

Personal information

Address
and contact details

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Date of birth, nationality

14 May 1980, Polish

Professional Objective

Senior research engineer

Professional Resume

(detailed information
on continuation)

TCP/IP Research and Development

- Research work focuses on the network congestion control, addressing the most important unresolved issues of TCP in the current networking scenarios and includes advanced mathematical modelling, as well as practical protocol implementation, and evaluation.
- Substantial experience in TCP/IP network programming, in particular C++, and oTCL /AWK/PERL/bash scripting while developing TCP and Stream Control Transmission Protocol (SCTP) modules for the Network Simulator 2 (ns-2) and TCP module for Linux kernel.
- Strong computer networks background, especially TCP/IP, SCTP, and related protocols, including expertise in network analysis tools (tcpdump, Ethereal/Wireshark).
- **Work dissemination and most important articles:** TCP module for Linux kernel, 1 journal article, 1 international conference article, plus 1 submitted journal article in the evaluation process (see annex):
Ł. Budzisz, R. Stanojevic, A. Schlotte, R. Shorten and F. Baker, "Delay based congestion control for heterogeneous environments", submitted to IEEE/ACM Transactions on Networking, under evaluation.
Ł. Budzisz, R. Stanojevic, R. Shorten and F. Baker, "A strategy for fair coexistence of loss and delay-based congestion control algorithms," IEEE Communications Letters, vol. 13, no. 7, pp. 555-557, July 2009.

Research on IP-based Mobility in Heterogeneous Wireless Networks

- 4+ years of experience in research on mobility management in IP-based heterogeneous wireless networks, during the PhD work at UPC Barcelona.
- PhD dissertation evaluated the concept of seamless handover management at the transport layer (in particular SCTP protocol) in IP-based heterogeneous wireless networks, as well as introduced a cross-layer design, and concurrent multipath transfer to optimize such a handover process. Results were validated by ns-2 simulations, formal specification and comparative frameworks.
- **Work dissemination and most important articles:** 1 journal article, 6 international conference articles plus 1 submitted journal article still in the evaluation process (see annex for more details):
Ł. Budzisz, J. Garcia, A. Brunstrom, and R. Ferrús, "A taxonomy and survey of SCTP research", submitted to the ACM Computing Surveys magazine, under evaluation.
Ł. Budzisz, R. Ferrús, F. Casadevall, and P.Amer, "On Concurrent Multipath Transfer in SCTP-based handover scenarios", Proc. of IEEE International Conference on Communications, 2009 (ICC '09), Dresden, Germany, June 2009.

Common Radio Resource Management (CRRM) Experience

- 2 years of experience developing CRRM algorithms for heterogeneous wireless networks as a part of the European project focusing on development of advanced radio resource management solutions for future all-IP mobile radio networks.
- Contribution to the development of a real-time testbed supporting IP-based mobile multimedia applications with the end-to-end QoS capabilities to validate the proposed CRRM algorithms.
- **Work dissemination:** 3 international conference articles (see annex), and 5 technical reports (see <http://www.aroma-ist.upc.edu> for details).

Intelligent Network (for Mobile Networks) application development

- Practical knowledge of the following cellular network technologies: GSM (BSC, MSC, HLR) GPRS, UMTS and IN, as well as Signalling (SS7) gained while working for a telecommunication company.

Education background

- PhD (2009) in Signal Theory and Communication, UPC Barcelona, Spain. Graduated with honours
- MSc (2003) in Electronics and Telecommunication, Technical University of Łódź, Poland. Graduated with honours.

Work experience (detailed)

