Jose Sergio Hleap

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Summary

Data scientist and bioinformatician. Doctor in Biochemistry and Molecular Biology with emphasis in structural bioinformatics. More than 8 years of research experience in bioinformatics, structural biology, molecular biology, evolutionary biology, and macroecology. Functional expertise in different research areas such as: inshore and offshore field work, wet-lab, biostatistics, statistical genomics, and bioinformatics; including student supervision and resource management. Main strengths are: innovative thinking, collaborating and engaging with collegues and both senior and junior lab members, holistic understanding of the biological sciences, and being highly motivated.

Education

Period	**Sep 2010 - Dec 2015**
Degree	**Ph.D. in Biochemistry and Molecular Biology**
University	**Dalhousie University** Halifax, Canada
Thesis	*"Comparative quantitative genetics of protein structures: A composite approach".*
Description	Shape analysis of proteins, from basic statistical analysis of protein structures, to the modelling of quantitative parameters in a phylogenetic framework.
Skills	• Bioinformatics: python, R and Bash programming, analysing complex data • Structural Biology: Evolutionary and statistical analysis of protein structures • Interpersonal and Leadership: Mentoring and supervising junior researchers • Project Management and Organization: Managing schedules, meeting deadlines, writing grants and managing projects

Period	**Aug 2007 - Sep 2010**
Degree	**Master in Science Biology**
Rank	**With distinction**
University	**Universidad del Valle** Cali, Colombia
Thesis	*"Heredabilidad y potencial evolutivo en tres poblaciones de Urotrygon rogersi presentes en la costa central del Pacífico colombiano"* (Heritability and evolutionary potential in three populations of *Urotrygon rogersi* from the Colombian Pacific coast).
Description	Based on quantitative variables, analyse a natural population (round ray) parameters. It was awarded with a distinction honour.
Skills	• Quantitative genetics: Models and statistics of traditional meristic data • Marine biology: Inshore and offshore sampling techniques of non-model organisms (rays) and understanding of their biology • Interpersonal and Leadership: Mentoring and supervising junior researchers • Project Management and Organization: Writing grants, and managing projects including reactive procurement and administration

Period	**Aug 1999 - Sep 2005**
Degree	**Biologist**
Rank	**Top 5**
University	**Universidad del Valle** Cali, Colombia
Honours thesis	*"Evaluación de cinco métodos de preservación de tejidos y cinco protocolos de extracción de ADN en elasmobranquios"* (Evaluation of five tissue preservation methods and five DNA extraction protocols for Elasmobranchs).
Description	I tested the best non-cryogenic preservation of tissue and subsequent DNA extraction protocols in elasmobranchs. I also evaluated two different tissue types. In Colombia undergraduate programs are 5 years long, and include a thesis-type research and dissertation to fulfil the requirements for graduation.
Skills	• Molecular biology: Techniques and equipment commonly used in molecular biology (Tissue preservation, DNA extraction, PCR, electrophoresis, etc) • Marine biology: Techniques and experience in inshore and offshore sampling of non-model organisms (elasmobranches) • Interpersonal and Leadership: Working in team with fellow and senior lab members • Project Management and Organization: Efficiency in the procedures while working with scarce material (both biological samples and reactives)

Publications

Journal articles:

2018

* **Hleap, J.S.**, & Blouin, C. The response to selection in Glycoside Hydrolase Family 13 structures: A comparative quantitative genetics approach. PLoS ONE 13(4): e0196135. DOI: 10.1371/journal.pone.0196135

2016

* Navia, A.F., Mejía-Falla, P. A. & **Hleap, J.S.** Zoogeography of the elasmobranchs in the Colombian Pacific Ocean and Caribbean Sea. *Neotropical Ichthyology, 14(20): e140134*. DOI: 10.1590/1982-0224-20140134

* **Hleap, J.S.**, & Blouin, C. The semantics of the modular architecture of protein structures. *Current Protein & Peptide Science, 17: 62-71*, DOI: 10.2174/1389203716666150923104720.

* Castro,S.I., **Hleap, J.S.**, Cárdenas, H. & Blouin, C. Molecular Organization of the 5S rDNA gene type II in Elasmobranchs. *RNA biology, 13(4): 391-9*, DOI: 10.1080/15476286.2015.1100796.

2014

* **Hleap, J.S.**, & Blouin, C. Inferring Meaningful Communities from Topology-Constrained Correlation Networks. *PLOS ONE, 9, 11*, DOI: 10.1371/journal.pone.0113438.

2013

* **Hleap, J.S.**, Susko, E., & Blouin, C. Defining structural and evolutionary modules in proteins: a community detection approach to explore sub-domain architecture. *BMC Structural Biology, 13, 20*, DOI: 10.1186/1472-6807-13-20.

2012

* **Hleap, J.S.**, Mejía-Falla, P. A., & Cárdenas, H. Relaciones morfométricas de la raya redonda *Urotrygon rogersi*: implicaciones cuantitativas bajo modelos lineales. *Revista de biología marina y oceanografía, 47(1), 35-50*, DOI: 10.4067/ S0718-19572012000100004.

