

Curriculum Vitae

PERSONAL INFORMATION

Vuk Marojevic

Email **vuk.marojevic@gmail.com**
Nationality **German**
Date of birth **08/08/1977**
Profession **Researcher, Electrical Engineering**



EDUCATION

01/2004 – 10/2009 **Electrical Engineering, PhD Degree**
Dept. of Signal Theory and Communications, UPC
Thesis title: "Computing Resource Management in Software-Defined and Cognitive Radios"
Graduation Grade: summa cum laude

10/1997 – 08/2003 **Electrical Engineering, Dipl. Ing./MSc Degree**
University of Hannover, Germany
Graduation Grade: 1.7 (scale: 1-5, where 1 is highest)

PROFESSIONAL EXPERIENCE

07/2013 – present **Research Associate**
*Bradley Dept. Electrical and Computer Engineering
Wireless @ Virginia Tech*
Responsibilities: Software-defined radio (SDR) and cognitive radio research and education, Cornet testbed manager, R&D proposal preparation, etc.

02/2012 – 06/2013 **Researcher**
Radio Communications Research Group, Dept. of Signal Theory and Communications, UPC
Activities: SDR cloud research, open-source SDR framework development and promotion, R&D proposal preparation, supervision of undergraduate and graduate students, etc.

02/2008 – 02/2012 **Assistant Professor**
*Dept. of Signal Theory and Communications, Universitat Politècnica de Catalunya (UPC) –
Barcelona Tech, Spain*
Teaching:

- *Digital Techniques for Communications* (Bachelor Degree, EE): teaching, laboratory supervision, examination (six semesters: Spring '08 – Fall '10)
- *Analog and Digital Signal Processing for Aerospace Applications* (Master of Aerospace Science and Technology): teaching, examination, course coordination (two semesters: Fall '10 & '11)
- *Wireless Communications* (Master Degree, EE), group project definition and supervision (three semesters: Fall '10 – Fall '11)

Supervision: 2 Bachelor's Thesis, Ph.D. co-advisor of Ismael Gomez Miguelez
Research: SDR, cognitive radio, computing resource management, SDR framework and waveform development tools, SDR cloud, etc.

- 09/2007 – 12/2007 **Visiting Researcher**
Mobile and Portable Radio Research Group (MPRG), Virginia Tech, USA
 Activities: SDR and cognitive radio research, collaboration on research projects
- 01/2004 – 12/2007 **Researcher**
Radio Communications Research Group, Dept. of Signal Theory and Communications, UPC
 Activities: SDR and cognitive radio research (mapping and scheduling of waveforms on multi-processor platforms), participation in research projects
- 12/1999 – 10/2000 **Hardware Developer**
SCRIBOR AG, Hannover, Germany
 Activities: Hardware development for wireless computer networks: FPGA-design, mounting and initiation of printed circuit boards, assembly and test of prototype production run
- 1998 – 2000 **Physics Laboratory Assistant**
University of Hannover, Germany
Medical School Hannover, Germany

SPONSORED R&D PROJECTS

- 09/2012 – 06/2013 **Open-Source LTE Deployment**
 Financing entity: NLnet Stichting (non-profit private foundation), Amsterdam, The Netherlands
 Project duration: 12.09.2012 – 12.06.2013
 Project leader: Dr. Vuk Marojevic
 Project objective: Provide open-source LTE waveform implementation, promote SDR framework ALOE
 Responsibilities: project management, overall software architecture, implementation, documentation, advertisement, community building, commercialization, etc.
- 01/2012 – present **Digital signal processing solutions for reconfigurable and sustainable wireless systems**
 Financing entity: CICYT (TEC2011-29126-C03-02), Spanish Government
 Project duration: 01.01.2012 – 31.12.2014
 Principal investigator: Dr. Pere L. Gilabert Pinal
 Project objective: Investigate new architectures, tools and signal processing solutions for more flexible and sustainable wireless communications systems
 Responsibilities: resource management strategies for centralized baseband processing using SDR and cloud computing technology
- 09/2004 – 12/2010 **NEWCOM (Network of Excellence for Wireless Communications)**
 Financing entity: IST project of the European Union (FP6-IST-507325)
 Duration: 03/2004 – 12/2010
 Principal investigator: Dr. Sergio Benedetto
 Project objective: Design of flexible radio communications systems
 Responsibilities: execution environment/middleware for heterogeneous multiprocessor platforms
- 11/2006 – 11/2009 **Cognitive Radio and Heterogeneous Wireless Networks**
 Financing entity: CICYT (TEC2006-09109), Spanish Government
 Duration: 11/2006 – 11/2009
 Principal investigator: Dr. Antoni Gelonch Bosch
 Project objective: Design of reconfigurable and cognitive systems for radio communications
 Responsibilities: computing resource modeling, cognitive management methods and algorithms

