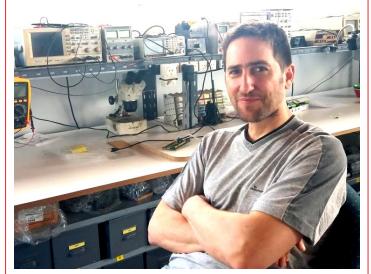


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✉️ [slavkin.pablo@gmail.com](mailto:slavkin.pablo@gmail.com)  
🌐 [github](#)  
🔗 [linkedin](#)  
13/12/1976



# Pablo Slavkin

## Resume

*"In the tools, as in the instruments, what matters is the artist"*

### Presentation

I'm an electronic engineer from School of Engineering and Technology [ITBA](#), with a Master Degree in Embedded Systems from University of Buenos Aires, [UBA](#).

I developed my career working in product development area of several national companies and in R&D in state institutions.

For some time I was in charge of an electronic engineering studio offering electronic design and production services and I'm currently working as a contract/freelance electronic engineer.

I work daily designing embedded electronic equipment executing tasks such as:

- Taking requirements and planning acceptance tests of hard and soft.
- Schematic design, PCB, simulations, assembly, 3D modeling and machining.
- Coding for real time in C / C ++ over bare metal, RTOS and embedded Linux.
- Bash and Python scripting over Linux and embedded Linux.
- Codification and execution of the unit tests and management of continuous integration tools.
- Assembly and start-up of prototypes and assembly line documentation.

I am very pragmatic, committed and enjoy solving complex problems in a creative way by exchanging ideas with my peers. I prefer down-top developments using Agile concepts to keep the product functional from the beginning.

I have an electronics workshop showed in figure 1 and in the [video](#), with tools as:

- Assembly line of SMD/TH plates, pasta stencil, pick and place, reflow oven and wave soldering machine.
- Reworking and manual welding tools.
- Stock of SMD and TH materials of current and specific use.
- CNC machining center.
- Machine for cutting and laser engraving.
- Several machines for 3D printing.
- Generators, Oscilloscopes and Advanced Instrumentation for measurement and diagnosis.
- Electronic tools for firmware development.

These tools, my experience, technical ability and frequent academic updating allow me to unwrap in most instances of the development of a professional embedded electronic equipment.

Just follow the links in each section to see videos pdf's and detailed information.

You could check my up-to-date resume [here](#).



figure 1: Development lab at Bariloche, 2021. [Video lab. 2019](#), [Video lab. 2021](#)

## Education

- 2019–2021 **Master's degree in Embedded Systems** , *UBA - University of Buenos Aires* , Buenos Aires , Average 9.28 [See program](#) , [See analitics](#) .
- 2018–2018 **Specialization in Embedded Systems** , *FIUBA - University of Engineering of Buenos Aires* , Buenos Aires , Average 9.33 [See program](#) .
- 2008–2012 **Doctorate in Engineering** , *UTN - National Technological University FRBA* , Buenos Aires , Average 10 on 3 approved subjects + 3 late due .  
Mention Digital processing of images and signals. Suspended by moving to another city. [See program](#)
- 1996–2005 **Electronic Engineering** , *ITBA - Technological Institute of Buenos Aires* , Buenos Aires , Average 6.5 [See program](#) .
- 1990–1995 **Electro Mechanical Technician** , *ENET N°1 Brigadier General Pascual Echagüe* , Concordia, Entre Ríos , Average 8.5 .
- 1982–1989 **Primary School** , *Velez Sarsfield School* , Concordia, Entre Ríos , Average 8.5 .

## Experience

### Professional

- 2021–Present **Embedded firmware and software developer** , *PAL Robotics* , Barcelona, España .  
I work as a senior embedded firmware and software developer for the boards utilized on the robots. I work on the field of motor control loops, multicore SoC's bootloaders, real time operatig systems and bring-up of new boards. I work with Agile driven, multidisciplinar group and exciting technologies. [See portfolio](#).
- 2020–2021 **Lead Embedded Software Engineer** , *Novo Space* , EE.UU, Argentina .  
As the first employee of the start-up, I worked as low level firmware, real time OS, bootloaders mainly u-boot, embedded Linux and bring up of new complex hardware boards. I work remotely for 12 month, the company grew up to more than 15 employees. [See portfolio](#).
- 2020–2020 **Design and development of BLDC power stage** , *Engineered Arts* , England .  
I work as a hardware engineer, making the electronic design, choosing componentes and topology for the power stage of a new BLDC servo drive. I work remotely with a team of specialists. [See portfolio](#).
- 2019–Present **Freelance Electronic Engineer** , , .  
Personal entrepreneurship Electronic design services, hardware, firmware and electronic equipment.
- 2019–2020 **Development of a PMSM servomotor controller** , *Nanocut* , Chisináu, Moldavia .  
For a company in the industrial machinery field, I work in the development of an integrated servo controller for a permanent magnet synchronous motor. It'll be used for the improvement of the actual machinery. [See portfolio](#).
- 2019–2019 **Consultant and CNC software development** , *Wolfcut* , Valencia, España .  
I worked in the implementation of a production line management software tool. I've also developed a plugin for improve the capabilities of the CNC software, adding an automatic tool changer, an automatic tool measurement, and others features. [See portfolio](#).
- 2011–2019 **Development and production of electronic equipment** , *Grupo Noto* , Argentina .  
I develop and manufacture a whole line of aesthetic electro medicine electronics equipment, hardware, firmware and production. [See portfolio](#).

- 2012–2019 **Development and production of electronic equipment** , *Piscina Natural* , Argentina .  
In conjunction with the company was developed a system for the generation of chlorine from saline water was developed to keep the pools clean. [See portfolio](#).
- 2011–2016 **Consultant and developer of electronic equipment** , *Softron* , Argentina .  
Consulting and development of electronic equipment and solutions for energy measurement and monitoring using Zigbee wireless and GSM technologies. [See portfolio](#).
- 2011–2017 **Consultant and developer of electronic equipment** , *Grupo Koner* , Argentina .  
Consulting and development of equipment and electronic solutions for the automatic vehicle location, AVL. I worked mainly in the development and integration of an RFID card reader for drivers registration. [See portfolio](#).
- 2005–2019 **Director in engineering company** , *disenioconingenio* , Argentina .  
Personal entrepreneurship Engineering study that offers electronic design services to companies, with ability to develop and manufacture electronic equipment, hardware, firmware, software, mechanics, PCB routing, assembly of PCB's SMD and TH, 3D printing, CNC machining, laser cutting and engraving and commercialization of equipment for access control RFID, monitoring of Ethernet temperature, automation of machines, converters of protocols, etc. [See portfolio](#).
- 2011–2014 **Consultant and developer of electronic equipment** , *Seconsat* , Argentina .  
Consulting and development of electronic accessories for the AVL business. I work mainly in a new multi sensor wireless dongle for AVL integration. [See portfolio](#).
- 2003–2005 **Electronic equipment developer** , *Digicard* , Argentina .  
Company referring to the national level in the area of access control. I've Worked on the development of an RFID reader of 125khz for the line of access controllers. I participated in all the stages since the requirements request, schematic design, PCB layout, prototype, start-up, firmware, and production documentation The reader is actively actively marketed by the company. [See portfolio](#).
- 2002–2003 **Firmware developer for microcontrollers** , *Pump-Control* , Argentina .  
Company dedicated mainly to the design, development and production of electronic controllers for the distribution of hydrocarbons. I've worked on the area of firmware development for 8bit microcontrollers of the Atmel line, implementing 1-Wire communication protocols, access control and dispenser control fuel.

## Teaching

- 2020–2021 **Digital signal processing, introduction course, upgraded version** , *University of Buenos Aires, UBA*.  
Within the framework of the Master in Embedded Systems of the UBA, MSE, a course on digital signal processing applied to embedded systems was taught, including subjects such as: quantization, convolution, correlation, discrete Fourier transform (DFT,FFT).[See program](#).[See recorded classes](#).[See material's course](#)
- 2020–2020 **Digital signal processing, introduction course** , *University of Buenos Aires, UBA*.  
Within the framework of the Master in Embedded Systems of the UBA, MSE, a course on digital signal processing applied to embedded systems was taught, including subjects such as: quantization, convolution, correlation, discrete Fourier transform (DFT,FFT).[See program](#).[See recorded classes](#).[See material's course](#)
- 2017–2017 **Introduction to robotics** , *Siglo XXI School* .  
A day of introduction to robotics was given for students from the third to fifth year, showing the history, basic concepts and culminating with a practice in different commercial platforms [See certificate](#).
- 2004–2004 **Altera FPGA programming intensive course using Quartus II** , *ITBA* .  
An introductory course with practical activities was carried out using an Altera evaluation board. [See material](#).

## Research

- 2015–2016 **Scholar in the National Atomic Energy Commission** , *CNEA*.  
I worked as a fellow in the completion of a fully developed PET (Positron Emission Tomography) in the center on which the doctoral thesis plan is developed. Particularly, work is done in the area of acquisition and processing of digital signals on high performance FPGA. The scholarship is terminated doubt as a move to another city. [See portfolio](#), [see material 2015](#) , [see material 2016](#).
- 2009–2009 **Assistant in the Research Center of Lasers and Applications** , *CITEDEF*.  
I worked as an assistant of Dr. Jorge Codnia and Lic. Laura Azcárate in the assembly of a flow condenser, which with the help of a laser produces isotopes of interest, and the first advances in a new mass spectrometer of flight time. [See material](#).

## Tutorials and jury

- 2021–2021 **Master thesis jury of Esp. Lic. Leopoldo A. Zimperz in his work, *Easy installation access control with remote administration.***, Universidad de Buenos Aires, UBA.  
Within the framework of the thesis defenses of the *Master's Degree in Embedded Systems of the UBA*, MSE, I participated as a master's thesis jury. [see thesis](#), [see presentation](#).