2009

* Rincón-Barón, E.J., Gélvez, L.V., Forero, H.G. & **Hleap, J.S**. Ontogenia del esporangio y esporogénesis del licopodio *Huperzia brevifolia* (Lycopodeacea) de las altas montañas de Colombia. *Revista de Biología Tropical 57 (4): 1141*. Available at http://www.scielo.sa.cr/pdf/rbt/v57n4/a18v57n4.pdf.

* **Hleap, J.S.**, Cárdenas, H. & García-Vallejo, F. Preservación no criogénica de tejido y extracción de ADN: Una aplicación para peces cartilaginosos. *Pan-American Journal of Aquatic Sciences 4(4): 545-555.* Available at http://www.panamjas.org/pdf_artigos/PANAMJAS_4(4)_545-555.pdf

PrePrints only:

2017

* **Hleap, J. S.**, & Blouin, C. Protein structures as shapes: Analysing protein structure variation using geometric morphometrics. bioRxiv, 219030. doi: https://doi.org/10.1101/219030
* **Hleap, J.S.**, & Blouin, C. Evolutionary variance analysis of the Glycoside Hydrolase Family 13: Structural evidence in classification and evolution. bioRxiv, 201251. doi: https://doi.org/10.1101/201251

Books/Booklets:

2010

* Mejía-Falla, P.A., K. Narvaez, J. Bohórquez, F. Osaer, V. Ramírez & **J.S. Hleap**. Libro de resúmenes II Encuentro colombiano sobre condrictios. Fundación SQUALUS.Cali, 106 p.

Book Chapter:

2011

* **Hleap,J.S.**. Familia Heterodontidae. In: Guía para la identificación de especies de tiburones, rayas y quimeras de Colombia. Bogotá, D.C.: Colombia. Ministerio de Ambiente y Desarrollo Sostenible; Corporación para el Desarrollo Sostenible del Archipiélago de San Andrés, Providencia y Santa Catalina CORALINA; Gobernación de San Andrés, Providencia y Santa Catalina, Fundación SQUALUS, 2011. p. 51-57.
* Navia, A.F., **J.S. Hleap**, A.V. Ramírez, J.D. Gaitán-Espitia, & M.A. Tobón. Familia Carcharhinidae. In: Guía para la identificación de especies de tiburones, rayas y quimeras de Colombia. Bogotá, D.C.: Colombia. Ministerio de Ambiente y Desarrollo Sostenible; Corporación para el Desarrollo Sostenible del Archipiélago de San Andrés, Providencia y Santa Catalina CORALINA; Gobernación de San Andrés, Providencia y Santa Catalina, Fundación SQUALUS, 2011. p. 119-155.
* **Hleap,J.S.**, S. Bessudo, G. Lara & G, Soler. Familia Sphyrnidae. In: Guía para la identificación de especies de tiburones, rayas y quimeras de Colombia. Bogotá, D.C.: Colombia. Ministerio de Ambiente y Desarrollo Sostenible; Corporación para el Desarrollo Sostenible del Archipiélago de San Andrés, Providencia y Santa Catalina CORALINA; Gobernación de San Andrés, Providencia y Santa Catalina, Fundación SQUALUS, 2011. p. 157-169.

Technical reports:

2018

* Khawasik, O., Littlefair, J., & **Hleap, J.S.**. Investigating the presence of fish in freshwater habitats (four ponds and one river) using environmental DNA. Technical Report for WSP. Cristescu Lab, McGill University

2010

* **Hleap, J.S.**, R. A. Lozano & A. F. Navia. 2010. Informe técnico sobre elasmobranquios en el PNN Gorgona. Expedición científica 2009. Documento técnico Fundación SQUALUS No FS0110. 43 pp

Conference presentations and abstracts:

2018

* **Hleap, J.S.** & Gravel, S. an Rawlsian theory of justice be applied to genomic research?: A framework for diverse populations inquiry. *Closing the genomics research gap. Montreal, Canada*
* Ben-Eghan, C., Munter, M. , **Hleap, J.S.**, Gravel S., Lathrop, M.G, Grant, A.V. Exploring Asthma and Asthma-related Quantitative traits across ethnicities in the UK Biobank via GWAS. *Closing the genomics research gap. Montreal, Canada*

2016

* Lu, S., **Hleap, J.S.** & C. Blouin. Capturing the major motions in the folding of the intrinsically disordered amyloid-beta peptide. *16th IUBMB Conferences: signalling pathways in development, disease and aging. Vancouver, BC, Canada.*
* Lu, S., **Hleap, J.S.** & C. Blouin. Discovering the major conformational motions of misfolding of amyloid beta peptide. *Canadian chemistry conference and exhibition. Halifax, NS, Canada.*

2015

* Ryan, J., **Hleap, J.S.** & C. Blouin. Finding clusters of correlating protein residue contacts through a graph-based modularity analysis. *Dalhousie Computer Science In-House Conference 2015 (DCSI2015), Halifax, NS, Canada.*
* Castro, S.I. & **J.S. Hleap**. RNAtk: Un módulo de python enfocado en analizar la diversidad de estructuras secundarias y terciarias de RNA. *III congreso colombiano de biología computacional y bioinformática. Medellín, Colombia.*
* Lu, S., **Hleap, J.S.**, & Blouin, C. Discover major conformational motions from misfolding amyloid-β peptide. *NeuronConX 2015. Charlottetown, Canada.*