- 09/2007 – 12/2007 **Open-Source SCA Implementation - Embedded (OSSIE)**
 Financing entity: National Science Foundation (NSF), USA, among others
 Project duration: 2005 – 2008
 Principal investigator: Dr. Jeffrey H. Reed
 Project objective: Develop open-source SDR framework and tools
 Responsibilities: OSSIE release testing, documentation, user guide
- 09/2006 – 03/2007 **E2R (End-to-End Reconfigurability), Phase II**
 Financing entity: IST project of the European Union, no. 027714
 Duration: 01/2006 – 12/2007
 Principal investigator: Dr. Didier Bourse
 Project objective: Design of end-to-end reconfigurable radio systems
 Responsibilities: real-time emulator (testbed) extension, audit preparation
- 01/2004 – 11/2006 **Reconfiguration Support (Software Radio) in Heterogeneous Radio Environments**
 Financing entity: CICYT (TIC2003-08609), Spanish Government
 Duration: 01/2004 – 11/2006
 Principal investigator: Dr. Antoni Gelonch Bosch
 Project objective: Definition and design of SDR platforms and applications
 Responsibilities: identification of real-time processing constraints, platform and application modeling, computing resource management methods and algorithms

AWARDS AND SCHOLARSHIPS

- 05/2012 **Recognition of Outstanding Doctorate** (Premi Extraordinari de Doctorat)
 Universidad Politècnica de Catalunya
- 02/2011 **Lecturer Accreditation**
 Catalan (Spanish) Government
- 12/2007 **Best Paper Award**
 A. Gelonch, X. Reves, V. Marojevic, J. Nareddine, J. Perez-Romero, O. Sallent, "A Real Time Emulator Demonstrating Advanced Resource Management Solutions," *Int. Conf. Wireless Personal Multimedia Communications (WPMC2007)*, Jaipur, India, 3-6 Dec. 2007.
- 09/2007 – 12/2007 **Short-Term Visiting Scholar**
 Virginia Tech, Blacksburg, VA, USA
 Financing entity: Catalan (Spanish) Government
- 01/2004 – 12/2007 **Graduate Fellowship**
 Universitat Politècnica de Catalunya (UPC), Barcelona, Spain
 Financing entity: Catalan (Spanish) Government

PATENTS AND PUBLICATIONS

PATENTS

- X. Revés, V. Marojevic, A. Gelonch – UPC, "Method for managing computation resources which is applicable to a software-defined radio system," Patent WO/2009/147261 (10-DEC-2009), Priority: P200801671, 30-MAY-2008.