## Courses and seminars

- 2020 **LATAM 2020 Entrepreneur Competition**, MIT - ITBA, 8hs, I participated as a jury of the LATAM 2020 contest, organized between MIT and ITBA. I analyzed innovation and entrepreneurship projects from Latin America. [See certificate](#), [See details](#).
- 2018 **LATAM 2018 Entrepreneur Competition**, MIT - ITBA, 8hs, I participated as a jury of the LATAM 2018 contest, organized between MIT and ITBA. I analyzed innovation and entrepreneurship projects from Latin America. [See certificate](#), [See details](#).
- 2017 **LASCAS 2017 Tutorials: Dependable Digital Systems and Fault Tolerant FPGA Design**, INVAP, Bariloche, 8hs.
- 2017 **SASE 2017, Argentine Symposium of Embedded Systems**, UBA, 8hs, [See certificate](#).
- 2016 **SASE 2016, Argentine Symposium of Embedded Systems**, UBA, 8hs, [See certificate](#).
- 2015 **Doctorate PSI Meeting: Models, Simulation and Fabrics Engineering**, Favaloro, GIBIO 2015, 8hs, [See certificate](#).
- 2015 **Advanced techniques for digital design**, UNICEN, National University of the center of Buenos Aires, Argentina , 40hs, Advanced virtual course of techniques of digital design by engineer Guillermo Jaquenod. [See program](#).
- 2015 **SASE 2015, Argentine Symposium of Embedded Systems**, UBA, 6hs, [See certificate](#).
- 2013 **SASE 2013, Argentine Symposium of Embedded Systems**, UBA, 18hs.
- 2012 **Introduction to L<sup>A</sup>T<sub>E</sub>X**, UP Palermo University, IEEE-UP Student Branch, 2hs, [See certificate](#).
- 2012 **First days of signal and image processing**, UTN, GIBIO 2012, 8hs, [See certificate](#).
- 2012 **SASE 2012, Argentine Symposium of Embedded Systems**, UBA, 18hs.
- 2011 **SASE 2011, Argentine Symposium of Embedded Systems**, UBA, 18hs.
- 2010 **SASE 2010, Argentine Symposium of Embedded Systems**, UBA, 18hs.
- 2008 **Conference on wireless technologies of Digi RF**, EDE2008 Electronic Design Expo, 6hs, [See certificate](#).
- 2007 **Practical theoretical course of screen printing oriented to the manufacture of PCBs** , 32hs, [See certificate](#).
- 2007 **Analog performance seminar using Silabs microcontrollers** , 8hs, [See certificate](#).
- 2006 **Launch of Freescale RS08KA microcontrollers, accelerometers and sensors** , 8hs, [See certificate](#)
- 2006 **Releases Freescale Coldfire microcontrollers 32 bits** , 10hs, [See certificate](#) .
- 2004 **Rabbit microprocessors and Dynamic C** , 24hs, [See certificate](#) .
- 2002 **Practical theoretical course IA, Artificial Intelligence** , ITBA, 18hs, [See certificate](#).
- 1995 **Amateur radio course with licensing LU9JJM** , Radio Club Concordia (LU9JJ), 48hs, [See certificate](#)

## Awards

- 2020 **Codility Palladium Challenge, Codility**, Golden Award, , .  
[See certificaue](#).
- 2002 **Initiation in research and development I+D ITBA** , 1<sup>th</sup> prize , , .  
*Design and Simulation of a pipeline-structured Floating Point Unit for high performance general purpose processors* [See material](#).
- 2001 **Battle Tek robots championship, ITBA Ingenio en Acción** , 3<sup>th</sup> prize , , .  
*Discotech Robot* A fight robot was designed and manufactured based on a high speed rotating disk with 2 protruding edges that impact against the adversary and a pneumatic ramp. [See certificate](#) , [see news](#).

## Works and Publications

- 2021 **Visual alignment using registration marks for a computer numerical controled machine CNC , Embedded systems Magister, FIUBA , , .**  
Final work of the magister course in embedded systems, Director: MEE. Ing. Norberto M. Lerendegui (IEEE) [see material](#) , [see presentation](#) , [see thesis defense](#) , [see videos](#) , [see official material](#)
- 2018 **Three Axis CNC Machine Controller , Embedded systems Specialization , , .**  
Final work of the specialization course in embedded systems, Director: Ing. Juan Manuel Cruz [see material](#) , [see presentation](#) , [see thesis defense](#) , [see videos](#) , [see official material](#)
- 2010 **Smoothing of images by inhomogeneous diffusion , Biomedical image processing, UTN , , .**  
Final work Processing of biomedical images, Tutor: Dr. Castro [See material](#) .
- 2008 **Study of photo thermal techniques applied to the measurement of gas flow. , CITEDEF , , .**  
I was presented under the tutelage of Dr. Francisco Manzano and as goal of approval of Optoelectronics II. [See material](#) .
- 2004 **Design and implementation of a dynamic screen based on 3200 filament lamps with 16 gray scales and 20fps updatable by ftp. , LampMatrix, Thesis, ITBA , , .**  
Under the tutelage of Professor Villamil, an advertising screen based on filament lamps was designed and manufactured entirely. [See video](#) , [See material](#) .
- 2003 **Design and Simulation of a pipeline-structured Floating Point Unit for high performance general purpose processors , JAIIo 32<sup>th</sup> Argentine Conference on Informatics and Operational Research , , .**  
[See material](#) .
- 2003 **Selection of the Optimum Stage Number in Pipelined Floating-Point Units , CACIC, Argentine Congress of Computer Science , , .**  
[See material](#)

## Technologies Experience

### Programming Languages

Advanced C, C++, Python, ASM assembler, Verilog, VHDL, Octave

Medium C#, Pascal, bash, makefiles, openHab, flask, Javascript, HTML, css,

Basic Java, php

### Operating Systems

Advanced Linux (Manjaro, Debian, Crunchbang, Bunsenlabs, Ubuntu, Slackware), FreeRTOS, Windows(Win10, Seven, XP, NT, Server2003)