2013

* **Hleap, J.S.**, Nguyen, K.N., Safatli, A. & C. Blouin. Reference matters: an efficient and scalable algorithm for large multiple structure alignment. *BICOB 2013, Hawaii-USA.*
* **Hleap, J.S.** & C. Blouin. Exploring sub-domain architecture in protein structures. *BFSS 2013, Herzogenhorn-Germany.*

2012

* **Hleap, J.S.** & C. Blouin. The evolutionary modules round rays, foxes and the tim-barrel of α-amylase: modularity as evolutionary integration. *1st Joint Congress on Evolutionary Biology, Ottawa-Canada.*
* **Hleap, J.S.** & C. Blouin. Robust Inference Of Structural Modules In Sets Of Homologous Proteins. *iEvoBio 2012, Ottawa-Canada.*
* **Hleap, J.S.** Susko, E. & C. Blouin. Significant clustering on geometric morphometrics data: defining evolutionary modules in complex biological datasets. *SMBE 2012, Dublin-Ireland.*
* Safatli, A., **Hleap, J.S.**, Nguyen, K., & C. Blouin. Automatic definition of homologous shape descriptors for geometric morphometric data. *Dalhousie Computer Science In-House Conference 2012 (DCSI2012), Halifax, NS, Canada.*

2011

* **Hleap, J.S.** & C. Blouin. Defining evolutionary modules in protein structures. *3DSIG 2011: The 7th Structural Bioinformatics and Computational Biophysics Meeting, Vienna-Austria.*

2010

* **Hleap, J.S.**, A. F. Navia & P. A. Mejía-Falla. Diversidad de elasmobranquios marino costeros del Pacífico Americano en el gradiente latitudinal: cuestión de azar?. *In: Memorias del II Encuentro colombiano sobre condrictios. Cali, Colombia. 48 p*

* **Hleap, J.S.**,R. A. Lozano, A. F. Navia & L. F. Payán. Elasmobranquios del Parque Nacional Natural Gorgona. In: Memorias del II Encuentro colombiano sobre condrictios. Cali, Colombia. 87 p.

* Navia, A. F., P. A. Mejía-Falla & **J.S. Hleap**. Zoogeografía de los elasmobranquios del océano pacífico y el mar Caribe de Colombia. *In: Memorias del II Encuentro colombiano sobre condrictios. Cali, Colombia. 47 p.*

2009

* **Hleap, J.S.**, Rincón-Barón, E.J. & R. Moreno-Laverde. Filogenia molecular de la familia Rajidae: hipótesis evolutiva a partir de la citocromo oxidasa, subunidad 1. *IX Coloquio sobre Investigación Científica en el Departamento de Biología, Universidad del Valle, Cali-Colombia.*

* **Hleap, J.S.**, Rincón-Barón, E.J. & R. Moreno-Laverde. Filogenia molecular de la familia Rajidae: hipótesis evolutiva a partir de la citocromo oxidasa, subunidad 1. *Taller Latinoamericano de Evolución Molecular - TLEM09-, Centro De Ciencias Genómicas-UNAM, Cuernavaca-México*

2008

* **Hleap, J.S.**, Mejía-Falla, P. A. & A. F. Navia. Patrones macroecológicos de elasmobranquios marinos de Colombia. *I Encuentro Colombiano sobre Condrictios, Fundación SQUALUS, Bogotá-Colombia.*

2007

* Mejía-Falla, P. A., **Hleap, J.S.**, Payan, L. F. & A. F. Habitat Use Of Whitetip Shark (*Triaenodon obesus*), Whale Shark (*Rhincodon typus*) and Manta Ray (*Manta birostris*) In The Gorgona National Natural Park, Pacific Ocean Of Colombia. *Memories of XXIII Meeting American Elasmobranchs Society, St. Louis-USA.*

* **Hleap, J.S.**, Cárdenas, H. & García-Vallejo, F. Evaluación de cinco métodos de preservación de tejidos y cinco protocolos de extracción de ADN en elasmobranquios. *IX Simposio Colombiano de Ictiología y I Encuentro Colombo - Venezolano de Ictiólogos, San Andrés-Colombia.*

Research

Positions:

Period	**September 2019 - present**
Employer	**Insight Data Science** Toronto, Canada
Role	Fellow
Contributions	• Deployed a dashboard using Bokeh in Python to extend and discover keyword candidates for GoogleAds. • Used NLP and Google API text mining to extract relevant corpora for topic modelling and keyword selection. • Provided optimal combination of keywords that maximizes impressions while minimizing daily cost.

