

SERGIO DANIEL HERNANDEZ CHARPAK

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French ◦ Colombian

Education

École Polytechnique Fédérale de Lausanne

Computational Science and Engineering, Master Thesis Student

Lausanne, **Switzerland**

September 2017 - February 13th 2020

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

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

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

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
Department of Computing
Engineering
Bogotá, Colombia
August - December 2016

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

Teaching Experience

Universidad de los Andes
Bogotá, Colombia
2011, 2012, 2013, 2014, 2015

Undergraduate Thesis

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.

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.

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.

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)