SERGIO DANIEL HERNANDEZ CHARPAK

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French ○ Colombian

Education

École Polytechnique Fédérale de Lausanne — Lausanne, **Switzerland**
Computational Science and Engineering, Master Thesis Student — *September 2017 - February 2020*

Universidad de los Andes — Bogotá, **Colombia**
Physics, Bachelor of Science — *January 2010 - March 2017 - GPA **4.23**/5.00*
Computing Engineering, Bachelor of Engineering — *January 2010 - March 2017 - GPA **4.23**/5.00*
Japanese Language and Culture, Minor

Tokyo University of Marine Science and Technology — Tokyo, **Japan**
Visiting Student — *May 2014-June 2014*
Control and Robotics Laboratory

Kyoto Institute of Culture and Language — Kyoto, **Japan**
Intermediate Japanese Student — *October 2013-March 2014*

Lycée Français Louis Pasteur — Bogotá, **Colombia**
Student — *Graduated, July 2009*
Scientific Bachalauréat, Mention Bien

Work Experience

Nagra Kudelski Group
Cloud
Cheseaux, Switzerland
February – July 2019

Internship – Cloud Infra Team
Enabled the usage of real-time deep learning in production for anomaly detection in data streams as a service. Developed neural networks models in Keras and Pytorch for unsupervised anomaly detection on time series. Transferred the trained models in a different environment using Scala, Spark and Deeplearning4J. Pipelined data using Kafka and deployed the models for alert generation to an Elasticsearch dashboard, under the supervision of engineer *Arnaud Gaillard*.

Research Experience

École Polytechnique Fédérale de Lausanne (EPFL)
G-Lab & MIP Lab
Geneva, Switzerland
September 2019 - February 2020

Master Thesis - Prof. Courtine's Laboratory & MIP Laboratory (prof. Van De Ville)
Conducting lumbar spinal cord fMRI study to deconstruct the segmental innervation of sensorimotor circuits in the lumbosacral spinal cord in healthy subjects during passive, active movements and tendon vibrations. Integrating this information personalized targeted spinal cord stimulation paradigms for spinal cord injury patients under the direction of PhD students Andreas Rowald, Nawal Kinany, prof. *Gregoire Courtine* and prof. *Dimitri Van De Ville*.

École Polytechnique Fédérale de Lausanne (EPFL)
G-Lab
Geneva, Switzerland
August 2018 – February 2019

Master Semester Project - Prof. Courtine's Laboratory
Artificially represented the brain input to the spinal sensorimotor circuits through the implementation of unsupervised and supervised learning strategies to drive a biomechanical model of the lower limbs of a human. Integrated a deep learning framework into biological realistic representations of the spinal cord combined with biomechanical modeling under the direction of PhD student *Andreas Rowald*.

École Polytechnique Fédérale de Lausanne (EPFL)
MIP Lab
Geneva, Switzerland
February - July 2018

Master Semester Project - Medical Image Processing Laboratory
Processed high resolution 7-Tesla 1-TR fMRI data FMRI data using the Total Activation method, and found the innovation-driven Co-Activation Patterns (iCAPs) and their time behaviors on three different paradigms. Worked under the direction of PhD student Anjali Tarun and the supervision of prof. *Dimitri Van De Ville*.

Universidad de los Andes	**Undergraduate Thesis**
Department of Computing Engineering	Implemented part of an Image Analysis tool for the <u>Segmentation of the aorta artery</u> for applications such as the quantification of the elasticity of the aorta artery
Bogotá, Colombia	and quantification of the aorta artery calcifications under the direction of prof.
August - December 2016	<u>*Marcela Hernandez*</u> and prof. <u>*Leonardo Florez*</u>.
Laboratoire CPPM	**Internship - LSST Project**
LSST Project	Studied and implemented different image processing and statistic techniques for
Marseille, France	the <u>detection of transients in astrophysical images</u>. Under the supervision of
June 2016	scientist <u>*Dominique Fouchez*</u>.
Universidad de los Andes	**Undergraduate Thesis**
Department of Physics	Titled Laniakea in a Cosmological Context. <u>Detected galaxies superclusters</u> in
Bogotá, Colombia	<u>simulated</u> cosmological structures based on <u>galaxies velocities properties</u> under
January - May 2016	the direction of prof. <u>*Jaime E. Forero*</u>.
Universidad de los Andes	**Undergraduate Research Assistant**
School of Engineering	Developed <u>Python tools</u> for testing prototypes in the project Astronomical Image
Bogotá, Colombia	processing from large all-sky photometric surveys for the detection and
August 2015 - December 2016	measurements of transients under the mentorship of prof. <u>*Marcela Hernandez*</u>.
Fermi National Laboratory	**IPM Intern – Muon G-2 Experiment**
Neutrino Division	Part of the team for the Test Beam of a <u>Straw Detector Prototype</u> in charge of the
Batavia, U.S.A.	High Voltage and assisted with the <u>analysis of the data</u> taken under the mentorship
June –July – August 2015	of scientist <u>*Brendan C Casey*</u>.
Tokyo University of Marine Science and Technology	**Visiting Student - Control and Robotics Laboratory**
	Assisted with the integration and control of a helicopter with Arduino under the
Tokyo, Japan	supervision of professors <u>*Sho*</u> and <u>*Ito*</u>.
May -June 2014	

Teaching Experience

Universidad de los Andes	**Undergraduate Teaching Assistant**
Bogotá, Colombia	Teaching Assistant for Object Oriented Programming, Data Structures, Modeling,
2011,2012,2013,2014,2015	Simulation and Optimization, and Computational Methods courses.

Publications and Conferences

XV LARIM (Latin American Regional IAU Meeting)	**Oral Talk - Laniakea in a Cosmological Context**
	Detected galaxies superclusters in simulated cosmological structures based on
Cartagena, Colombia	galaxies velocities properties under the direction of prof. Jaime E. Forero.
October 2016	

Skills

Software and programming	**Github**: https://github.com/sercharpak

<u>Proficient</u>	<u>Experienced</u>
Python, MATLAB, C, C++, Java, Git, LaTeX,	FLUENT, Javascript, HTML5, CSS, Firebase, Processing, Arduino,
Bash, Pytorch, Deeplearning4J, Spark, Scala	Assembler, UML, PHP, MPI, Neuron, Webots, Quantum Espresso
<u>OS</u>: Linux, Windows and Mac OS.	

Online certified courses

Udemy **(2017) -** Machine Learning A-Z:	*Udemy* **(2017) -** Deep Learning A-Z: Hands-On Artificial Neural
Hands-On Python and R in Data Science	Networks

Languages

French (fluent)	Spanish (fluent)	English (fluent)	Japanese (Intermediate, JLPT level 3-2)