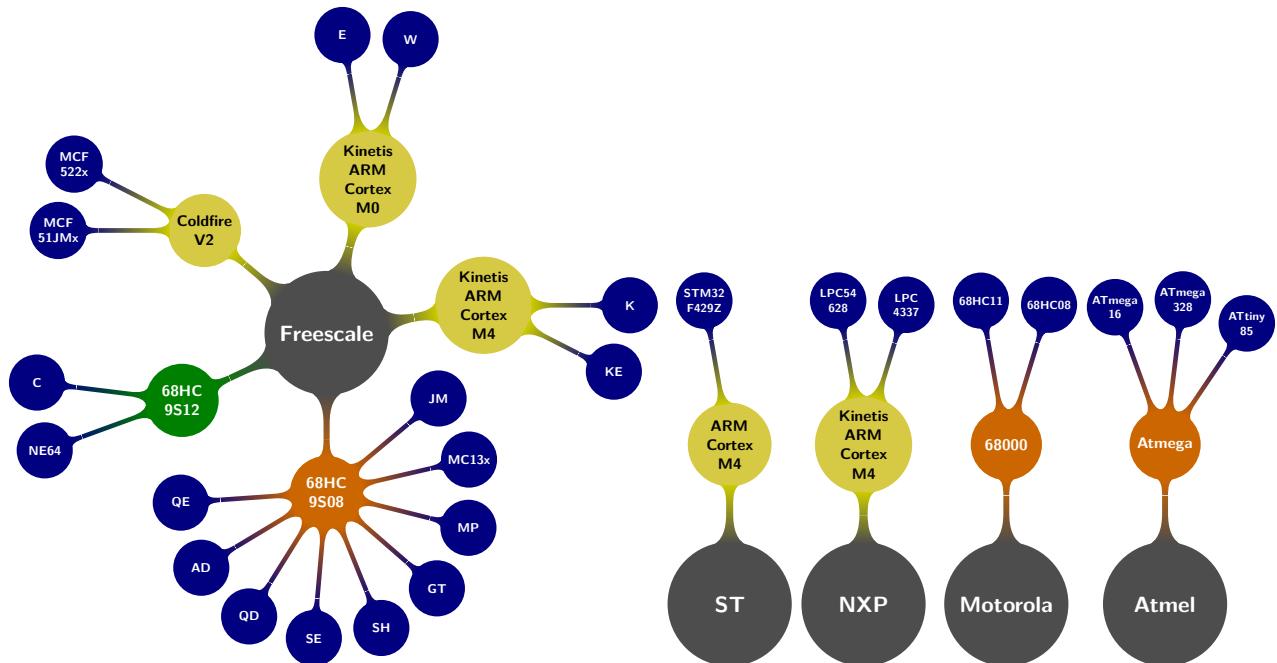
Medium FreeBSD

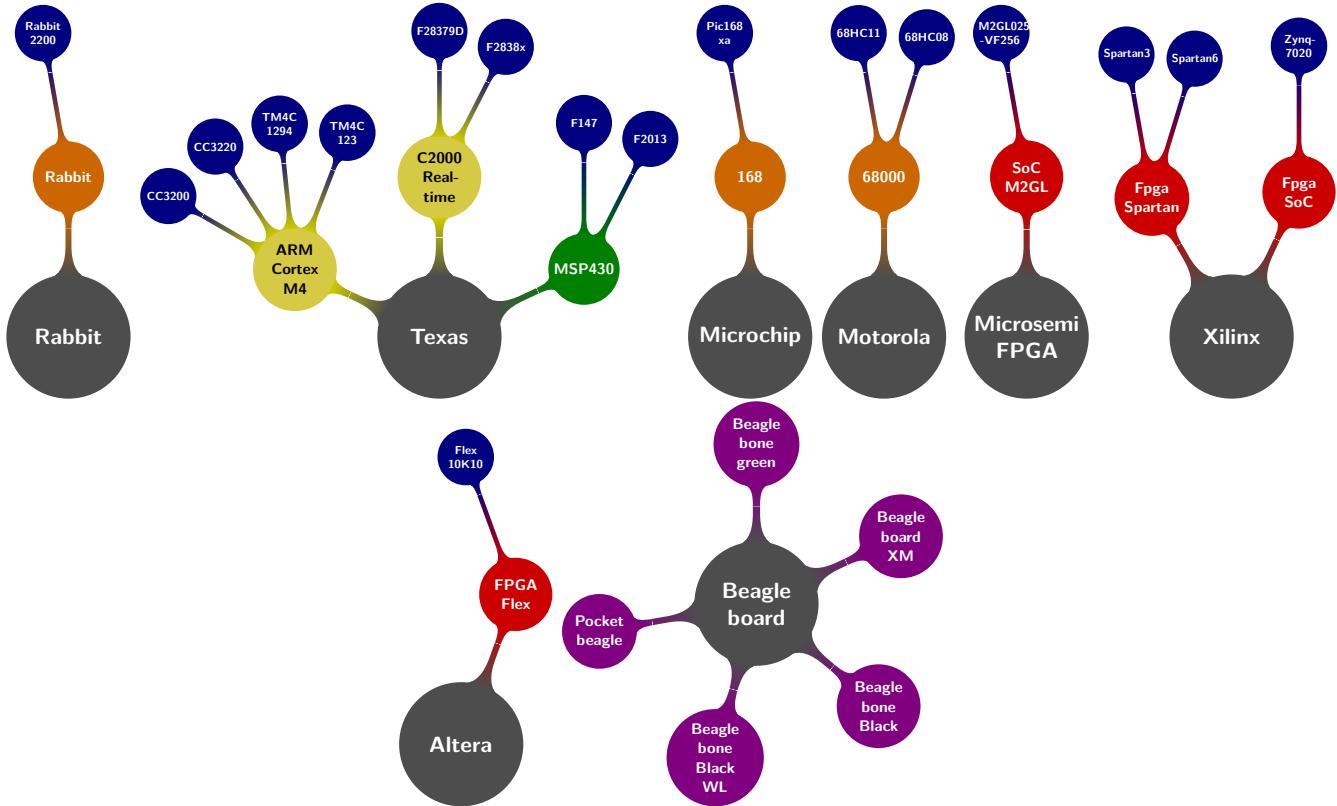
Basic OSEK, plan9, VXWorks, RTems

### Outstanding Computer Software

Advanced	<b>vim</b> <sup>15</sup> ssh ipython Allegro PCB Router gnumeric Prontierface LinuxCNC Borland C++ Builder openocd Libero 12.x icarus cups cryptsetup gnuplot	<b>git</b> <sup>8</sup> anaconda screen Orcad16 Design CIS mutt Freecad Rhinoceros gcc ncurses Softconsole ghdl Swat Wireshark LibreOffice	mercurial pyfda <b>tmux</b> <sup>6</sup> Orcad16 Layout $\text{\LaTeX}$ Slic3r RhinoCam gdb cdk Xilinx (ISE y Vivado) cocotb Samba VirtualBox Freecad	bash jupyter Kicad Orcad16 Pspice Cura Mach3 Flash MX pudb Microsoft Visual Studio gtkwave redmine ceedling pass numpy
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Medium	OpenOffice Mathcad ffmpeg gitlab	Eclipse quemu Openscam gitlab runners	Matlab Arduino IDE Webadmin gitlab runners	Jenkynts svn SonarQube CD/CI						
Basic	Quartus II, Delphi, Blender, Krita, odoo ERP									
Experience in software patterns and techniques										
Advanced	linux device drivers	device tree	Das U-Boot	buildroot						
Medium	NASA CFS									
Basic	Yocto	nmigen								
Communications protocols and digital techniques										
Advanced	Ethernet SPI RS232	lwIP I2C RS485	TCP LVDS PoE+	IPv4 USB FS/HS MQTT	SNMP Zigbee	SMTP RFID	NTP PWM	ARP ADC	UDP DAC	SCI 1-Wire
Medium	IPv6	CAN	6LoWPAN	IEEE 802.15.4	I2S	Radius	Modbus			
Basic	HTTP	Lora	MPI							
Other technologies of interest										
Advanced	Edding CNC macro programming language, electronic board SMD mounting line, manual PCB soldering, infrared oven PCB soldering, FDM 3D printer, rigid silkscreen, PCB silkscreen, CNC machine handling, laser cutter handling , machine tool handling									
Medium	PCB manufacturing, arc welding, lathe handling									
Basic										
Microcontrollers, microprocessors and FPGA architectures experience										
At least one project developed using one of these:										
Colors	● 8 bits	● 16 bits	● 32 bits	● FPGA	● SBC (single board computers)					





## Idioms

Spanish	Oral/Reading/Writing Advanced	<i>Native tongue</i>
English	Reading Advanced Oral/Writing Medium	<i>TOEIC 2005–785 See certificate</i>
Hebrew	Reading Medium, Oral/Writing Basic	<i>Full Hebrew primary school</i>
Russian	Reading, Oral and Writing Basic	<i>Personalized curse at Moldova</i>

## Sports and recreational activities

2016–2017	<b>Basketball</b> , <i>Bariloche</i> , Nahuel sport club, <a href="#">facebook</a> . Training in the club's first division squad.
1983–1994	<b>Basketball</b> , <i>Concordia</i> , J.N.Bialik , . Training from mosquito category to be part of the first division squad.
1995–2004	<b>Basketball</b> , <i>Buenos Aires</i> , University Basketball, ITBA . Training on the campus throughout the whole race.
1994–	<b>Cycling</b> , , , .
Presente	Competition in cross-country category sub-23, competition in category sub-30 trialbike, amateur cycling to the present.
2014–	<b>Guitar</b> , , , .
Presente	Amateur learning of electric guitar and music.

## Other activities and interests

- Physics
- Astronomy
- Motorcycling
- History of science
- Philosophy
- Cycling

# Portfolio

## PAL Robotics

I begin working on the firmware for the fresh new robot *Kangaroo*. I study the hardware platform, main SoC capabilities and then a master plan was designed.



figure 2: Fresh new robot from PAL Robotics *Kangaroo*. It has a new mechanics and extremely powerful electronics. I work on the motors control loop, bootloaders and software in general running on it.

During my job at [PAL Robotics](#) I mainly work as a bootloader and control loops firmware design and developer engineer. The actual core is in fact a 5x core: 1xARM Cortex + 2x C2000 architecture + 2 small but fast cores with custom RISC architecture.

I've actually work on topics like:

- Design the main architecture of the bootloader taking in account the restricted resources
- Design the IPC for inter processors communication
- Implement a baremetal framework with full featured CLI to interact with the bootloader
- Implement a realtime time and frequency visualizer over EtherCAT and UART using matplotlib + numpy
- Implement a persistent telemetry over EtherCAT and UART with custom Json lib converter to a bootloader <-> CLI <-> python -> influxDB <- Grafana
- "Three cores one code" pattern to reuse the same files for each core with minor changes related to hardware, architecture and memory layout multiplexed using makefiles and #ifdef's
- Implement a hex files receiver on C2000 core and a hex file sender in python both from scratch.
- Using CLI + file sender + hex file parser + flash\_burn/ram API, the firmware update for any/all cores is just a text file script, and this is one of the more powerful feature achieved until now.
- I began the implementation of a CI/CD and runners over PAL's gitlab server. They already have been using that for software, but not for firmware neither hardware.
- Help my partners with some ideas on how to improve actual servo drive loop and firmware questions in general
- Work with CLI git, push on gitlab servers, Agile environment with weekly reports and meetings.

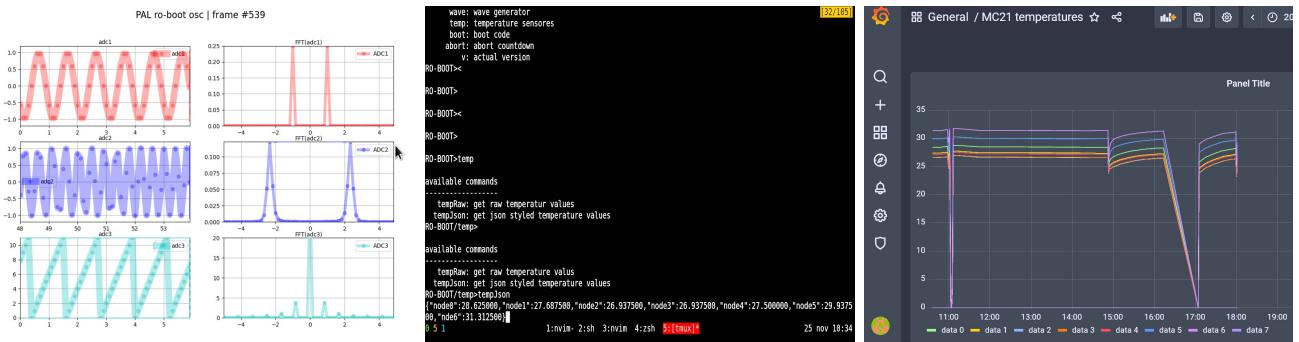


figure 3: Command line to interact with any core with same interface. Realtime matplotlib visualizer. Python -> influxDB <- Grafana persistent data visualizer.

