PERSONAL INFORMATION

Laurentiu-Cristian DUCA

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https://github.com/laurentiuduca/cv

Sex Male | Date of birth 20/December/1979 | Nationality Romanian

WORK EXPERIENCE

2017/10 – today

Software engineer

Self employed

▪ Hazard3 based RISC-V SoC Skeleton in Verilog
▪ Apache Nuttx RTOS microsd block device driver in C
▪ Write-back and write-through, AMBA5 AHB compatible cache memory Verilog driver

▪ L-C. Duca, A. Duca, Road to Linux on RISC-V in FPGA, 2nd edition, Smart Publishing, 2024. Linux on dual-core RISC-V in $30 FPGA board written in Verilog.

▪ Apache NuttX RTOS port to RLSoC2 system on chip

▪ IoT OTA secure update system
(Linux, openSSL, Buildroot, swupdate, Eclipse hawkBit, u-boot)
https://www.ijana.in/download13-3-7.php?file=V13I3-7.pdf

▪ RTnet UDP and raw sockets port to PREEMPT_RT Linux from Xenomai 3.0.9 and network drivers porting for raspberry pi 4, orange pi one, beaglebone black, microchip enc28j60 and realtek 8139too
(C, RTnet, Linux kernel, PREEMPT_RT patch for Linux 5.9, Buildroot)
https://github.com/laurentiuduca/rtnet-preempt_rt

▪ PREEMPT_RT Linux real-time drivers for Texas Instruments am335x omap4 SPI module and raspberry pi
(C, Xenomai/EVL/PREEMPT_RT Linux 6.1, SPI, beaglebone-black, raspberry pi, Buildroot)
https://github.com/laurentiuduca/real-time-spi

▪ FPGA based latency computation for the Nicolas Schurando's SPI Xenomai linux real time driver
(Linux, Xenomai,, Raspberry Pi, stress-ng, Xilinx FPGA, Verilog, Git)

▪ Inference implementation of M. Courbariaux MLP Binarized Neural Network using Y. Umuroglu formulas
(C, Python, Linux, VHDL, Xilinx FPGA)

▪ Linux fast boot: 3.x seconds cold start login console
(Linux, beaglebone, Buildroot, U-boot Falcon)

▪ Various client-server applications
(Linux, Bluetooth, BLE, C, ESP32-C3, IFTTT, Adafruit cloud)

▪ OpenVeriFLA - the open source FPGA based logic analyzer
(Verilog, VHDL, FPGA, Xilinx, Java, Python)
https://opencores.org/projects/openverifla

▪ IPv6 6to4 automatic tunnel configuration tutorial for GNS3
(IPv6, IPv4, Cisco, GNS3)
https://www.youtube.com/watch?v=mW_34xbs4CI&t=240s

▪ For training programs please see the site afterprof.eu

2016/10 – 2017/10 **Researcher**

University Politehnica of Bucharest Grant of Excellence, UPB-GEX, Project ID 254 / 2016, contract number 76 / 2016 ,"QPSO algorithms and GPGPU techniques for electromagnetic optimization problems"

- Design and implementation of parallel algorithms (in CUDA, OpenCL, MPI, Pthreads) for electromagnetic devices optimization
- Scientific papers writing

2006/03 –2016/09 **Teaching assistant**

University Politehnica of Bucharest, Automatic and Computers Faculty, Computer Department, Splaiul Independenţei, nr. 313, sector 6, 060042, Bucharest, www.pub.ro

- Organizing and teaching seminars, laboratories and projects at Digital Computers and Microprocessor based systems classes (Verilog, VHDL, Xilinx, SoC)
- Coordonating graduation projects
- Member in examining board of student research sessions
- Member in examining board of graduation sessions
- Member in national research projects

2005/03 –2006/03 **Software engineer**

S.C. ITC Networks, Bucharest, www.itcnetworks.ro

- Software maintenance and bugs solving for the L2/L3 layer of a Nortel network switch, protocols FDB, STP, ARP, static routing, ACL, CLI/BBI interfaces (C language, Networking, ClearCase, Bugzilla)
- Implementation of the "Static MAC Forwarding Database" feature for the LLC sub-layer of the network switch Nortel Blade Server Switch for HP/IBM Blade Servers (C language, Networking)