JOURNAL PAPERS

1. I. Gomez-Miguel, V. Marojevic, A. Gelonch, "Energy-efficient water-filling with ordered statistics," *IEEE Trans. Veh. Tech.*, Vol. 63, Iss. 1, pp. 428-432, Jan. 2014.
2. I. Gomez-Miguel, V. Marojevic, A. Gelonch, "Deployment and management of SDR cloud computing resources: problem definition and fundamental limits," *EURASIP J. Wireless Comm. & Networking*, 2013:59, pp. 1-11, March 2013.
3. V. Marojevic, I. Gomez, A. Gelonch, "Tools for analyzing computing resource management strategies and algorithms for SDR clouds," *FREQUENZ – J. RF/Microwave Engineering, Photonics and Communications*, vol. 6, iss 9-10, pp. 241-249, Sept. 2012, de Gruyter, Berlin.
4. V. Marojevic, et al., "Resource management implications and strategies for SDR clouds," *J. Analog Integrated Circuits and Signal Processing*, vol. 73, iss. 2, pp. 473-482, Sept. 2012, Springer US.
5. I. Gomez-Miguel, V. Marojevic, A. Gelonch, "Link adaptation for energy-efficient transmission with receiver CSI," *IEEE Commun. Lett.*, vol. 16, iss. 9, pp. 1412-1415, Sept. 2012.
6. I. Gomez-Miguel, V. Marojevic, A. Gelonch, "Processing-to-amplifier power ratio for energy efficient communications," *IET Electron. Lett.*, vol. 48, iss. 2, pp. 732-734, June 7, 2012.
7. V. Marojevic, I. Gomez, A. Gelonch, "Cognitive resource management for all wireless access layers," *IEEE Veh. Tech. Mag.*, vol. 7, iss. 2, pp. 100-106, June 2012.
8. I. Gomez Miguel, V. Marojevic, A. Gelonch Bosch, "Resource management for software-defined radio clouds," *IEEE MICRO*, vol. 32, iss. 1, pp. Jan./Feb. 2012.
9. I. Gomez, V. Marojevic, A. Gelonch, "ALOE: an open-source SDR execution environment with cognitive computing resource management capabilities," *IEEE Commun. Mag.*, vol. 49, iss. 9, pp. 76-83, Sept. 2011.
10. I. Gomez, V. Marojevic, A. Gelonch, "SDR receiver computational model for application in power control," *Analog Integrated Circuits and Signal Processing*, vol. 69, iss. 2-3, pp. 163-160, Dec. 2011, Springer.
11. A. Gelonch, et al., "A real time emulator demonstrating advanced resource management solutions," *Int. J. Wireless Pers. Comm.*, Vol. 56, Iss. 1, pp. 123–136, July 2010, Kluwer Academic Publishers.
12. V. Marojevic, X. Revés Balleste, A. Gelonch, "A computing resource management framework for software-defined radios," *IEEE Trans. Comput.*, vol. 57, no. 10, pp. 1399-1412, Oct. 2008.
13. V. Marojevic, X. Revés, A. Gelonch, "Dynamic resource allocation in software-defined radio – the interrelation between platform architecture and application mapping", *FREQUENZ J. RF Engineering and Telecommunications*, vol. 60, iss. 7-8, pp. 167-170, Sept.-Oct. 2006.
14. X. Revés, A. Gelonch, V. Marojevic, R. Ferrús, "Software radios: unifying the reconfiguration process over heterogeneous platforms," *EURASIP J. Applied Signal Proc.*, vol. 2005, no. 16, pp. 2626-2640, Sept. 2005.

INVITED TALKS AND TUTORIALS

1. I. Gomez, V. Marojevic,
2. I. Gomez, A. Gelonch, V. Marojevic, "ALOE Framework and Waveform Design Workshop," *European Conf. Wireless Comm. Technologies and SDR*, Munich, Germany, 11-13 June, 2013.
3. V. Marojevic, I. Gomez, A. Gelonch, "Open-Source SDR Framework ALOE (ALOE Tutorial)," *SDR-WinnComm Conf. Wireless Comm. Technologies and SDR*, Washington DC, 8-11 Jan. 2013.
4. V. Marojevic, I. Gomez, A. Gelonch, "ALOE – Abstraction Layer and Operating Environment & FlexNets," *COST-TERRA Summer School*, Trinity College Dublin/CTVR, 23-25 July, 2012.
5. V. Marojevic, I. Gomez, A. Gelonch, "ALOE Framework and Tools," *Joint Meeting of the WinnForum Technical Committees (Webinar)*, 24 May, 2012.