## NOVO SPACE

I worked for a year at an exciting aerospace start-up as an embedded systems leader. I've developed firmware for complex SoCs, analysis of new technologies, port of bootloaders, port of embedded linux, device drivers, baremetal C and ASM startup coding, analysis of aerospace software, among other related activities. I've worked in a team with other 15 specialists, but I quit due to moving to another country.



figure 4: A capture of an embedded Linux (left) ported from scratch and running on NOVO SPACE boards (right).

During my job at [NOVO SPACE](#) I mainly work as a lead firmware developer. At the begining the main focus of the job was:

- Bringup the fresh new NOVO boards
- Write startup firmware for SoC's (ARM C-M0 with FPGA)
- Write FPGA interfaces and connect them with firmware drivers
- Golden mode firmware image recover
- Reliance edge, wear leveling capable file system port/choose/select/implement
- Memory stress test
- Telemetry report of main internal values from the very early code until main app runs
- Bootloader develop/port
- u-boot as a general bootloader ported to a very constrained M0 and without DDR
- FreeRtos ported to M0, DDR access through FPGA and then a file system over that was mounted.
- NASA CFS ground app connected with the boards
- DAP protocol access from python script to a memory mapped internal bank as a telemetry
- Port and run custom <800kB Linux kernel + FS for C-M0, with custom timer and UART device drivers with a minimal busybox RAM file system and launched from a custom u-boot from NOR to DDR.
- HUGO documentation and gitlab CI/CD daily use.

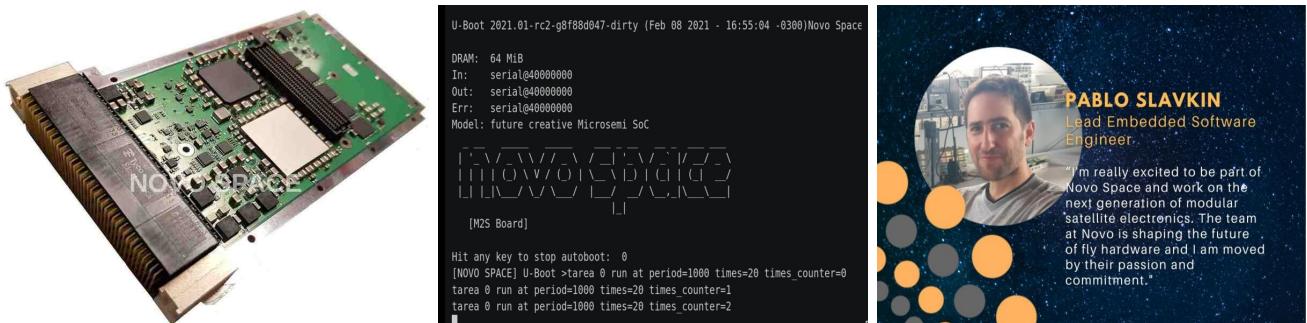


figure 5: Novo super high speed and complex boards with a u-boot running on it.

## Engineered Arts

I've worked on a new high precision, mid power BLDC power stage board. I've made the schematics, I've chosen the parts and finally I've routed the PCB board in Kicad 5.0 over 4 layers as I shot in [6](#)

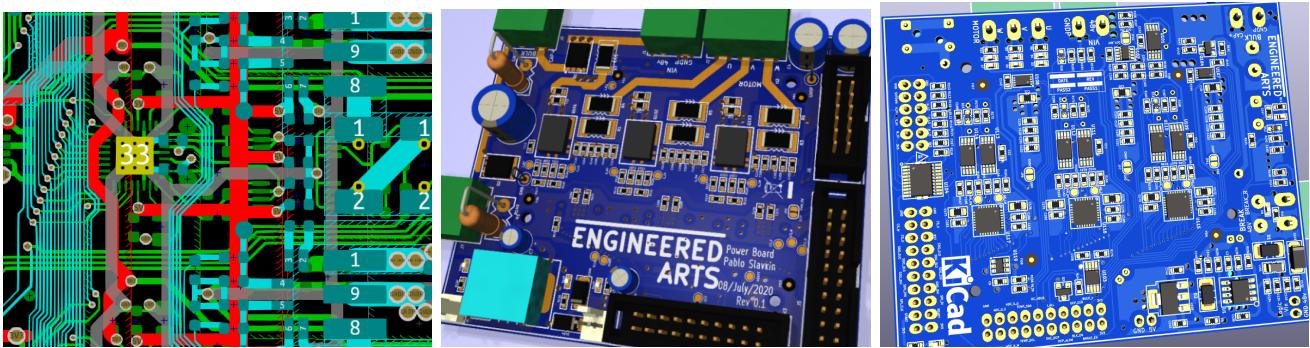


figure 6: PCB power stage for high precision mid power servo BLDC motor for Engineered Arts. [see rotating 3D board](#)

## Nanocut 2.0

Working for Nanocut company at Moldova in second quarter of 2019 I've developed a PMSM (*permanent magnet synchronous motor*) servo motor controller using a Texas Instruments development board with a C2000 real-time microcontroller. I've implemented a torque, speed and position closed loop control algorithms using a relative optical encoder as a feedback. I've implemented a FOC vector control method using Clarke / Parke transforms and three nested PID's. This work will be the hardware and firmware base for a new generic servo drive for using in all the company's machines. Figure [7](#) shows the hardware tools and the algorithms implemented. Figure [8](#) shows the prototype running at



figure 7: Development tools and algorithm output plots of the PMSM servo driver

Nanocut's labs.



figure 8: Mechanical prototype used for the PMSM algorithm test, torque, speed and position

## Nanocut 3.0

Working for Nanocut company at Moldova in first quarter of 2020 I've designed the hardware for the new servo drive. I've made the schematics, layout routing and 3d model of the equipment. I've used Kicad 5.0 for all the process and complete the design using 6 layers traces of 6mils/6mils, and vias of 0.3 mm min to support the restricted 337 BGA pins footprint.

At the end this were the numbers:

- 2253 pads
- 728 vias
- 8531 segments
- 552 nets
- 19 pages

There is the link of the public github project repository [repo](#) and these is a video showing the final model [video](#). The board has the following main capacities:

- Triple real time designed 32b 200MHz core procesar
- Differential isolated incremental encoder x2
- Differential isolated absolute encoder x2
- Differential isolated step direction input x2
- Isolated RS485 x1
- Isolated CAN x1
- Ethercat slave
- Ethernet
- Isolated current measurement using LEM x6
- Isolated voltage measurement x2
- Isolated PWM IGBT signals to x12
- Isolated alarm input x2
- Isolated brake output x2
- Isolated fan RMP measurement input x2
- Isolated sigma delta input x8
- Isolated NTC temperatura sensor x4
- Isolated 1-Wire bus x1
- SPI LCD interface for EVE touch screen modules or basic characters LCD
- Dual isolated power supply's
- Some others minor features

With these capabilities the board could drive two PMSM motors at the same time and many powerful possibilities. In the figure 9 I show some pics of the design process. In the figure 10 I show some pics of the final release.

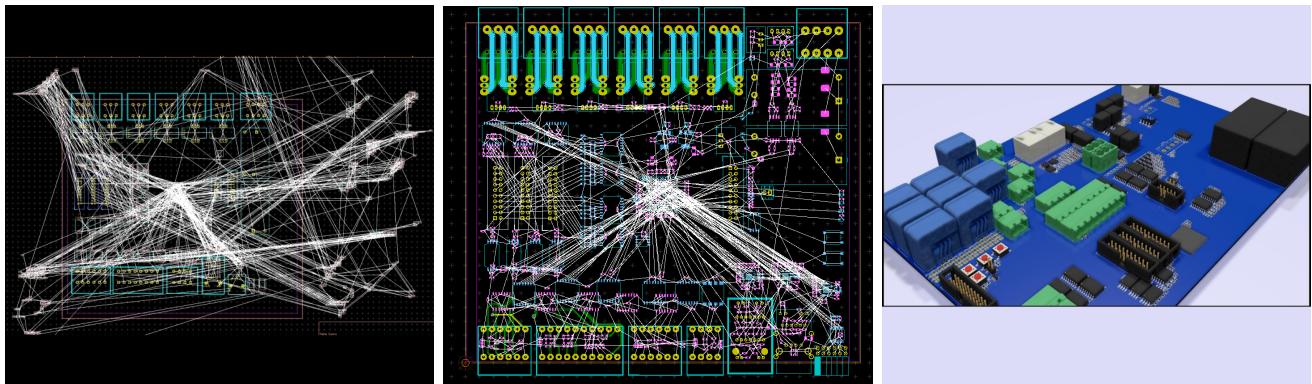


figure 9: PCB design stages at Nanocut Moldova for a PMSM servo drive.

In the figure 11 I show some pics of the mounted board.

### [Wolfcut](#)

I've developed a HTML/WIFI remote control for a NK105 based CNC machine for [Wolfcut](#).

I've used a Beagle Bone Green Wireless embedded computer that behaves as an USB mass storage for file exchange eliminating the need of connecting and disconnecting a pendrive.

I've design a small Beagle break board that connect in between the keyboard cable and emulate the actual keyboard.

