

# SERGIO DANIEL HERNANDEZ CHARPAK

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French ◦ Colombian

## Work Experience

### **Nagra Kudelski Group**

*Cloud*

Cheseaux, Switzerland

February 2019 - Present

### **Internship – Cloud Infra Team**

Implemented real time alert generation pipelines using unsupervised deep learning models (auto-encoders) trained for anomaly detection on log data streams. Developed from several models in Keras and Pytorch. Implemented an anomaly detection framework in Scala, Spark and Deeplearning4J, deployed the trained models in a distributed system and sent alerts to an Elasticsearch dashboard, under the supervision of engineer Arnaud Gaillard.

## Education

### **École Polytechnique Fédérale de Lausanne**

Computational Science and Engineering, Master Student

Lausanne, Switzerland

September 2017-Present

### **Universidad de los Andes**

Physics, Bachelor of Science

Computing Engineering, Bachelor of Engineering

Japanese Language and Culture, Minor

Bogotá, Colombia

January 2010 - March 2017 - GPA **4.23/5.00**

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### **Tokyo University of Marine Science and Technology**

Visiting Student

Control and Robotics Laboratory

Tokyo, Japan

May 2014-June 2014

### **Kyoto Institute of Culture and Language**

Intermediate Japanese Student

Kyoto, Japan

October 2013-March 2014

### **Lycée Français Louis Pasteur**

Student

Bogotá, Colombia

Graduated, July 2009

Scientific Bachalauréat, Mention Bien

## Research Experience

### **École Polytechnique Fédérale de Lausanne (EPFL)**

*G-Lab*

Geneva, Switzerland

August 2018 - Present

### **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 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**

Department of Computing Engineering

Bogotá, Colombia

August - December 2016

### **Undergraduate Thesis**

Perfect Score of 5.0/5.0. Implemented part of an Image Analysis tool for the Segmentation of the aorta artery for applications such as the quantification of the elasticity of the aorta artery and quantification of the aorta artery calcifications under the direction of prof. Marcela Hernandez and prof. Leonardo Florez.

**Laboratoire CPPM***LSST Project*

Marseille, France

June 2016

**Universidad de los Andes***Department of Physics*

Bogotá, Colombia

January - May 2016

**Universidad de los Andes***School of Engineering*

Bogotá, Colombia

August 2015 - December 2016

**Fermi National Laboratory***Neutrino Division*

Batavia, U.S.A.

June - July - August 2015

**Tokyo University of Marine  
Science and Technology**

Tokyo, Japan

May - June 2014

**Internship - LSST Project**

Studied and implemented different image processing and statistic techniques for the detection of transients in astrophysical images. Under the supervision of scientist Dominique Fouchez.

**Undergraduate Thesis**

Titled Laniakea in a Cosmological Context. Detected galaxies superclusters in simulated cosmological structures based on galaxies velocities properties under the direction of prof. Jaime E. Forero.

**Undergraduate Research Assistant**

Developed Python tools for testing prototypes in the project Astronomical Image processing from large all-sky photometric surveys for the detection and measurements of transients under the mentorship of prof. Marcela Hernandez.

**IPM Intern – Muon G-2 Experiment**

Part of the team for the Test Beam of a Straw Detector Prototype in charge of the High Voltage and assisted with the analysis of the data taken under the mentorship of scientist Brendan C Casey.

**Visiting Student - Control and Robotics Laboratory**

Assisted with the integration and control of a helicopter with Arduino under the supervision of professors Sho and Ito.

## Teaching Experience

**Universidad de los Andes**

Bogotá, Colombia

2011, 2012, 2013, 2014, 2015

**Undergraduate Teaching Assistant**

Teaching Assistant for Object Oriented Programming, Data Structures, Modeling, Simulation and Optimization, and Computational Methods courses.

## Publications and Conferences

**XV LARIM (Latin American  
Regional IAU Meeting)**

Cartagena, Colombia

October 2016

**Oral Talk - Laniakea in a Cosmological Context**

Detected galaxies superclusters in simulated cosmological structures based on galaxies velocities properties under the direction of prof. Jaime E. Forero.

## Additional Work Experience

**Mariño Math**

Bogotá, Colombia

Sept 2011-Present

**Tutor**

High School Physics, Chemistry, Math and Biology Tutoring in both French and Spanish.

## Skills

**Software and programming**Proficient

Python, MATLAB, C, C++, Java, Git, LaTeX,  
Bash, Pytorch, Deeplearning4J, Spark, Scala  
OS: Linux, Windows and Mac OS.

**Github:** <https://github.com/sercharpak>

Experienced

FLUENT, Javascript, HTML5, CSS, Firebase, Processing, Arduino,  
Assembler, UML, PHP, MPI, Neuron, Webots, Quantum Espresso

**Online certified courses**

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

**Udemy (2017)** - Deep Learning A-Z: Hands-On Artificial Neural  
Networks

**Languages**

French (fluent)

Spanish (fluent)

English (fluent)

Japanese (Intermediate, JLPT level 3-2)