2002/07 – 2005/03 **Software engineer**

S.C. Ferrotec Engineering S.R.L., Bucharest, www.ferrotec.com

- Interpreter and communication server of a waffer manipuluation robot controller (flex, yacc, TCP, RS232)
- Simulator and user menu for the remote control of an industrial apparatus (VisualC++, ANSI C, microcontroller DSP Motorola 56F803), User manual (english)
- Graphical viewer with scroll and zoom for data vectors (VisualC++)
- Software distribution protection library and web site for online activation of the software product (VisualC++, Serial Number, RegisterKey, AES, IIS-ISAPI, MySQL)

EDUCATION AND TRAINING

2013 – 2017 **PhD in Electrical engineering**

University Politehnica of Bucharest, Electrical Engineering Faculty,

Splaiul Independenței 313, District 6, postal code 060042, Bucharest

- High performance computing techniques for electromagnetic devices optimization

2006 – 2007 **Teaching certificate**

Certificate of completion of the postgraduate course from the Department for training teaching staff

2003 – 2004 **Master in Computer Science**

University Politehnica of Bucharest, Computer science department

- Project planning, Networking, Distributed systems, High Performance Computing

1998 – 2003

Engineer in Computer Science, Software development

University Politehnica of Bucharest, Computer science department

- Compilers, embedded systems firmware, network & distributed systems, Internet, Databases

PERSONAL SKILLS

Natural language: Romanian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C2	C1	C1	C2
French	A2	B1	A2	A2	A2

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

My desk

IT skills

- Design and development of software and SoC architectures (teaching and research).
- Experience in languages: C, C++, CUDA, OpenCL, Assembly, Verilog, VHDL, Java SE.
- Development IDE: Xilinx Vivado, ModelSim, Xilinx ISE Webpack, GoWin IDE, Microsoft VisualStudio, Eclipse, CodeBlocks.
- Microsoft Office, Libre Office.
- Experience with Linux and Windows.