Period	**June 2018 - present**
Employer	**Department of Biology - McGill University** Montreal, Canada
Job Title	**Postdoctoral fellow**
Role	Data analysis and bioinformatics development for metabarcoding and eDNA research

Contributions

- Development of the mutation acumulation time series analysis of *Daphnia pulex* project
- Support the lab in bioinformatic analyses and software development
- Participate in project development and data analysis within the LEAP: Large Experimental Array of Ponds
- Develop bioinformatic tutorials for the QCBS
- Participate in the eDNA reports presented to WSP
- Develop pipelines to assign taxonomy to NGS data
- Advice and mentor junior lab members in bioinformatics
- Implement pipelines for species identification and diversity analyses

Period	**July 2016 - June 2018**
Employer	**Department of Human Genetics - McGill University** Montreal, Canada
Job Title	**Postdoctoral fellow**
Role	Develop mathematical models and computational methods for the analysis and interpretation of complex genomic data

Contributions

- Tested the effect of mixing populations in the statistical power of genotype-phenotype associations
- Developed code to simulate genotypes and phenotypes controlling some statistical and population parameters
- Currently devising a strategy to deal with diverse population in the context of GWAS, from the experimental design to data analysis

Period	**April 2016 - July 2016**
Employer	**Department of Fisheries and Oceans** Halifax, Canada
Job Title	**Postdoctoral research associate**
Role	Genome annotation of two organisms: Green Crab (*Carcinus maenas*) and Scallop (*Placopecten magellanicus*).

Contributions

- Analysis of assembly quality from NGS data for both species
- Accessory data acquisition: Related species sequences and gene models
- Identification and masking of repeats in the genomes and gene prediction
- Developed a detailed annotation pipeline
- Currently analysing the annotation and writing two papers about the peculiarities of the draft genomes

Period	**November 2006 - Present**
Employer	**SQUALUS Foundation** Cali, Colombia
Job Title	**Researcher and Member of the Scientific committee**
Role	Project generation and supervision, including review of articles, projects and reports related to genetics, evolutionary biology and macroecology of elasmobranchs. Also responsible for advising, mentoring and supervising students in regards to molecular biology, genetics and bioinformatics.

Contributions

- Graduation of two undergrad students and one master student under my supervision
- Two small grants co-written and succesfully awarded and executed
- Graduation of one master student under my counsel (I was part of the committee)
- Evaluation (review) of a honour's thesis

Projects:

Period	**2018 - ongoing**
Institution	**McGill University** Montreal, Canada
Role	**Postdoctoral fellow**
Project	**The flow and persistence of environmental DNA in complex aquatic networks**
Status	Ongoing
Objective	Understand the effect of eDNA flow in connected aquatic environments and the relationship with diversity analyses

Contributions

- Developed quality control pipelines for the Illumina MiSeq data

Period	**2017 - ongoing**
Institution	**ELASMOCAN/SQUALUS foundation** International
Role	**Researcher**
Project	**Genetic analysis of the angel shark *Squatina squatina*, with emphasis in individual identification and diversity analysis**
Status	Ongoing
Objective	Provide a better understanding of *Squatina* populations in the canary islands, starting with identification and diversity analyses.

Contributions

- Advise and lead the genetic analysis
- Collaborate on the analysis of data
- Preliminary analysis of genetic diversity among islands to focus future sampling

Period	**2016 - ongoing**
Institution	**McGill University** Montreal, Canada
Role	**Postdoctoral fellow**
Project	**Modelling recent genetic events in complex cohorts**
Status	Ongoing
Objective	To increase our understanding of large-scale medical cohorts through the development of quantitative models for complex population and sampling processes.

Contributions

- Developed a toy model to test effects of confounder in associations
- Tested the effect of sample composition on power in the toy model
- Currently writing a paper on the effect of composition on power, and developing a guideline for sampling design in the context of GWAS
- Currently testing the effect of diversity in sampling in the estimation of polygenic risk scores with the UK biobank cohort

Period	**2016 - ongoing**
Institution	**Dalhousie University** Halifax, Canada
Role	**Lead bioinformatician**
Project	**SPOCK: an automated Search Protocol for Orthologs of Components of Key molecular systems**
Status	Ongoing
Objective	To develop a bioinformatics tool to facilitate the accurate identification of gene orthologs and their manual curation during functional annotation of genomes.

Contributions

- Participated in the design of the pipeline
- Main coder of the project

Period	**2010 - 2016**
Institution	**Dalhousie University** Halifax, Canada
Role	**Ph.D. student**
Project	**Comparative quantitative genetics of protein structures: A comparative approach.**
Status	Finished
Objective	To develop a framework to analyze the evolution of protein structures

Contributions

- Tested and adjusted traditional quantitative genetics framework to work with protein structures
- Developed a simple yet novel method (and code) to estimate the approximate response to selection and to analyse protein structure modularity and variability
- Wrote three published and one submitted manuscripts
- Developed three python scripts and contribution to 4 modules for protein structure data analysis and manipulation

Period	**2012 - 2015**
Institution	**Universidad del Valle** Cali, Colombia
Role	**Co-researcher**
Project	**Determination of the genetic relationship between type I and type II 5S rDNA genes among bony and cartilaginous fishes**
Status	Finished
Objective	To model the secondary and tertiary structures of 5S RNA and evaluate the differences between type 1 and type 2 in fishes

Contributions

- Small grant written, awarded and executed
- Administration of the grant and supervision of lab acquisitions
- Field work management
- Supervision of a master student and his graduation
- Sponsorship of my master student to get an internship at Dalhousie University through the ELAP program
- Reviewed and contributed to one published article and one article in preparation

Period	**2010 - 2012**
Institution	**Universidad del Valle** Cali, Colombia
Role	**PI**
Project	**Molecular Organization and Evolution of the 5S rDNA gene type II in Elasmobranchs**
Status	Finished

Contributions

- Lab resources administration
- Sample gathering and field work management
- Supervision of one undergrad student (shared with another project)
- Wrote one published manuscript