Dates	Since October 2008
Position	Research Fellow
Company	Hamilton Institute, National University of Ireland, Maynooth
Main activities	<ul style="list-style-type: none">▪ Development of new delay-based congestion control algorithms, as part of the projects with one of the leading industry companies (Cisco), as well as academic partners (as an extension of FEDERICA project framework, see: www.fp7-federica.eu).▪ First author of 1 journal and 1 international conference article plus 1 submitted journal article still in the revision process. Co-authored 1 international conference article.▪ Invited talks (Würzburg University, Germany)▪ Chair of technical seminars
Dates	February 2004 – October 2008
Position	Research assistant, PhD candidate
Company	UPC (Universitat Politècnica de Catalunya) Barcelona, Spain
Main activities	<ul style="list-style-type: none">▪ Research on mobility management in IP-based heterogeneous wireless networks, including formal specification, comparative frameworks and simulation in ns-2 (C++, oTCL, AWK/PERL, bash).▪ First author of 1 journal and 7 international conference articles plus 1 submitted journal article still in the evaluation process. Additionally, co-authored 3 international conference articles.▪ Invited to two research visits (USA, Sweden, see internships).▪ European research project: NEWCOM (Network of Excellence, ref. FP6-IST-507325):<ul style="list-style-type: none">• Responsible for evaluation of existing transport layer protocols in context of challenges in wireless environments.• Author of a study on new transport-layer protocols, optimized for considered radio access networks.▪ European research project: AROMA (Advanced Resource Management Solutions for Future All IP Heterogeneous Mobile Radio Environments, ref. FP6-IST-4-027567):<ul style="list-style-type: none">• Responsible for development of a real-time emulator for heterogeneous all-IP network with Quality of Service provisioning in the end-to-end context.• Responsible for implementation of the IP transport into the radio part of the emulator as well as for the new common radio resource management (CRRM) algorithms: fittingness factor, and network-controlled cell breathing (NCCB).▪ Invited reviewer for various journals and international conferences (e.g., Elsevier COMCOM 08, Globecom 07-08, VTC 05-09, PIMRC 04-07, WCNC 07-08, ICC 09)
Dates	September-December 2007
Position	Internship
Company	Protocol Engineering Labs (PEL) at University of Delaware, United States
Main activities	<ul style="list-style-type: none">▪ Evaluation of the SCTP's concurrent multipath transfer (CMT) in context of transport layer mobility.▪ First author of joint publication published at IEEE ICC'09 conference (see annex).▪ Development of ns-2's SCTP module (C++, oTCL).
Dates	August-September 2006
Position	Internship
Company	Computer Science Department at Karlstad University, Sweden
Main activities	<ul style="list-style-type: none">▪ Evaluation of the standard SCTP failover in handover context.▪ First author of joint publication in IEEE WCNC'07 conference (see annex).▪ Taxonomy of SCTP research (initial work for journal article), see for more details: http://www.cs.kau.se/cs/prtp/sctpwiki/pmwiki.php?n=Resources.SCTPSurvey
Dates	September 2003-February 2004
Position	Junior System Engineer
Company	Ericpol Telecom Sp. z o.o., Poland (cooperation with Ericsson AB, Stockholm, Sweden)
Main activities	<p>Project: CN4.0 HLR/FNR (Core Network 4.0 Home Location Register / Flexible Number Register)</p> <ul style="list-style-type: none">▪ Function Test Execution (Intelligent Network development, responsible for verification tests).▪ Location: Ericsson AB, Stockholm, Sweden. <p>Project: AOC (Advice of Charge) for RSE 231 for LDCOM</p> <ul style="list-style-type: none">▪ Function Test Design (Intelligent Network application development).▪ Location: Ericpol Telecom Sp. z o.o., Poland.

Education and training (detailed)

- Dates **February 2004-October 2008**
PhD in Signal Theory and Communication (2009) – UPC Barcelona, Spain
PhD thesis: "Stream Control Transmission Protocol (SCTP), a proposal for seamless handoff management at the transport layer in heterogeneous wireless networks".
Main scientific advisors: Prof. Ferran Casadevall Palacio and Dr. Ramon Ferrús
Final grade: 10 out of 10, graduated with honours.
- Dates **October 1998-September 2003**
MSc in Electronics and Telecommunication (2003) – Technical University of Łódź (TU Łódź), Poland
MSc thesis: "Implementation of sensor network using GPRS technology" carried out at: UPC Barcelona, Spain, within the FP5 project SEWING (System for European Water MonitorING, ref. IST-2000-28084).
Main scientific advisors: Prof. Andrzej Napieralski (TU Łódź) and Prof. Joan Cabestany Montcusí (UPC Barcelona)
Final project grade: 5 out of 5, graduated with honours (see prizes and awards).

Other education and training

- Member of Technical Committees:
 - Green networking 2010 workshop (co-located with the 7th International ICST Conference on Broadband Communications, BROADNETS 2010).
 - Mosharaka International Conference (M-CCAT 2007).
- Organizing member of PIMRC 2004 and INFOCOM 2006 international conferences (both held in Barcelona), incl. responsibilities in scientific organization and logistics of the conferences.
- Active participation in 10+ projects activities (software integration meetings, testing events and interactions with other developers).
- Attended multiple international scientific conferences, workshops and panels on IP-based mobility and wireless networks (INFOCOM, PIMRC, WCNC, VTC, WPMC, ...)
- Attended advanced tutorials on mobility management (INFOCOM, PIMRC and WCNC sessions).

Skills and competences

Technical skills and competences

- TCP/IP and upper layer protocols (IPv4, IPv6, TCP, SCTP, SIP, HTTP, FTP, ECN)
- Wireless networks and mobile computing (IEEE 802.11a/b/e/g/n, Mobile IP, Cellular IP, ad-hoc networks, DSR, AODV, TCP issues in MANET)
- Computer network performance (queuing delay models, ARQ retransmission strategies, multi-access communication, routing, flow and congestion control)
- Ethereal/Wireshark, tcpdump network analysis tools
- MATLAB™ advanced programming
- LaTeX and MSOffice™ tools (including VBA programming)
- User mode in Unix and Windows based systems, network administration basics.

Language skills (and certificates)

- **English** – fluent, certificates: FCE (1999), CAE (2004)
- **Spanish** – fluent
- **German** – advanced
- **Catalan** – intermediate
- **Polish** – mother tongue

Other relevant issues

- Fast adaptation to multicultural environments, 7+ years experience of living abroad (Spain, Sweden, USA, Ireland).