Publications

Scientific papers:and books

- **L-C. Duca**, A. Duca, Road to Linux on RISC-V in FPGA, 2nd edition, Smart Publishing, 2024. Linux on dual-core RISC-V in $30 FPGA board written in Verilog.
- **L.-C. Duca**, A. Duca, C. Popescu, "OTA Secure Update System for IoT Fleets", IJANA, Int. J. Advanced Networking and Applications, Volume 13, Issue 03, Pages 4988-4992(2021), ISSN 0975-0290.
- **L.-C. Duca** and A. Duca, "Achieving Hard Real-Time Networking on PREEMPT_RT Linux with RTnet" 2020 International Symposium on Fundamentals of Electrical Engineering (ISFEE), 2020, pp. 1-4, doi: 10.1109/ISFEE51261.2020.9756165
- Book (in english): **L-C. Duca**, A. Duca, Computer Architecture, Printech publishing, ISBN: 978-606-23-1115-5, june 2020.
- Book (in romanian language): **L-C. Duca**, A. Duca, PSO algorithms and HPC techniques for electromagnetic devices optimization, Printech publishing, ISBN: 978-606-23-1003-5, november 2019.
- **L-C. Duca**, A. Duca, A-S. Lup, “Real-time Linux drivers and latency evaluation system for TI OMAP4 mcSPI peripheral”, Proc. of the 2nd International Conference on Electrical, Communication and Computer Engineering (ICECCE), 2020.
- **Laurentiu Duca**, Cornel Popescu, Improving PSO based algorithms with the domain-shrinking technique for electromagnetic devices optimization, U.P.B. Sci. Bull., Series C, Vol. 80, Iss. 1, 2018 ISSN 2286-3540
- **Laurentiu Duca**, Anton Duca, Daniel Ioan, “High Performance Computing techniques for fast solving a NDET forward problem”, IEEE MTT-S International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization for RF, Microwave and Terahertz Applications (NEMO), 2017.
- **Laurentiu-Cristian Duca**, Daniel Ioan, Cornel Popescu, “QPSO with neighborhood strategies for solving NDET inverse problems”, The 10th International Symposium on Advanced Topics in Electrical Engineering (ATEE), 2017.
- Anton Duca, **Laurentiu Duca**, Gabriela Ciuprina, Asim Egemen Yilmaz, Tolga Altinoz, “PSO algorithms and GPGPU technique for electromagnetic problems”, International Journal of Applied Electromagnetics and Mechanics, vol. 53, DOI 10.3233/JAE-140166, pag. 249–259, 2017
- Anton Duca, **Laurentiu Duca**, Gabriela Ciuprina, Daniel Ioan, Capitol – “SPSO Parallelization Strategies for Electromagnetic Applications“, Computational Intelligence, International Joint Conference, IJCCI 2015 Lisbon, Portugal, Revised Selected Papers, Springer, ISBN: 978-3-319-48504-1, 2017.
- Anton Duca, **Laurentiu Duca**, Gabriela Ciuprina, Daniel Ioan, “Neighborhood strategies for QPSO algorithms to solve benchmark electromagnetic problems”, International Conference on Evolutionary Computation and Applications (ECTA 2016), part of the Joint Conference on Computational Intelligence (IJCCI 2016).
- **Laurentiu Duca**, Cornel Popescu, Daniel Ioan, "Rapid evaluation of objective function for efficient optimization of the TEAM22 SMES electromagnetic device", Proceedings RCITD (Proceedings in Research Conference in Technical Disciplines), DOI:10.18638/rcitd.2015.3.1.59, ISBN: 978-80-554-1125-5, ISSN: 2453-6571, vol. 3, issue 1, pp. 98 - 101, 2015.
- Anton Duca, **Laurentiu Duca**, Gabriela Ciuprina, Daniel Ioan, “GPGPU vs Multiprocessor SPSO Implementations to Solve Electromagnetic Optimization Problems”, International Conference on Evolutionary Computation and Applications (ECTA 2015), part of the Joint Conference on Computational Intelligence (IJCCI 2015).
- Anton Duca, Mihai Rebican, **Laurentiu Duca**, Ladislav Janousek, Tonga Altinoz, “Advanced PSO Algorithms and Local Search Strategies for NDT-ECT Inverse Problems”, in the International Symposium on Fundamentals of Electrical Engineering (ISFEE 2014), ISBN: 978-1-4799-6820-6, DOI:10.1109/ISFEE.2014.7050538, pp. 1-5, 2014.
- **Laurentiu-Cristian. Duca**, A. Duca, C. Popescu, A. Petrescu, “Program interpreter and communication server for an industrial robot controller”, Buletinul Stiintific UPB, nr. 4/2013 (U.P.B. Sci. Bull., Series C, Vol. 75, Iss. 4, 2013, ISSN 2286 – 3540, pag.35-44).
- **Laurentiu-Cristian Duca**, “SBC System Implemented On FPGA Technology”, Politehnica Press, Proceedings CSCS-17, Vol. 1, 2009, pag. 585, ISSN 2066-4451.
- **Laurentiu-Cristian Duca**, “Combining simulation with real time debugging”, UPB, Sci.Bull., Series C, Vol. 70, No. 3, 2008, pag. 101-111, ISSN 1454-234x.

Research projects

National research projects:

- UPB team and **L. Duca,** University Politehnica of Bucharest Grant of Excellence, UPB-GEX, ID project 254 / 2016, contract number 76 / 2016 ,"QPSO algorithms and GPGPU techniques for electromagnetic optimization problems".
- UPB team and **L. Duca,** "Neuro-protection embedded systems for recovery of neuro-motor handicap persons (SINPHA)", Research contract – National Center for Management Programs (CNMP) Bucharest , contract nr: D11-068/18.09.2007, Period 2007 – 2010.
- UPB team and **L. Duca,** "Control and technology integrationof materials and intelligent structures – CITMSI", Excellence research consortial project – complex development, Research contract AMCSIT Bucharest, No. 259/11.09.2006, UPB internal number: 130606, Period 2006 – 2008.

Hobbies

Listen to Music, Radio, TV, Chess, Sports, Walks.