Period	**2007 - 2010**
Institution	**Universidad del Valle** Cali, Colombia
Role	**Master student**
Project	**Heredabilidad y potencial evolutivo en tres poblaciones de *Urotrygon rogersi* presentes en la costa central del Pacífico colombiano (Heritability and evolutionary potential in three populations of *Urotrygon rogersi* from the Colombian central Pacific coast).**
Status	Finished
Objective	To evaluate the resilience of the populations of *Urotrygon rogersi* in the Colombian Pacific coast using quantitative genetics of meristic traits and molecular biology

Contributions

- Small grant writing, and execution, including administration and acquisitions of lab resources
- Sample gathering and field work management
- Supervision of two undergrad students until graduation
- Wrote one published manuscript

Period	**2008 - 2010**
Institution	**Fundación SQUALUS** Cali, Colombia
Role	**Field assistant**
Project	**Programa Nacional de Avistamiento de Tiburones y Rayas PNAT- (National program of sighting of sharks, skates, and rays)**.
Status	Permanently in development
Objective	To register the elasmobranch diversity by leveraging the scuba divers in Colombia

Contributions

- Scientific scuba diving with description of species
- Physico-chemical parameters registration and underwater photography

Period	**2009 - 2009**
Institution	**Fundación SQUALUS** Cali, Colombia
Role	**Field assistant**
Project	**Dinámica poblacional y uso de hábitat de elasmobranquios en el PNN Gorgona (Population dynamics and habitat use of elasmobranches in the Gorgona National Natural Park)**.
Status	Finished
Objective	To determine the population dynamics of elasmobranch in a Colombian national park

Contributions

- Scientific scuba diving with description of species
- Physico-chemical parameters registration and underwater photography

Period	**2007 - 2010**
Institution	**Fundación SQUALUS** Cali, Colombia
Role	**Field assistant**
Project	**Aspectos bioecológicos de los elasmobranquios capturados como fauna acompañante del camarón on en aguas someras del Pacífico colombiano (Bioecological aspects of elasmobranchs bycatch of the shallow waters shrimp fisheries).**
Status	Finished
Objective	To determine the bioecological parameters of the elasmobranch populations affected by the shallow waters shrimp fisheries

Contributions

- Field assistant for sample and data collection

Period	**2004 - 2005**
Institution	**Universidad del Valle** Cali, Colombia
Role	**Honours student**
Project	**Evaluación de cinco métodos de preservación de tejidos y cinco protocolos de extracción de ADN en elasmobranquios (Evaluation of five tissue preservation methods and five DNA extraction protocols in elasmobranches).**
Status	Finished
Objective	To determine the best non-cryogenic method to collect and preserve elasmobranch tissue and the best subsequent DNA extraction protocol to increase the DNA yields

Contributions

- Proposal writing
- Lab resources procurement mainly through networking with other labs
- Sample gathering
- Data generation and analysis
- One manuscript written and published

Reviewing activities:

Grant review:

Institution	**COLCIENCIAS** Colombia
	http://www.colciencias.gov.co/
Type	**Grant evaluation**
Description	Evaluation of a project for funding in 2011. This particular project was versed in phylogeography.

Journals (review and co-review):

- GigaScience (https://academic.oup.com/gigascience)
- Biological Invasions (https://link.springer.com/journal/10530
- Biología Tropical (http://revistas.ucr.ac.cr/index.php/rbt)
- SCIENCE (http://www.sciencemag.org/)
- PLOS Genetics (http://journals.plos.org/plosgenetics/)
- Regional Studies in Marine Science (Elsevier-RSMS)
- PLOS ONE (http://www.plosone.org/)
- International Journal of Molecular Sciences (http://www.mdpi.com/journal/ijms/)
- Genes (http://www.mdpi.com/journal/genes/)
- Caldasia (http://www.revistas.unal.edu.co/index.php/cal)
- Revista Respuestas (http://www.ufps.edu.co/ufpsnuevo/revista-respuesta/presentacion.php)

Volunteering:

Period	**May 2002 - Aug 2002**
Employer	**Bimini Biological Field Station (BBFS)** Bimini, Bahamas
	Field support and sample gathering. This volunteer program was framed into a trophic ecology of Lemon sharks (Negaprion brevirostris) project. I was involved in collecting fish samples for diversity measures. I was also involved in sampling live shark young, as well as the gathering of their stomach contents while keeping them alive and the inoculation of an internal tag. In June 2002, I took part in a shark tagging program, where a long-line was set up, sharks were caught, tagged and released.
Period	**Jan 1999 - Dec 2006**
Employer	**Cali Zoo** Cali, Colombia
	Otter ethology registration, including the behaviour of adults with newborns. Caretaker of the experimental butterfly house. In the latter, I was involved in the expansion of the house, as well as egg gathering, caterpillar feeding, adult release, and adult feeding.

Teaching

Period(s)	**Jul-Dec 2018**
Institution	**McGill University** Halifax, Canada
Role	**Instructor**
	Designing and delivering bioifnormatic tutorials for the LEAP and QCBS groups. Tutorials are available online at https://github.com/CristescuLab/Tutorials

Period(s)	**Sep-Dec 2015**
Institution	**Dalhousie University** Halifax, Canada
Role	**Co-Lecturer**

Developing course material, evaluation and lecturing of Bioinformatics (CSCI 4180 / CSCI 6801) in the Computer Science Faculty. The course is a fourth year / Graduate course. My contribution was on metabolic network analysis.

