Matthieu PASQUET

Freelance Research Engineer

Hardware, Embedded Software, Software

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Professional experience

Since May 2016:	**Freelance hardware and software research engineer**. Sorèze, France.
Mission:	Propose **engineering services** for **developing novel instrumentation** in the field of **life sciences/neuroscience research.** Customers include **academic** and **industrial laboratories.**
Responsibilities:	• Assist customers in translating a scientific paradigm in an experimental set-up. • Review customers' experimental protocols to advise on gaining efficiency to minimize experimental burden by reducing experiments cost and delay. • Develop experimental systems as per customers' needs or specification. Past and current projects include: • Miniature wireless data acquisition systems dedicated to small animal research. • Wired or **wireless movement measurement systems** for **behavioral research**. • Real-time data acquisition systems for neuroscience research.
Environment:	Neuroscience/behavioral/bio-medical/pharmaceutical research, neuro-engineering, neuro-technology. Optogenetics, miniature wireless systems, real-time systems, data acquisition, USB, Bluetooth, sensors. Hardware, software, embedded software, National instrument Labview, circuit board design and fabrication, electronic assembly. Vision software, video tracking. Multiple parallel set-ups management.

Sept. 2014 - Mar. 2016:	**Research Engineer**, **INMED** (institut de neurobiologie de la méditerranée), **Neuronal dynamics and functions of the basal ganglia lab**., Marseille, France.
Mission:	**Responsible for the team scientific instrumentation development.**
Responsibilities:	• Development of **behavioral control systems** implementing **real-time video tracking** functions and allowing for independently running several instances of the same experiment on multiple identical setups. • Development of a miniature **wireless device** for **closed-loop movement-triggered brain optical stimulation in rats.** • Support of the team for all hardware and software related topics. • Contribution to the animals training. • Contractors' follow-up (mechanics). • Involved in the creation of the institution scientific hardware platform.
Environment:	Behavioral control systems, real time data acquisition, wireless data acquisition, video tracking, Labview, embedded software, FPGA, HDL, wireless systems, MEM digital movement sensors. Neuroscience research environment.

June 2013 – June 2014:	**Research Associate**, **SISSA** (international school for advanced studies), cognitive neuroscience dept., **tactile perception and learning lab.**, Trieste, Italy.
Mission:	**Analysis of artificial tactile sensors performances from a cognitive perspective, in the frame of a hand prosthesis development project.**
Responsibilities:	• Design of an experimental setup to assess an artificial finger tactile perception properties. • Development of texture/vibrations discrimination algorithms. • Proposition of enhancement for the artificial finger sensors. • Autonomous work, international environment.
Environment:	Tactile perception, tactile sensors. Neuroscience/biomedical/cognitive sciences research environment.

Sept. 2011 – May 2013:	**Head of the scientific hardware development platform,** Champalimaud Neuroscience program, **Fundação Champalimaud**, Lisbon, Portugal.
Mission:	**Head of the scientific hardware platform (mechanics/electronics/embedded software)** of the **Champalimaud** Neuroscience Program.

Responsibilities:	Give the researchers an easy access to innovative and novel hardware equipment, technology and knowledge.
	• **Creation** and **management** of the **hardware development facility**:
	  o Suppliers research, management and follow-up.
	  o Creation of the electronic prototyping lab (PCB production and SMD/PTH assembly).
	  o Creation of the electronic development lab (general instrumentation, components stock).
	• **Hardware development activity**:
	  o Researchers support and advise.
	  o Simple or complex systems design and production.
	  o Mechanical and electronic workshops management.
	• **Autonomous** work, **international** environment.

Environment:	Technical facility management. Neuroscience/biomedical/cognitive sciences research environment. Microcontrollers, FPGA/EPLD, C, Labview. Optoelectronics, sensors interfacing, data acquisition, motor control. C, VHDL, real time programming.

Feb. 2008 – Jul. 2011:	**Research, Operations** and **System Engineer SAFRAN** Engineering Services for **Airbus**. Toulouse, France.
	Communication Navigation Surveillance – Air Traffic Management – Cockpit operations dept.
Mission:	**EMMA-2 European research project: evaluation** of new **operational concepts** implemented on a **ground guidance system**.
Responsibilities:	Evaluation of safety, efficiency and technical feasibility topics on the ground guidance system, following operational scenarios driven on Airbus flight simulators. • Briefing of the participants (flight test and training pilots) on the system concepts prior to simulator sessions. • Collection and synthesis of data related to safety and efficiency during the simulator session and the participants debriefing. • Participation to interoperability meetings with pilots and ground stakeholders (Air Traffic Management systems manufacturers, air traffic controllers, air navigation services providers). • Edition of a man-machine interface and operational recommendations synthesis document.
Environment:	Controller-Pilot data-link, ground operations concepts. Cockpit Man-Machine Interface. Human factors evaluation.
	Communication Navigation Surveillance – Air Traffic Management – Cockpit operations dept.
Mission:	**Datalink** team: **system design**, **V&V** on an onboard air/ground communication data router (ATA 46).
Responsibilities:	• Specifications update (Frequency Support Lists as per ARINC 631 on ATN router) • V&V objectives update.
Environment:	ATN and ACARS basics, ATSU/ATIMS.