Additional information

Prizes and awards

- 5th score overall MSc thesis, TU Łódź, 2003

Fellowships and grants

- Awarded a 4 year PhD grant (FPU) by Spanish Ministry of Education, 2005-2008
- Awarded a 4 year PhD grant (FI-AGAU) by Catalan Government, 2004-2007
- Awarded a student exchange grant Erasmus (5 months) at TU Łódź, Poland, 2003

Affiliations

- IEEE member # 80254095, since 2005

Hobbies

- Travelling
- Photography
- Skiing

Annexes

Annex I. List of scientific publications

Annex 1.
Scientific Publications List
(partial)

TCP congestion control

- **Ł. Budzisz**, R. Stanojevic, A. Schlotte, R. Shorten and F. Baker, "Delay based congestion control for heterogeneous environments", submitted to IEEE/ACM Transactions on Networking magazine, **under evaluation**.
- **Ł. Budzisz**, R. Stanojevic, A. Schlotte, R. Shorten and F. Baker, "On the fair coexistence of loss- and delay-based TCP", Proc. of 17th International Workshop on Quality of Service (IWQoS 2009), Charleston, SC, United States, July 2009.
- **Ł. Budzisz**, R. Stanojevic, R. Shorten and F. Baker, "A strategy for fair coexistence of loss and delay-based congestion control algorithms," IEEE Communications Letters, vol. 13, no. 7, pp. 555-557, July 2009.

IP-based mobility

- **Ł. Budzisz**, J. Garcia, A. Brunstrom, and R. Ferrús, "A taxonomy and survey of SCTP research", submitted to the ACM Computing Surveys magazine, **under evaluation**.
- **Ł. Budzisz**, R. Ferrús, F. Casadevall, and P.Amer, "On Concurrent Multipath Transfer in SCTP-based handover scenarios", Proc. of IEEE International Conference on Communications, 2009 (ICC '09), Dresden, Germany, June 2009.
- **Ł. Budzisz**, R. Ferrús, and F. Casadevall, "Design principles and performance evaluation of mSCTP-CMT for transport-layer based handover", Proc. of 69th IEEE Vehicular Technology Conference (VTC 2009-Spring), Barcelona, Spain, April 2009.
- **Ł. Budzisz**, R. Ferrús, A. Brunstrom, R. Grinnemo, K.-J. Fracchia, G. Galante, and F. Casadevall, "Towards transport-layer mobility: Evolution of SCTP multihoming," Computer Communications, vol. 31, no. 5, pp. 980–998, March 2008.
- **Ł. Budzisz**, R. Ferrús, K.-J. Grinnemo, A. Brunstrom, and F. Casadevall, "An analytical estimation of the failover time in SCTP multihoming scenarios", Proc. of IEEE Wireless Communications and Networking Conference (WCNC 2007), pp. 3932–3937, Hong Kong, March 2007.
- **Ł. Budzisz**, R. Ferrús, and F. Casadevall, "SCTP multihoming performance in dynamically changing channels with the influence of link-layer retransmissions", Proc. of 64th IEEE Vehicular Technology Conference (VTC 2006-Fall), pp. 2624–2628, Montreal, Canada, September 2006.
- **Ł. Budzisz**, R. Ferrús, and F. Casadevall, "On the performance of multihoming SCTP in dynamically changing radio channels", Proc. of 15th International Mobile Summit (IST 2006), Mykonos, Greece, June 2006.
- **Ł. Budzisz**, R. Ferrús, and F. Casadevall, "Study on transport layer handover using SCTP", Proc. of 8th International Symposium on Wireless Personal Multimedia Communications (WPMC 2005), Aalborg, Denmark, September 2005.

Network simulation and emulation tools

- O. Heimlich, R. Sailer, and **Ł. Budzisz**, "NMLab: A Co-Simulation Framework for Matlab and ns-2", **accepted** to the 2nd International Conference on Advances in System Simulation (SIMUL 2010).
- N. Vucevic, F. Bernardo, A. Umberto, and **Ł. Budzisz**, "Evaluation of Perceived QoS with Multimedia Applications in a Heterogeneous Wireless Network", Proc. of 4th International Symposium on Wireless Communication Systems (ISWCS 2007), pp. 102-106, Trondheim, Norway, October 2007
- A. Umberto, **Ł. Budzisz**, F. Bernardo, and N. Vucevic, "An all-IP heterogeneous wireless testbed for RAT selection and e2e QoS evaluation", Proc. of 2007 International Conference on Next Generation Mobile Applications, Services and Technologies (NGMAST 2007), pp. 310-315, Cardiff, Wales, 2007.
- F. Bernardo, N. Vucevic, **Ł. Budzisz**, and A. Umberto, "A beyond 3G real-time testbed for an All-IP heterogeneous network", Proc. of 5th ACM International Workshop on Mobility Management and Wireless Access (MOBIWAC 2007), pp. 50-59, Chania, Crete Island, Greece.
- N. Akar, M. Barbera, **Ł. Budzisz**, R. Ferrús, E. Kankaya, and G. Schembra, "A Performance Evaluation Framework of A Rate-Controlled MPEG Video Transmission over UMTS Networks", Proc. of 12th IEEE Symposium on Computers and Communications (ISCC 2007), pp. MW 63 - MW 68, Aveiro, Portugal, July 2007.