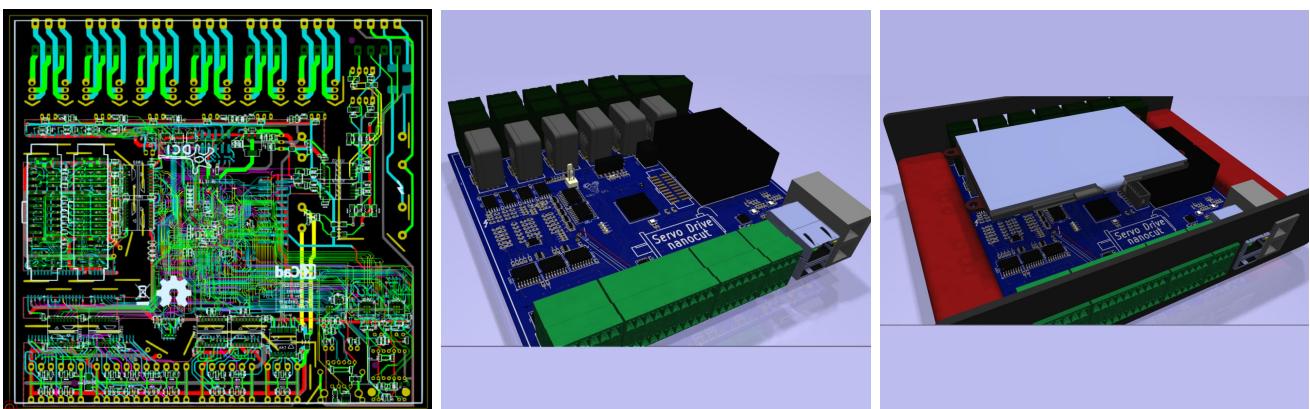


figure 10: PCB design release with a preliminary case at Nanocut Moldova for a PMSM servo drive.

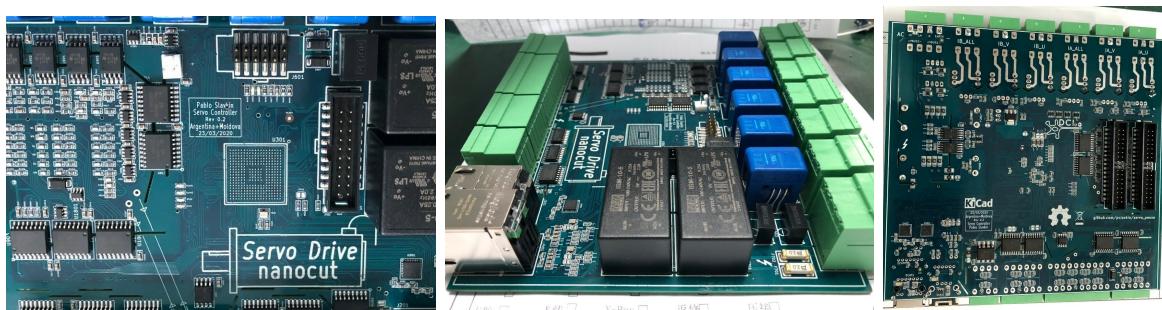


figure 11: Manufactured and mounted board in OurPCB factory for the PMSM servo drive.

I've compiled the GCC for the ARM using crosstool-ng, then compile the linux kernel using the GCC generated, a custom file system using buildroot.

I've used the new style configFS to emulate the mass storage profile, and configured an apache deamon for the web GUI and php support for the backend interacion with a C code that do the actual communication with the NK105. Figura 12 shows the implemented layer model and some captures of the web page.



figure 12: Software layer model and the web page designed to remote control the NK105 CNC controller through WIFI.

Figure 13 shows some captures of the compilation setup in action.

### Noto Group S.A.

As a technological partner of Noto Group S.A I've developed and manufactured electronic equipment for electromedicine aesthetics among which stand out:

- Tripolar radiofrequency.
- Electroporador.
- microdermabrasion.
- Cavitator.

The figure consists of three side-by-side terminal windows. The left window shows the configuration for 'USB Gadget Support' in a Linux kernel. The middle window shows the 'crosstool-NG Configuration' with 'Paths and misc options' selected. The right window shows the 'Buildroot Configuration' with 'Target options' selected.

figure 13: crosstool-ng, kernel and buildroot setup, used in the wifi remote control of NK105

- Light therapy.
- Portable electrostimulator.
- Medical certified power supplies.

The figures 14, 15 y 16 shown some of the equipments:



figure 14: Power equipments, power supplies, oscillators, TH and SMD mounting techniques

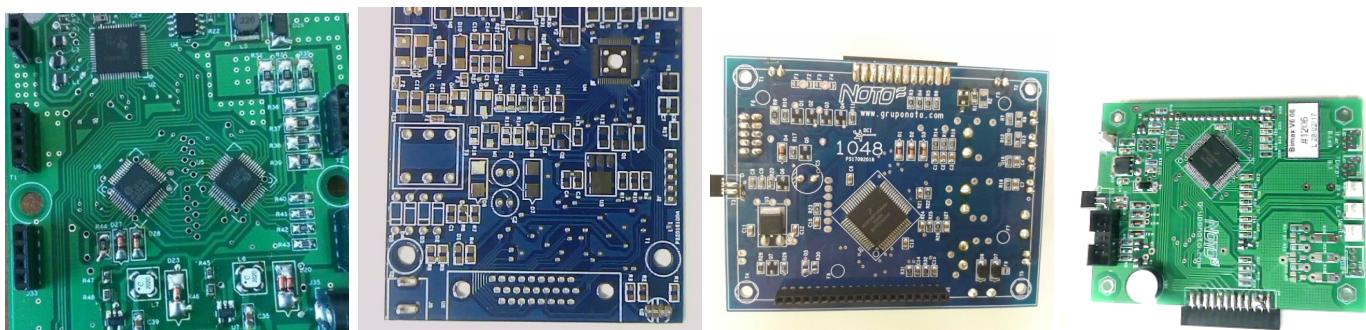


figure 15: Controller boards, LCD controllers, PWM drivers, signal generators, TH y SMD 1206, 0805 y 0603 technologies used.

### Master's degree in Embedded Systems

During the MSE I've developed a lot of hardware, firmware, software and management project, and the following stand out:

- Python + sockets + threads + json + OOP

During the subject *General purposed operative system application deployment* I've code a Python program to send currency exchange through UDP using sockets, threads and json. You'd see my public [repository](#) in this [link](#) and enjoy a simple demo following asciinema link in the figure 17

### CNC Machine controller

As a final project for the CESE (Embedded system specialization), I've designed a complete 3 axis CNC machine controller including the firmware for the real time task and Ethernet communication on a cortex M4F, the stepper motor drives and a software for PC to send the GCode files and show the actual position of the machine on real time. The machine could be managed over the internet or run completely alone using the embedded controller.



figure 16: Some electronics equipment developed and manufactured for Noto Group.

```

doc.md+ 6 lo que hace el programa es lanzar 3 threads cada una asociada a un puerto coincidente con el servicio. 10000, 10001 y 10002
4 el programa lee 3 config diferentes config0.txt 1 y 2 en donde se redireccionan a 3 csv
2 diferentes tambien
13 por eso el service muestra una salida
I [buffers] 10:56:16.856300 IP localhost.10001 > localhost.49885: UDP, length 2
10:56:17.019660 IP localhost.50267 > localhost.10000: UDP, length 268
10:56:18.023780 IP localhost.50267 > localhost.10000: UDP, length 268
10:56:18.032507 IP localhost.50267 > localhost.10002: UDP, length 268
10:56:18.799385 IP localhost.56868 > localhost.10002: UDP, length 274
10:56:18.806244 IP localhost.10002 > localhost.56868: UDP, length 2
10:56:18.807196 IP localhost.10000 > localhost.10001: UDP, length 272
10:56:19.035419 IP localhost.10001 > localhost.10000: UDP, length 272
10:56:19.033346 IP localhost.50267 > localhost.10000: UDP, length 268
10:56:19.040279 IP localhost.10000 > localhost.50267: UDP, length 2
10:56:20.041176 IP localhost.50267 > localhost.10000: UDP, length 268
10:56:20.047202 IP localhost.10000 > localhost.50267: UDP, length 2
10:56:20.085080 IP localhost.10000 > localhost.10001: UDP, length 272
10:56:20.085087 IP localhost.10001 > localhost.49885: UDP, length 272
10:56:21.044879 IP localhost.50267 > localhost.10000: UDP, length 268
10:56:21.054637 IP localhost.10000 > localhost.50267: UDP, length 2
10:56:21.087266 IP localhost.50267 > localhost.10002: UDP, length 274
10:56:21.081118 IP localhost.10002 > localhost.56868: UDP, length 2
10:56:21.083504 IP localhost.10002 > localhost.10001: UDP, length 272
10:55:22.051527 IP localhost.10000 > localhost.50267: UDP, length 268
10:56:22.073041 IP localhost.10001 > localhost.10001: UDP, length 272
10:56:22.082534 IP localhost.10000 > localhost.49885: UDP, length 2
10:56:23.062573 IP localhost.50267 > localhost.10000: UDP, length 268
10:56:23.069410 IP localhost.10000 > localhost.50267: UDP, length 2
10:56:24.070202 IP localhost.10001 > localhost.50267: UDP, length 268
10:56:24.077053 IP localhost.10000 > localhost.50267: UDP, length 272
10:56:24.077053 IP localhost.10000 > localhost.10002: UDP, length 274
10:56:24.077053 IP localhost.10002 > localhost.56868: UDP, length 2
10:56:24.077053 IP localhost.10002 > localhost.10001: UDP, length 272
10:56:24.077053 IP localhost.10001 > localhost.49885: UDP, length 2
10:56:25.077924 IP localhost.50267 > localhost.10000: UDP, length 268
10:56:25.089419 IP localhost.10000 > localhost.50267: UDP, length 2
I v14 17 Nov 10:56

```

MONEDA	COPRA	VENTA	MONEDA	COPRA	VENTA
Dolar:	58.63	61.61	Dolar:	38.63	61.61
Euro:	65.12	68.93	Euro:	55.12	68.93
Real:	13.45	14.23	Real:	13.45	14.23
leu:	22.45	22.23	Yenes:	122.45	122.23

figure 17: Python development using socket, threads, json and cvs during a master's degree subject

The pictures of my actual implementation are shown in the figure 18 and I've upload some videos of the running machine cutting a piece of wood in the following link [videos pap](#). On the videos list you will find my public defense of the work at the UBA university.