Period(s)	**Jan-May 2011 & Jan-May 2012 & Jan-May 2014**
Institution	**Dalhousie University** Halifax, Canada
Role	**Teaching assistant**

Assisting 60 undergraduate Introduction to Biochemistry (BIOC2610) students with laboratory inquiries, marking the assignments and problem sets. The course is a first year course, and the laboratory includes an overview of some biochemical techniques.

Period(s)	**Sep-Dec 2011 & Sep-Dec 2012 & Sep-Dec 2013**
Institution	**Dalhousie University** Halifax, Canada
Role	**Teaching assistant**

Assisting 60 undergraduate Nucleic acids (BIOC3400) students with laboratory inquiries, marking the assignments and problem sets. The course is a third year course, and the laboratory includes the main techniques for nucleic acids analysis.

Period(s)	**Jan-May 2013**
Institution	**Dalhousie University** Halifax, Canada
Role	**Teaching assistant**

Assisting graduate and undergraduate Bioinformatics (BIOC4010/5010) students with laboratory inquiries, marking the assignments and problem sets. The course is a general Bioinformatics course (fourth year/graduate course) covering from sequence alignment to structural bioinformatics.

Period(s)	**Aug-Dec 2010**
Institution	**Universidad del Valle** Cali, Colombia
Role	**Guest Lecturer**

Invited lecture in the course of Sistemática (Systematics ; 102027M). The course is a second year course. My lecture was about the species concept.

Period(s)	**Aug-Dec 2008 & Feb-Jul 2009 & Feb-Jul 2010**
Institution	**Universidad del Valle** Cali, Colombia
Role	**Teaching assistant**

Assisting 40 undergraduate General genetics (102013M) students with laboratory inquiries, marking the assignments and problem sets, and teaching tutorials. The course is a third year course, and the laboratory includes theoretic tutorials and three project-style labs (each lab takes several weeks) reviewing the main concepts in general genetics. I was also involved in the re-structuring of the lab from a workshop-based lab to a project-based one.

Period(s)	**Aug-Dec 2009**
Institution	**Universidad del Valle** Cali, Colombia
Role	**Teaching assistant**

Assisting 35 undergraduate Animal Physiology (102025M) students with laboratory inquiries and marking the assignments. The course is a third year course, and the laboratory includes the main techniques in animal physiology analysis. I was also involved in the field work required to gather appropriate samples.

Period(s)	**Aug-Dec 2007 & Feb-Jul 2008**	
Institution	**Universidad del Valle**	Cali, Colombia
Role	**Lecturer of general genetics for teachers**	

Developing the course program, exams and assignments, taught the lectures and completed course evaluation for the General genetics (102013M) course. This is a fourth year course, involving the main fields in general genetics. Its aim is to prepare elementary, junior high, and high school teachers to teach basic genetics at schools. It also covered some modern advances in genetics, as well as bio-ethical discussions.

Period(s)	**Aug-Dec 2006 & Feb-Jul 2007 & Aug-Dec 2007 & Feb-Jul 2008**	
Institution	**Universidad del Valle**	Cali, Colombia
Role	**Lecturer of Biology for paramedics**	

Developing the course program, exams and assignments, teaching the lectures and course evaluation for Biology (102118M) for paramedics. This was a first year course and includes basic background in biology. My course was designed to contextualize the main general biology concepts with emergency patient treatment.

Period	**Aug 2006 - Jun 2007**	
Institution	**The British School**	Cali, Colombia
Role	**Natural Sciences teacher and Science department chief**	

Developed the schedule for the science department and coordinated the science department meetings. Oversaw the quality of the science taught at all levels. Taught science from 7th grade to 9th grade, including lectures, labs and workshops. I was also involved in designing the science curriculum for the school.

Period	**Aug 2005 - Jun 2006**	
Institution	**Colegio Franciscano de PIO XII**	Cali, Colombia
Role	**Natural Science teacher**	

Taught science to 4th and 5th graders.

Period	**Jan 2005 - Jun 2005**	
Institution	**Anglo-American school**	Cali, Colombia
Role	**Natural Sciences teacher and Science department chief**	

Developed the schedule for the science department, supervised the elementary school teachers, as well as gave talks on current science issues to the supervised teachers. Taught science from 6th grade to 9th grade.

Period	**Aug 2002 - Dec 2002**	
Institution	**Universidad del Valle**	Cali, Colombia
Role	**Academic monitor (undergrad teaching assistant)**	

Solved student inquiries. Developed workshops. Readied lab material.

Administration

Period	**Nov 2006 - Dec 2010 & Nov 2012 - Present**	
	SQUALUS Foundation	Cali, Colombia
	Member of the directive board	

Discuss and oversee the activities of the foundation including reviewing the bylaws, reviewing membership applications, as well as members' petitions.

Period	**Nov 2005 - Dec 2017**
	SQUALUS Foundation Cali, Colombia
	Communications coordinator

Oversee of the direct communications (institutional e-mail) of the foundation.