	Maintenance dept.
Mission:	**Centralized Maintenance System** - A400M aircraft: **system design**.
Responsibilities:	• Man-Machine Interface design. • Interactive mode design (dedicated dialog with the system to troubleshoot). • Systems failures and cockpit effects correlation algorithms design. • Test-flights maintenance reports analysis for failures correlation evaluation. • Supplier follow-up (software production).
Environment:	DOORS, Built In Test Equipment (BITE) interfacing, AFDX and ARINC429 concepts, Airbus processes and directives (ABD0100, etc). Avionics. Aircraft general maintenance concepts.

Jun. 2006 – Feb. 2008:	**Software engineer** EVOSYS for **Thales - Air Traffic Management**. Toulouse, France.
Mission:	**Software development** on the **EUROCAT** – COOPANS **Air Traffic Management software**.
Responsibilities:	• New functionalities development on the "Flight Data Processing" core component: o System reviews. o Software specifications writing. Coding. o Tests writing and running on a controller position. o Demonstration to integration team and customers. • Involved in EVOSYS Toulouse business development.
Environment:	ADA, C, Air Traffic Management concepts (Coordination, COP selection filters, SSR codes management, paper strips printing, route field processing, etc).

Jan. 2005 – Jun. 2006:	**Software Engineer** COFRAMI(AKKA) for **Airbus**. Toulouse, France.
Mission:	**Flight and integration simulators software packages development**.
Responsibilities:	• Flight Warning Computer software simulation package: o Simulation package automatic coding tools maintenance. o Simulation packages development. • Engines/FADEC (engine controller) activity: o New functionalities development on a FADEC integration software test tool. o Software engine models integration and testing.
Environment:	C, FORTRAN, Korn Shell, UNIX, ARINC429, avionics, turbo-fan engines, flight simulators, complex real-time software development.

Dec. 2003 – Dec. 2004:	**Design engineer**, **CNRS**, **Ecole Normale Supérieure Neurobiology research laboratory**, Paris, France.
Mission:	**Hardware** and **software development** in the frame of **neuroscience research projects**.
Responsibilities:	• Software and embedded software development (Labview, assembly, embedded C, etc). • Digital and analogue electronic systems development (amplifiers, filter wheels, etc). • Autonomous work, international environment.
Environment:	Microcontrollers, EPLD, assembly, C, Labview. Optoelectronics, data acquisition, motor control, 2 photons microscopy.

Education

2001-2002:	DESS "Concepteur en Architecture de Machines et Systèmes Informatiques": **Masters degree in Computers hardware and software architecture design**, Toulouse university. France.
1999-2001:	Licence & Maîtrise "Electronique, Electrotechnique, Automatique": diplomas equivalent to a **Bsc** in **electronics, electrical and automatic Control systems engineering**, Bordeaux and Toulouse universities, France.
1997-1999:	DUT "Génie Electrique et Informatique Industrielle": diploma equivalent to an **Associate degree** in **electrical, electronics, automatic control systems and Software engineering**, university institute of technology, Bordeaux, France.

Publications

In preparation	**Wireless inertial measurement of head kinematics in freely-moving rats.**

Poster communications

Pasquet, M., Tihy, M., Gourgeon, A., Lena, C. & Dugué, G. (2015, May). **A miniature wireless inertial-sensing device for measuring head movements in rats**. French society for neuroscience annual conference. Montpellier, France.

Pasquet, M., Jurado-Parras, M-T. & Robbe, D. (2015, October). **A miniature wireless device for movement-triggered optical stimulation in rats**. Society for neuroscience annual conference. Chicago, USA. Also presented at the International workshop on optogenetic approaches for pre-clinical studies, ICM-Brain and Spine Institute, Paris, France.

Skills

Hardware/Software:

- Labview.
- Matlab.
- C, ADA, FORTRAN, assembly.
- Real time programming.
- VHDL.
- ST ARM Cortex M, Microchip PIC and dsPic, experience on Intel, Motorola and Siemens microcontrollers.
- Analog Devices DSPs.
- ALTERA EPLDs and FPGAs.
- Analog electronics basics.
- RF and antennas basics.
- Linux and networking basics.
- USB, RS232, I²C, AFDX, A429 digital busses.
- Motor control, sensors interfacing, ...
- Position video tracking.

Manufacturing: Complete circuit board design from CAD to prototype circuit making. Through hole and SMD component assembly technologies and practical experience.

Tools and methods: Requirement management (DOORS), software configuration management (CVS), aeronautical software development norm basics (DO178B). Cadsoft EAGLE electronics CAD software.

Languages: French mother tongue, fluent **English**. Intermediate Portuguese. Spanish, Russian and Slovene basics.

Interests and hobbies

Private pilot, interested in amateur aircraft building. Reading.