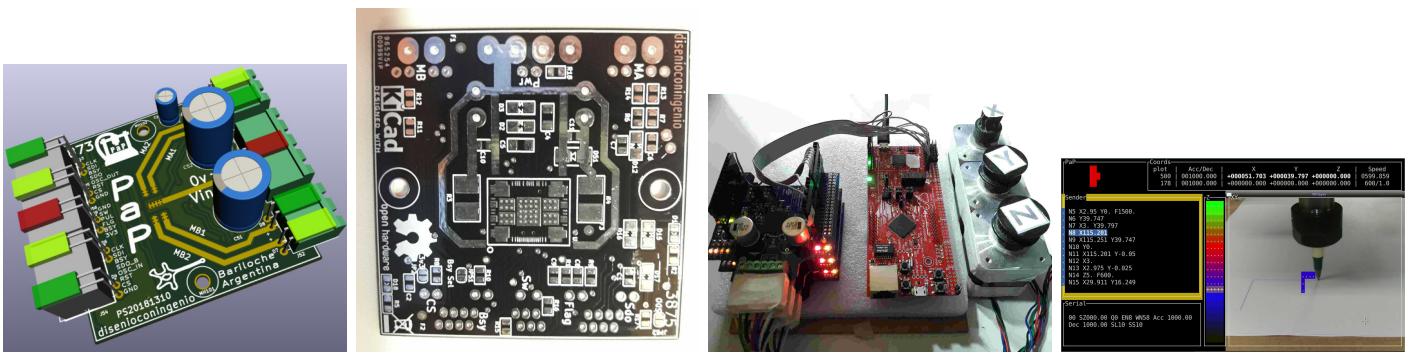


figure 18: CNC machine system. Hardware, firmware and software developed as my final project for the CESE career.

### [disenioconingenio](#)

When I was in charge of Disenioconingenio, I developed several products for sale in the market and customized according to the characteristics required by the customers, the following stand out:

- RFID 125Khz Multiprotocol

A 125khz RFID card reader was designed with a discrete frontend and fully decoded by the microcontroller. This allows reading data from different manufacturers and different protocols, and combining with multiple data outputs, such as RS232, RS485, Wiegand and ABA.

There are shown some pictures in the figure 19.



figure 19: 125khz RFID multiplrotol card reader, compatible with most card manufacturers.

- Hango - Wheel chair motorizer

In conjunction with institutions dedicated to assisting people with mobility difficulties such as CIAPAT, AEDIN and FAME, we develop Hango.

It consists of a motorizer that attaches to manually driven wheelchairs granting comfort and independence.

Models for children and adults up to 100kg were developed with different styles of commands, some based on the typical joystick, and other new ones using touch screen technology.

The equipment adapts to the vast majority of market chairs with minimal mechanical intervention and allows the coupling and uncoupling without tools, suitable for transfers by car and plane.

Thrre are some pictures in the figure 20 and 21 and also some videos at [Videos Hango](#).

### [National Atomic Energy Commission](#)

I worked at the CNEA as a research fellow in the PET (Positron Emission Tomography) development group.

During the work period, a CNC machine was developed for automatic movement of radioactive material. I also code part of the photon coincidence algoritm in VHDL for the FPGA shown in the figure 22.

Then I developed the software for acquisition and analysis of raw data from the equipment shown in the figure 23.

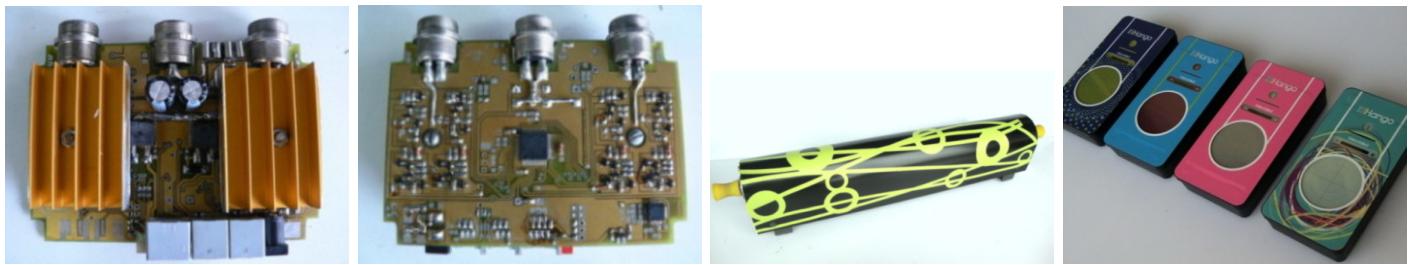


figure 20: Hango Power boards, controller and joysticks.



figure 21: Hango parts, and Hango at the CIAPAT expo.

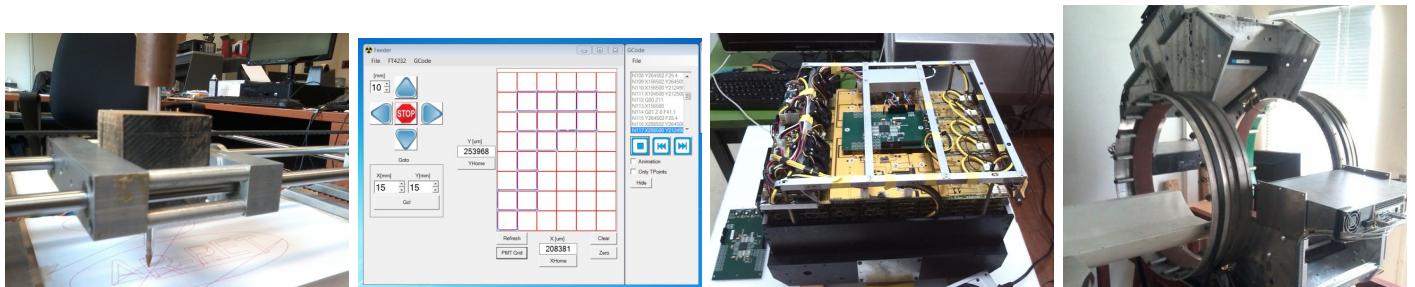


figure 22: CNC table for automation of acquisitions with a capture of the management software, the board with the FPGA mounted in one of the 6 heads, and the half-finished tomograph.

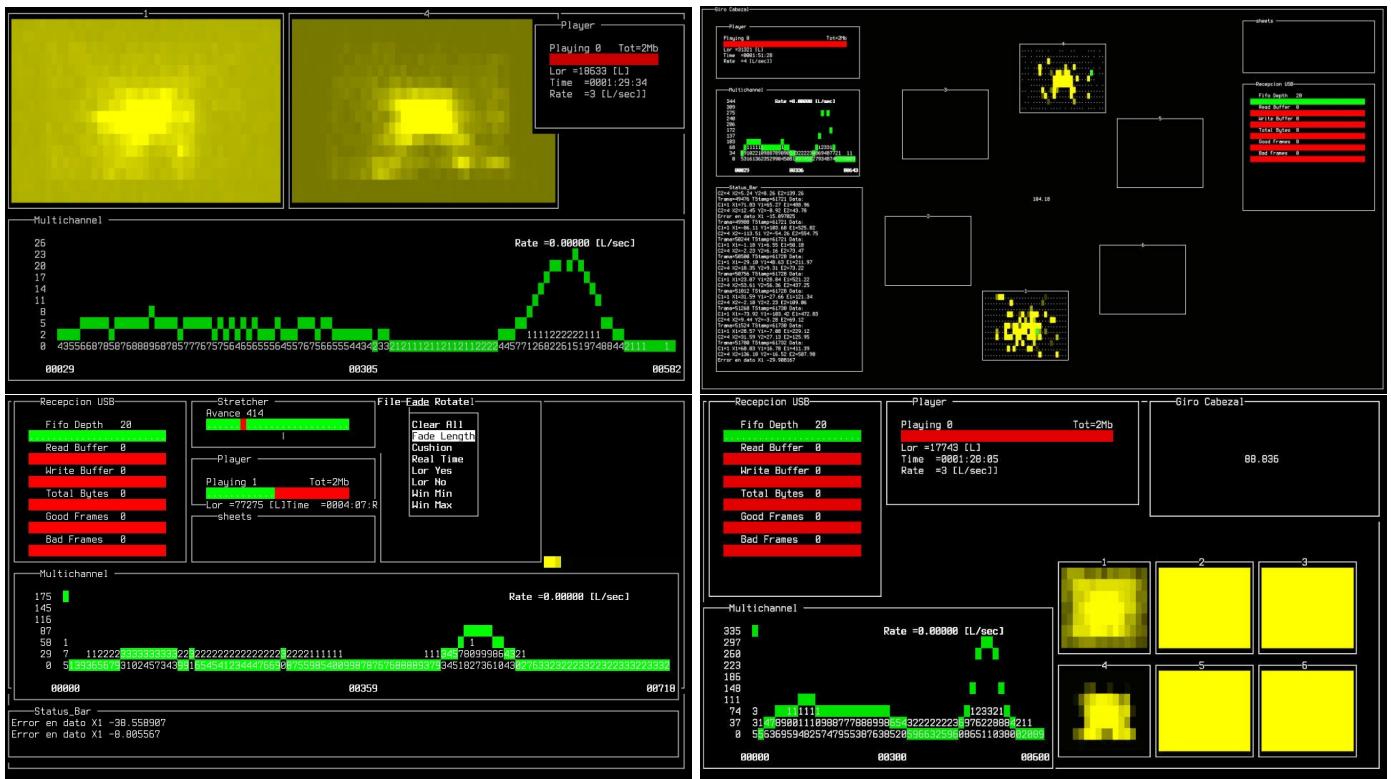


figure 23: Captures of acquisition software, CUIPET, of the PET at CNEA's lab.