Supervised thesis, thesis review, and committee involvement

Period	**Oct 2018**
University	**Universidad Industrial de Santander** Bucaramanga, Colombia
Role	**Honours's thesis reviewer**
Student	**Isabella Beltrán Triana**
Level	**Undergraduate (5-year honours program)**
Thesis	***Evolutionary history of the ceruloplasmin from an ancestral multi-copper oxidase of 6 domains***

Reviewed the project presented by the student as Honours thesis.

Period	**Jan 2014 - Oct 2016**
University	**UNAM** Mexico, Mexico
Role	**Master's committee member (Advisor)**
Student	**Paola Palacios**
Level	**Graduate (M.Sc.)**
Thesis	***Population structure and phylogeography of the genus Rhinoptera***

Reviewed the project presented by the student as Master thesis, advised the student in methodological and conceptual issues and helped her with difficulties she encountered.

Period	**Aug 2012 - Jan 2015**
University	**Universidad del Valle** Cali, Colombia
Role	**Supervisor**
Student	**Sergio Iván Castro**
Level	**Graduate (M.Sc.)**
Thesis	***Análisis de la estructura primaria, secundaria y terciaria de las dos clases de genes 5S rARN tipo I y tipo II en la clase Pisces*****(Analysis of the primary, secondary, and tertiary structure of the rRNA type I and type II in the class Pisces.)**

Guided the student in coursework selection, appropriate sources, methods and approaches to the thesis' topic. Scheduled meetings with the student. Advised the student on the appropriate research directions. Provided timely feedback and reviewed written work which included (not exclusively) thesis sections, reports, and articles.

Period	**Aug 2013 - Oct 2014**
University	**Universidad del Valle** Cali, Colombia
Role	**Honours project reviewer and evaluating committee member**
Student	**Daniela Gómez Martínez**
Level	**Undergraduate (5-year honours program)**
Thesis	***Evaluación experimental de la tolerancia de Potamotrygon magdalenae a altas temperaturas (Experimental evaluation of high-temperature tolerance of Potamotrygon magdalenae)***

Reviewed the project presented by the student as Honours thesis.

Period	**Aug 2010 - Jun 2012**
University	**Universidad del Valle** Cali, Colombia
Role	**Co-Supervisor**
Student	**Sergio Iván Castro**
Level	**Undergraduate (5-year honours program)**
Hons. Thesis	***Análisis de la organización molecular y evolución del gen 5S rADN tipo II en elasmobranquios y sus implicaciones filogenéticas*** **(Analysis of the molecular organization and evolution of the 5S rDNA type II gene in elasmoabranches and its phylogenetic implications)**

Provided the student with guidance during the development of his Honours thesis. Collaborated with him in the data gathering, data analysis, and report and article writing.

Period	**Feb 2009 - Jun 2010**
University	**Universidad del Valle** Cali, Colombia
Role	**Co-Supervisor**
Student	**Ana María Quiñonez**
Level	**Undergraduate (5-year honours program)**
Hons. Thesis	***Estandarización de las condiciones de PCR para la amplificación de citocromo oxidasa c, subunidad I (COI) y evaluación de su contenido informativo en dos poblaciones de Urotrygon aspidura del Pacífico vallecaucano*** **(Standardization of the PCR conditions for the amplification of the cytochrome oxidase c, subunit I (COI) and evaluation of its informative content in two populations of *Urotrygon aspidura* of the Colombian Valle's Pacific coast.)**

Helped the student in the proposal writing process, methodological problems, data analysis, and Honours thesis writing.

Grants, scholarships, and awards:

Grants:

Period	**Pending matching funds**
Funding	**Dovetail Genomics LLC** Santa Cruz, USA
Role	**Applicant**
Project	**Towards a gold standard of *Daphnia pulex* reference genome**
Status	Awarded
Amount	$3000 USD

Description I am author of the proposal and I am in charge of the bioinformatic analyses and paper writing. This project is pending disbursement of the funds by the funding agencies and to find the matching funds for the project execution.

Period	**2017 - ongoing**
Funding	**Fund. para la Promoción de la Investigación y la Tecnología** Bogotá, Colombia
Role	**Co-Applicant**
Project	**Sistemática molecular, tiempos de divergencia y correlación gigantismo-diversidad en Psocidae (Psocodea: Psocoptera). (Molecular systematics, divergence times, and giantism-diveristy correlation in Psocidae [Psocodea: Psocoptera])**
Status	Awarded
Amount	$6000 USD

Description I am a co-author of the proposal. I am in charge of the bioinformatic supervision during the execution of the project. This project is pending disbursement of the funds by the funding agencies and University. This project will be carried out at the Universidad del Valle in Cali, Colombia.

Period	**2013**
Funding	**Emerging leaders in the Americas (ELAP)** Halifax, Canada
Role	**Co-Applicant / Research coordinator**
Project	**Evolution, structural constraints and dynamics of the 5S rDNA paralogs in fishes**
Status	Awarded
Amount	$9700 CAD
Description	I am a co-author of the proposal. I was in charge of the 50 % of the supervision during the execution of the project. This project required the supervision of a master student from Colombia, and inculded amplification and sequencing of DNA and its bioinformatic analyses. This project was carried out in Dalhousie University in Canada.