CONFERENCE PAPERS

1. N. Sharakhov, V. Marojevic, F. Romano, N. Polys, C. Dietrich, "Visualizing real-time radio spectrum access with CORNET3D," *Proc. ACM 19th Int. Conf. 3D Web Technology (Web3D '14)*, Vancouver, Canada, 8-10 Aug. 2014, pp. 109-116.
2. A. V. Padaki, V. Marojevic, J. H. Reed, "Role of Receiver Performance Data in Efficient Spectrum Utilization," *IEEE DySPAN 2014*, McLean VA April 2014.
3. E. Sollenberger, V. Marojevic, C. Dietrich, "Micro cognitive radio network testbed (MICRONET) for education, experimentation, and demonstration," *Proc. SDR-WInnComm 2014*, Schaumburg, ILL, 11-13 Mar. 2014.
4. V. Marojevic, I. Gomez, A. Gelonch, "Evaluation of computing resource management methods for SDR clouds," *Proc. SDR-WInnComm Conf. Wireless Comm. Tech. and SDR*, Washington DC, 8-11 Jan. 2013.
5. A. Lozano, C. Pardo, E. Romea, M. J. Lopez, G. Ostos, I. Gomez, V. Marojevic, "Analysis of SDR cloud resource management algorithms and strategies," *Proc. WSR'12*, Karlsruhe, Germany, 7-8 March, 2012.
6. V. Marojevic, I. Gomez, P. L. Gilabert, G. Montoro, A. Gelonch, "Resource management strategies for SDR clouds," *Proc. SDR'11-WInnComm*, Washington D.C., 29 Nov – 2 Dec., 2011.
7. V. Marojevic, I. Gomez, X. Arteaga, P. L. Gilabert, A. Gelonch, "SDR tools and projects for electrical engineering education," *Proc. 2011 SDR'11-WInnComm*, Washington D.C., 29 Nov – 2 Dec., 2011.
8. I. Gomez, V. Marojevic, J. Salazar, A. Gelonch, "Analyzing the effect of power control algorithms on the receiver's computing resource consumption," *Proc. SDR'10-WInnComm*, Washington DC, 30 Nov–3 Dec.2010.
9. V. Marojevic, I. Gomez, J. Olmos, G. Montoro, A. Gelonch, "SDR in undergraduate engineering education," *Proc. SDR'10-WInnComm*, Washington D.C., 30 Nov – 3 Dec., 2010.
10. I. Gomez, V. Marojevic, J. Bracke, A. Gelonch, "Performance and overhead analysis of ALOE middleware for SDR," *Proc. Military Communications Conference (MILCOM 2010)*, pp. 1134–1139, San Jose, CA, USA, 31 Oct. – 3 Nov., 2010.
11. I. Gomez, M. Camatel, J. Bracke, V. Marojevic, A. Gelonch, F. Vacca, G. Masera, "ALOE-based flexible LDPC decoder," *Proc. 13th Euromicro Conf. Digital System Design: Architectures, Methods and Tools (DSD 2010)*, pp. 314–320, Lille, France, 1-3 Sept. 2010.
12. I. Gomez, V. Marojevic, A. Gelonch, "Automatic computing resource awareness in resource managers for cognitive radios," *Proc. 2nd Int. Workshop Cognitive Information Processing (CIP2010)*, pp. 122–127, Elba Island, Italy, 14-16 June, 2010.
13. I. Gomez, H. Wang, A. Nafkha, V. Marojevic, C. Moy, P. Leray, A. Gelonch, "Middleware extension for partial reconfiguration management in cognitive radios," *Proc. 6th Karlsruhe Workshop on Software Radios (WSR'10)*, Karlsruhe, Germany, 3-4 March, 2010.
14. V. Marojevic, X. Revés, A. Gelonch, "An open computing resource management framework for real-time computing," *LNCS 5374*, pp. 169-182, *Springer Berlin Heidelberg – 15th Int. Conf. High Performance Computing (HiPC 2008)*, Bangalore, India, 17-20 Dec. 2008,.
15. V. Marojevic, I. Gomez, J. Salazar, A. Gelonch, "Dynamic mapping of waveforms within the PHAL execution environment," *Proc. 2008 SDR Technical Conf. and Product Exposition*, Washington D.C., 26-30 Oct. 2008.
16. I. Gomez, V. Marojevic, J. Salazar, A. Gelonch, "A lightweight operating environment for next generation cognitive radios," *Proc. 11th Euromicro Conf. Digital Systems Design (DSD 2008)*, Parma, Italy, 3-5 Sept. 2008.
17. V. Marojevic, J. Salazar, X. Reves, A. Gelonch, "Resource modeling for a joint resource management in cognitive radio," *Proc. IEEE Int. Conf. Communications (ICC 2008)*, Beijing, China, 19-23 May 2008.
18. V. Marojevic, J. Salazar, I. Gomez, A. Gelonch, "Computing system modeling for flexible radios," *Proc. 5th Karlsruhe Workshop on Software Radios (WSR'08)*, Karlsruhe, Germany, 5-6 March 2008.