### Seconsat

In addition to consulting tasks, a wireless device was developed to report temperature, humidity, speed, and other parameters from the box of a cargo truck to a GSM tracking equipment.

I've used 0402 technology in a 4-layer PCB with radiofrequency requirements from 200 MHz to 2.4 GHz.

I've developed the schematic, and the PCB in Orcad Allegro as shown in the figure 24.

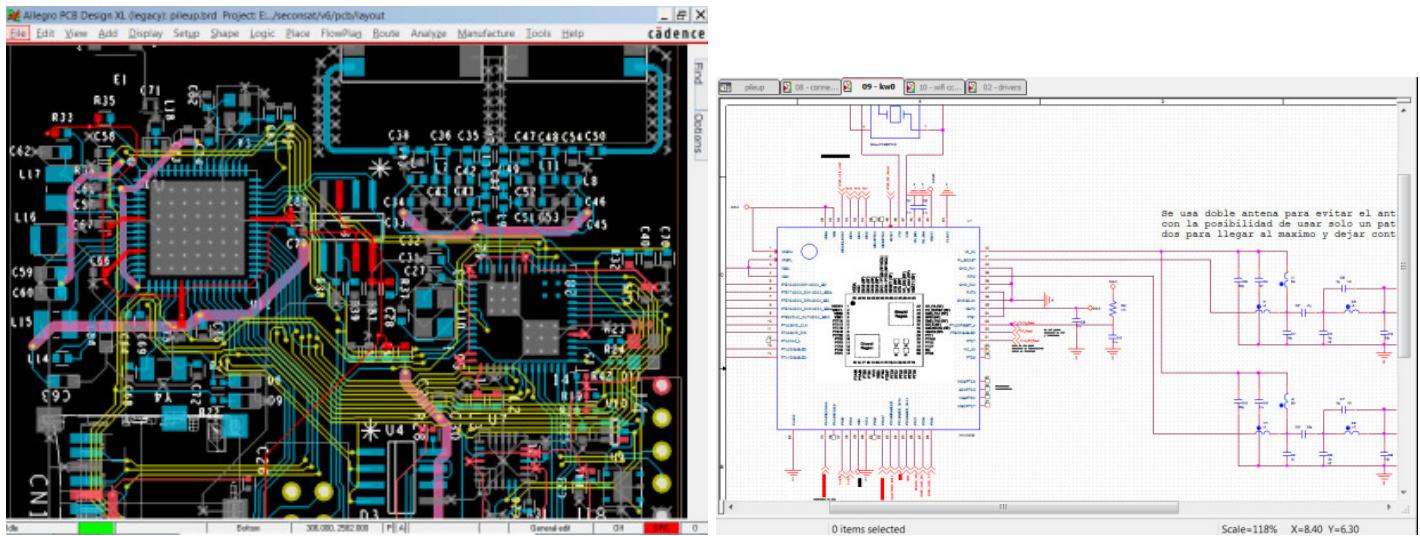


figure 24: PCB development using one 2.4Ghz and one sub-1Ghz radio for wireless communication.

### Xenon S.A.

I've worked for Xenon S.A as a developer and manufacturer of electronic equipment for cinemas automation. The equipment is controlled by a RS232 channel using a custom protocol based on MODBUS. Models are manufactured with different performance, sizes and cabinets as shown in figure 25.



figure 25: Cinema automation equipment for Xenon S.A. using RS232 channel and customized communication protocol.

### Pointer

I've worked for Pointer as a consultant engineer, firmware and hardware developer in the vehicle tracking sector. I've made some products among those that stand out:

- 3D printed lighted keyboard.
- LCD touch keyboard access control.

Figure 26 shows some of the equipments developed and manufactured:



figure 26: LCD touch keyboard as a truck driver access control.

### Piscina Natural

I've worked for Piscina Natural, as a consultant engineer, developer and manufacturer making products related to swimming pools electronic cleaner.

I've developed a product in charge of control and measure the electrical current driving carbon cells that made chlorine using electrolysis over saline water.

The design an equipment manufactured are currently running all over the country.

Figure 27 shows some pics of the controller.

### La Colmena

For the well-known disc of Pilar, La Colmena, a LED ceiling was developed and manufactured using Ethernet with the sophisticated software Madrix, highlighting the photos of the installation in the figure 28 and there are also some public videos on [videos La Colmena](#).

From this work, a product that consists of interconnected modules to form LED screens different pitch and sizes. Can you see in the pictures of the figure 29 and you can see some videos at [see videos](#).

### Grupo Koner

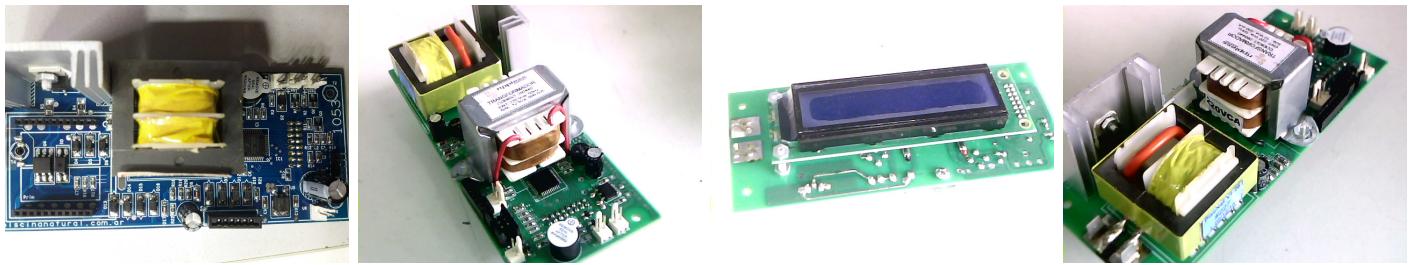


figure 27: Electrolysis of saline water electronically controlled for automated swimming pool cleaner for Piscina Natural



figure 28: LED display mounted on the roof of the La Colmena disc, developed, manufactured and installed.



figure 29: Modules of interconnectable LEDs to form LED screens controlled by ethernet of different pitch and sizes.

I've worked for Grupo Koner as a consultant engineer, developer and manufacturer of products related to access control. I've developed from scratch a fully customized RFID reader to communicate with a GSM tracker and report the truck driver remotely and also have some alarm functions.

I've made also a wireless panic button integrated with the actual design.

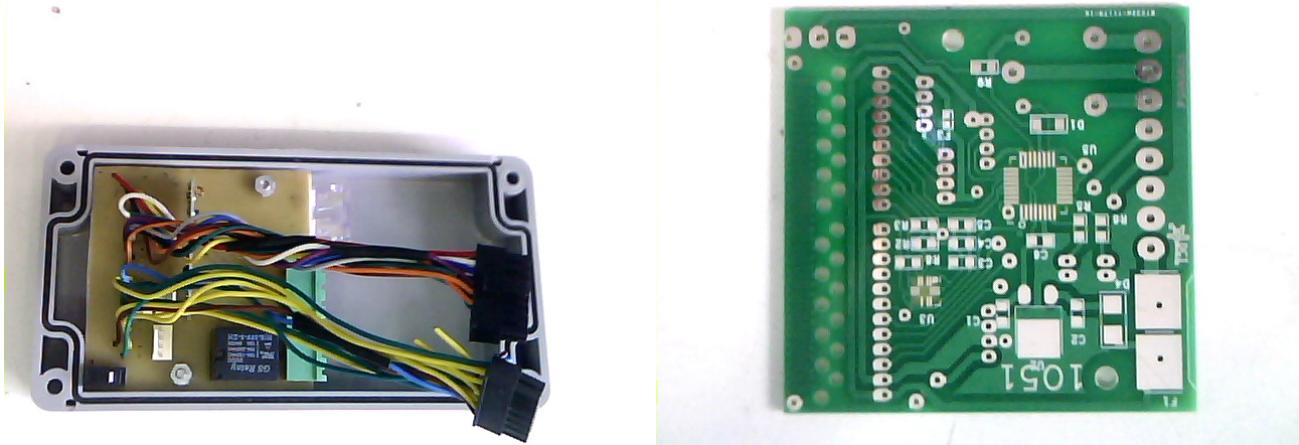


figure 30: Wireless equipment connecting the AVL equipment at Grupo Koner

### Digicard S.A.

For several years, I work for the company in the area of development of new hardware products aimed at access control. I can highlight the development of a new RFID reader of 125khz to replace the old magnetic cards readers and provide customized solutions integrated with the rest of the access control system of the company. I did the requirements, schematic design, PCB design, prototype, documentation for production, commissioning and documentation of use. The reader is still produced and using currently. Some photos of the equipment can be seen in figure 31.

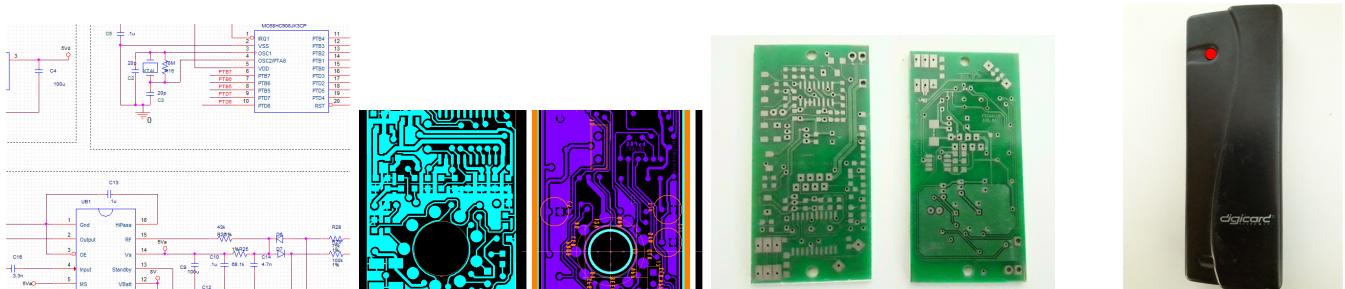


figure 31: Development of hardware, firmware and production of RFID reader of 125khz for the company Digicard.

