonal Designs & Space-Time Coding* where the impact of **time-selectivity**, **frequency-selectivity** and **spatial correlation** on the orthogonality of **space-time block codes** was investigated, and mitigated. The second was dedicated to *Orthogonal Designs & Antenna Arrays*, where I considered the problem of designing optimum (nearly) **orthogonal beampatterns** (or equivalently, filters) with adjustable lobes under the constraint of a given sidelobe ratio. The methods developed thereby were patented for Sony Corporation and find application (in **SDMA systems**, **software-defined radios** and even indoor systems such as microphone arrays). Finally, the third part focused on *Orthogonal Designs & UWB Systems*, where a mathematical framework was developed to solve various orthogonality-related problems of **UWB signaling**, including the **correction of waveform distortions**, the improvement of receivers, and the design of antenna arrays using simple tools previously only available to narrowband signals. My Doctoral studies were fully supported by a number of prestigious scholarships (see **Awards & Honors**) and marked by a strong publication record (see **Publication Record**).

March 2001 **M.Eng. – Physics, Electrical and Computer Engineering**
Yokohama National University, Yokohama, Japan
- Thesis Title: "*Near Field Adaptive Array Antenna for Indoor Radio Communications*"
Award: *Best Foreign Student Master's Thesis* (Uenohara Foundation - Tokyo University, 2000)
The research for my Master's Thesis was conducted partly at the Advanced Telecommunications Laboratory (ATL) of Sony Corporation in Tokyo, Japan and earned me the *Best Master's Thesis by a Foreign Student in Japan* in the year 2000, awarded by Tokyo University's Uenohara Foundation (see **Awards & Honors** section below) as well as two international patents (for Sony Corporation). My Master's Thesis studies were fully supported by a number of prestigious scholarships (see **Awards & Honors**) and marked by a strong publication record (see **Publication Record**).

Nov. 1997 ***Latu Sensu* – Telecommunications Engineering**
Universidade Federal da Bahia, Salvador, Bahia, Brazil

Jan. 1996 **B.Eng. – Electrical Engineering (Electronics)**
Universidade Federal da Bahia, Salvador, Bahia, Brazil

Awards & Honors

2010 **Fellowship** - Visiting Scholar - *Japanese Society for the Promotion of Science - JSPS*

2009 **Nomination** - Finalist, Best Paper Award Contest - *IEEE Asilomar Conf. on Signals, Systems and Comp., U.S.A.*

2002 - 2003 **Scholarship** - *Honjo International Foundation, Japan*
Scholarship - *Futaba Foundation, Japan*

2001 **Scholarship** - *Takaku International Foundation, Japan*
Scholarship - *Yokohama Industrial Association, Japan*

2000 **Scholarship** - *Rotary Yoneyama Memorial Foundation, Japan*
Award - Best Foreign Student Master's Thesis - *Tokyo University's Uenohara Foundation, Japan*

1997 - 1998 **Scholarship** - *Ministry of Education, Culture, Sports, Science and Technology, Japan*

1995 **Scholarship** - *Carl Duisberg Gesellschaft, Germany*

1992 - 1995 **Scholarship** - *Conselho Nacional de Pesquisa e Desenvolvimento, Brazil*

Languages

Portuguese **Native**
English **Fluent**
Japanese **Fluent**
Spanish **Advanced**
French **Intermediate**
Finnish **Notions**
German **Notions**