19. A. Gelonch, X. Reves, V. Marojevic, J. Nasreddine, J. Pérez-Romero, O. Sallent, "A real time emulator demonstrating advanced resource management solutions," *Proc. 10th Int. Conf. Wireless Personal Multimedia Communications (WPMC 2007)*, Jaipur, India 3-6 Dec. 2007, BEST PAPER AWARD.
20. J. Salazar, V. Marojevic, I. Gomez, A. Gelonch, "Computing resources in flexible radio environments," *Proc. 2007 Software Defined Radio Technical Conf. and Product Exposition*, Denver, CO, 5-9 Nov. 2007.
21. V. Marojevic, J. Salazar, X. Reves, A. Gelonch, "On integrating radio, computing, and application resource management in cognitive radio systems," *Proc. 3rd IEEE Int'l Conf. Wireless and Mobile Computing (WiMob 2007)*, White Plains, NY, Oct. 8–10, 2007.
22. J. Salazar, I. Gomez, V. Marojevic, A. Gelonch, "Computing and radio resource management interactions in flexible radio environments," *Proc. 18th IEEE Int'l Symposium Personal, Indoor and Mobile Radio Communications (PIMRC'07)*, Athens, 3-7 Sept. 2007.
23. V. Marojevic, N. Vucevic, X. Revés, A. Gelonch, "Cognitive computing resource management for a ubiquitous wireless access", *Lecture Notes on Computer Science*, vol. 4611/2007, pp. 808-818, Springer Berlin / Heidelberg – 4th Int'l Conf. Ubiquitous Intelligence and Computing (UIC'07), Hong Kong, July 11-13, 2007.
24. V. Marojevic, N. Vucevic, X. Revés, A. Gelonch, "Integrated resource management in cognitive radio", *Proc. 16th IST Mobile & Wireless Communications Summit*, Budapest, Hungary, July 1-5, 2007.
25. V. Marojevic, X. Reves, A. Gelonch, "Cooperative Resource Management in Cognitive Radio," *Proc. IEEE Int'l Conf. Communications (ICC'07)*, Glasgow, 24-28 June 2007, pp. 5939-5944.
26. V. Marojevic, X. Reves, A. Gelonch, "Modelado para la gestión de recursos de computación en sistemas SDR," *Proc. URSI'06*, Oviedo, Spain, Sept. 12-15, 2006.
27. V. Marojevic, X. Revés, A. Gelonch, "Dynamic resource allocation in software defined radio – the interrelation between platform architecture and application mapping," *Proc. 4th Karlsruhe Workshop on Software Radios (WSR'06)*, Karlsruhe, Germany, March 22/23, 2006, pp. 39–44.
28. V. Marojevic, X. Revés, A. Gelonch, "Computing resource management for SDR platforms," *Proc. 16th IEEE Int'l Symposium Personal, Indoor and Mobile Radio Communications (PIMRC '05)*, Berlin, Sept. 11-14, 2005, pp. 685–689 (Vol. 1).
29. X. Revés, V. Marojevic, R. Ferrús, A. Gelonch, "FPGA's middleware for software defined radio applications," *Proc. 15th Int'l Conf. Field Programmable Logic and Applications (FPL 2005)*, Tampere, Aug. 24-26, 2005.
30. X. Revés, V. Marojevic, A. Gelonch, "Fully software-based radio equipment," *Proc. XI Polish National Symposium of Radio Science - NEWCOM Special Session*, Poznan, Poland, 7-9 April 2005.
31. X. Revés, V. Marojevic, A. Gelonch, R. Ferrús, "The cost of an abstraction layer on FPGA devices for software radio applications," *Proc. 15th IEEE Int'l Symposium Personal, Indoor and Mobile Radio Communications (PIMRC '04)*, Barcelona, September 5-8, 2004, vol. 3, pp. 1942–1946.
32. X. Revés, V. Marojevic, A. Gelonch, "Run-time development framework for heterogeneous hardware radios," *Proc. E2R Workshop on Reconfigurable Mobile Systems and Networks beyond 3G*, Barcelona, September 5, 2004.

COMPETENCES

EXPERTISE

- Software-defined radio
- Cognitive radio
- Digital signal processing
- Mapping and scheduling for distributed computing
- Middleware
- Graph theory

COMPUTER TOOLS

- Operating systems: Windows, Linux
- Programming and development: C, Matlab, VHDL, Code Composer Studio
- Data processing and text edition: Microsoft Office, LaTeX

LANGUAGES

- **German**
- **Serbo-Croatian**
- **English**
- **Spanish**
- **Catalan**
- **Russian**

EVENT ORGANIZATION

- 15th IEEE Personal Indoor Mobile Radio Comm. Symposium (PIMRC 2004), Barcelona, Spain, 5-8 Sept., 2004: reception, social event, translation.
- 69th IEEE Vehicular Technology Conference (VTC Spring-2009), Barcelona, Spain, 26-29 April, 2009: speaker and session chair assistance.