### Softron

La empresa Softron S.A provee soluciones al mercado mayorista de proveedores de energía, instalando medidores de consumo y ofreciendo el servicio de monitoreo remoto.

Para dicha empresa se desarrollaron placas de integración entre SBC, computadoras en una placa, y periféricos como, salidas de relé, entradas IO's, fuentes de alimentación, soporte para modulo GSM y dual SIM, entre otras opciones. Se pueden ver algunas fotos de la placa desarrollada en la figura 32 para la cual se realizaron varios prototipos y se generó toda la documentación de fabricación en volumen.

Por otra parte también se diseñaron dispositivos inalámbricos para monitoreo de temperatura usando redes Zigbee en modo mesh, se pueden ver algunas fotos de los equipos fabricados en la figura 32.

### Certificates and Awards

At the figure 33 there is the engineering degree certificates.

At figure 34 there is certificates from mixed activities.

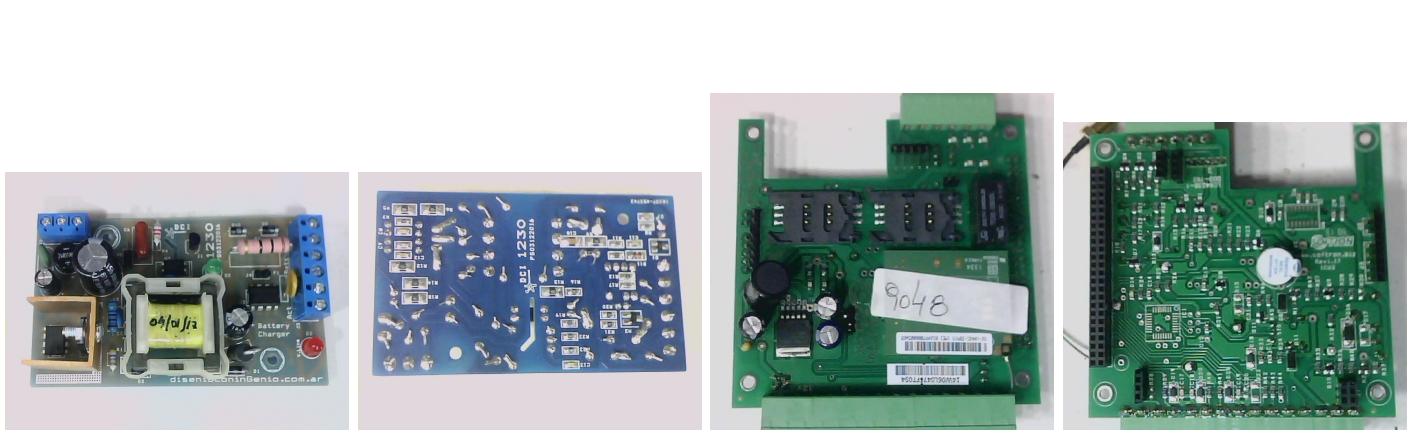
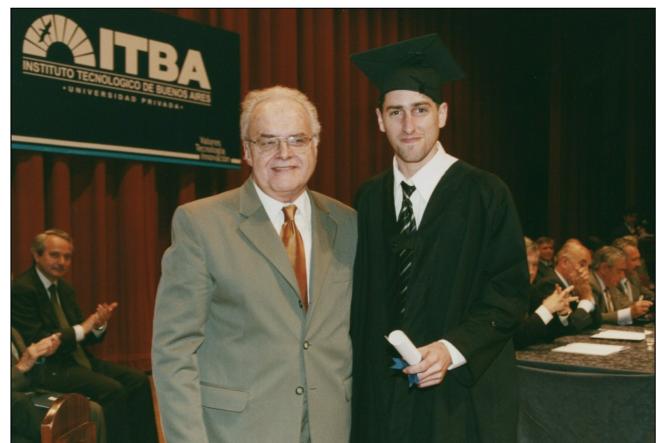


figure 32: Placa de integración entre una SBC y una amplia gama de periféricos, modulo GSM, fuente de alimentación y conectores.



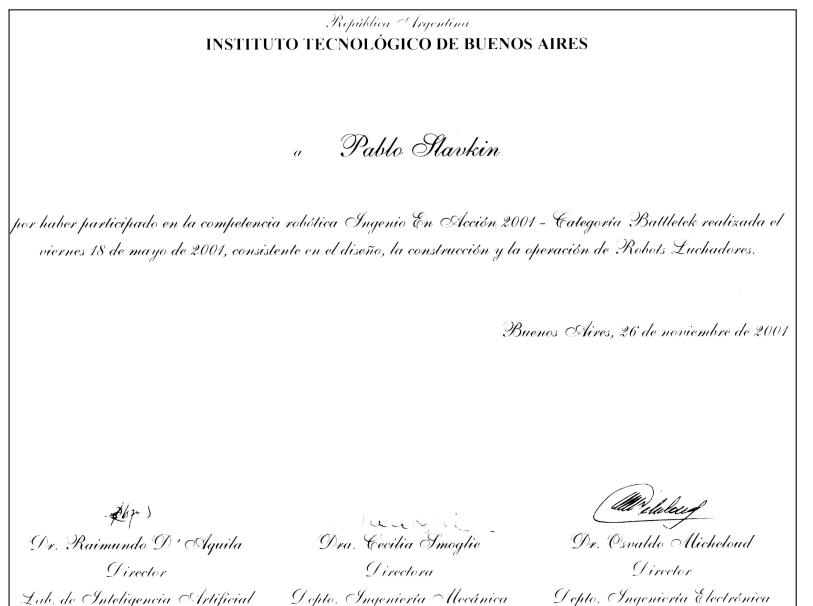
(a) Electronic engineer degree certificate, telecommunication specialist, from ITBA university.



(b) Diploma ceremony next profesor Eng. Eduardo Martinez.



(c) 1<sup>th</sup> prize medal in R&D, research and development beginning, from ITBA university competition



(d) 3<sup>th</sup> prize on Battletek, robot fight competition at ITBA university .

figure 33: Certificates and awards during engineering carer at ITBA university.



(e) Clarin newspaper note about robot fight competition participation. Black disco robot is from our team, called *Discotech*

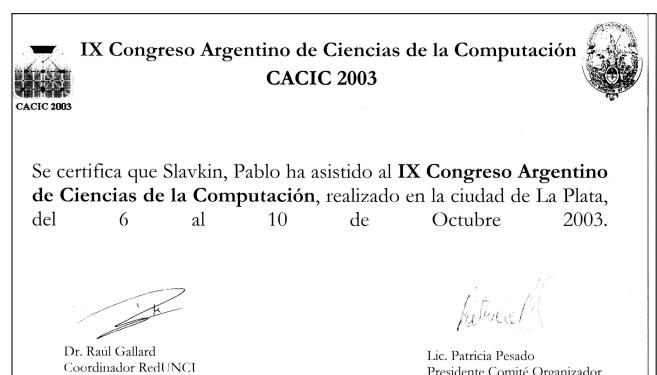


(f) AI, artificial intelligence certificate at ITBA university course .

figure 33: Certificates and awards during engineering carer at ITBA university.



(g) JAIIO, 32º Argentinian journals in Informatics and applied investigation at which we presented the paper *Design and Simulation of a pipeline-structured Floating Point Unit for high performance general purpose processors*. [read paper](#).



(h) CACIC, IX Argentinian Congress in Computer Science where we present the paper *Selection of the Optimum Stage Number in Pipelined Floating-Point Units* [read paper](#).

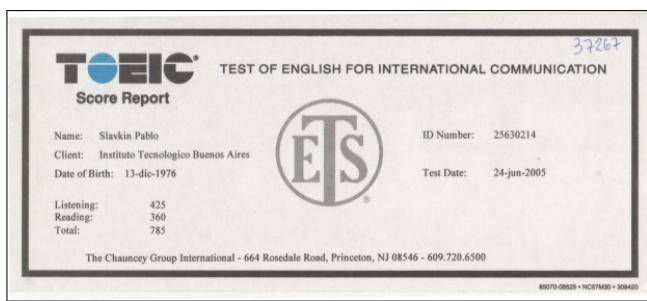
figure 33: Certificates and awards during engineering carer at ITBA university.



(a)  $\text{\LaTeX}$  introduction course certificate. Taken with the aim of professional paper presentation and I work on  $\text{\LaTeX}$  every day since then. [Ver certificado](#)



(b) Certificado por el dictado de un curso a escuela secundaria de introducción a la robótica, teórica y práctica. [Ver certificado](#)



(c) Certificado de examen de inglés TOEIC. [Ver certificado](#)



(d) Certificate for being a jury on LATAM 2018 innovation projects contest organized by MIT and ITBA universities. [see certified](#)



(e) Certificate for being a jury on LATAM 2020 innovation projects contest organized by MIT and ITBA universities. [see certified](#)

figure 34: Certificados obtenidos en diferentes cursos y seminarios participando de manera independiente como parte de la actualización personal técnica y académica.

At the figure 35 there is some certificates and awards from Codility challenges platform that measure coding skills in different languages .



(a) Golden award in Palladium challenge 2020 from Codility.  
Coded in C. [see certificate](#).

figure 35: Certificates from Codility platform