Period	**2013 - 2014**
Funding	**Universidad del Valle** Cali, Colombia
Role	**Co-Applicant**
Project	**Determinación de la relación génica entre el gen 5S rADN tipo I y tipo II entre peces óseos y cartilaginosos (Determination of the genetic relationship between type I and type 2 genes among bony and cartilaginous fishes).**
Status	Awarded and finished
Amount	$6000 USD
Description	I was the co-author (along with my master student) of the proposal. I was in charge of supervising Sergio Iván Castro during his master's, during which we carried out the research outlined in this grant.

Period	**2009 - 2010**
Funding	**Universidad del Valle** Cali, Colombia
Role	**Co-Applicant**
Project	**Determinación de la heredabilidad de algunos caracteres morfométricos y análisis molecular de la diferenciación intra e inter específica de las rayas del género *Urotrygon* presentes en la costa sur del Pacífico Colombiano (Determination of the heritability of some morphometric characters and molecular analysis of rays of the *Urotrygon* genus, found in the southern Pacific coast of Colombia).**
Status	Awarded and finished
Amount	$5000 USD
Description	I was co-author (along with my master's supervisor) of the proposal. I was in charge of the implementation of this grant as well as co-supervising two honours students.

Scholarships and studentship/stipends:

Period	**2018 - Ongoing**
Funding	**McGill University (through PI's grant)** Montreal, Canada
Ammount	**cad$43000/year**
Description	Melania Cristescu offered a postdoctoral stipend at McGill University starting in July 1^{st} 2018.
Period	**2016 - 2018**
Funding	**McGill University (through PI's grant)** Montreal, Canada
Ammount	**cad$41000/year**
Description	Simon Gravel offered a postdoctoral stipend at McGill University starting in July 1^{st} 2016.
Period	**2011 - 2016**
Funding	**COLCIENCIAS - Colombia** Bogotá, Colombia
Ammount	**cad$35000/year**
Description	The Crédito Beca Francisco José de Caldas Scholarship Program are granted to Colombians to pursue doctoral degrees at universities around the world. The program provides awards in the form of a forgiveable loan, and is awarded on the basis of academic merit of the applicant, as well as quality of the host university.

Period	**2010 - 2011**	
Funding	**TULA foundation (through PI's grant)**	Halifax, Canada
Ammount	**cad$31000**	
Description	Christan Blouin offered a graduate stipend or studentship award for me to start a Ph.D. at Dalhousie University. I eventually will be awarded de Colciencias Scholarship (on Novemver 2011), and therefore this stipend stopped when the other scholarship started.	
Period	**2010 - 2011**	
Funding	**Faculty of Graduate studies - Dalhousie University**	Halifax, Canada
Amount	**cad$13000**	
Description	The faculty of graduate studies at Dalhousie University offers the departments an annual allocation to be assigned to faculty who accept A- or better students to offset costs. This studentship was mainly used to cover the differential fees and part of the tuition.	
Period	**2010-2011**	
Funding	**Colfuturo**	Bogotá, Colombia
Amount	**usd$30000**	
Description	Colfuturo offers a scholarship to Colombians pursuing graduate degrees abroad. The program provides awards in the form of a forgiveable (50%) loan. The selection process considers three main criteria: academic quality of students, the quality of the study program, and the comparison amongst all applicants, maintaining each students anonymity. The academic quality of students is assessed with three aspects: undergraduate GPA, ranking position within their graduating class and an essay.	
Period	**2009**	
Funding	**Centro de Ciencias Genómicas-UNAM**	Cuernavaca, Mexico
Amount	**usd$1000**	
Description	Small travel and lodging grant to attend the workshop.	

Awards:

Date	**September 2013**	
Award	**Best oral presentation award**	
Institution	**University of Marburg**	Marburg, Germany
Level	Graduate (Ph.D.)	
Description	This award is granted to the best presentation in the Black Forest Summer School 2013.	
Date	**July 2007**	
Award	**Thesis/dissertation award**	
Institution	**Universidad del Valle**	Cali, Colombia
Level	Graduate (Master)	
Description	This award is granted to a graduate student who has completed all his/her academic requirements for graduation and whose work was original, significant, properly written, and that has at least one publication. It is awarded by the committee and external reviewer after dissertation.	
Dates	**Aug - Dec. 2000; Jan - May 2001; Aug 2001 - Jan 2002; Aug - Dec. 2002; Jan - Jun 2003**	
Award	**Estimulo Académico**	
Institution	**Universidad del Valle**	Cali, Colombia
Level	Undergrad	
Description	Estimulo Académico is an award based on academic excellence. It is awarded to the top 5 students of the semester and includes a partial tuition relief. It is awarded on a semester basis.	

Service and Outreach

2017

* Member and Mentor in the Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS). From 2016 to 2017.

2016

* Member of the scientific committee of the "V Encuentro colombiano sobre condrictios" (V Colombian meeting on Chondrichthyes). Fundación SQUALUS. Bogotá, Colombia.

2014

* Member of the scientific committee of the "IV Encuentro colombiano sobre condrictios" (IV Colombian meeting on Chondrichthyes). Fundación SQUALUS. Medellin, Colombia.

2012

* Member of the scientific committee of the "III Encuentro colombiano sobre condrictios" (III Colombian meeting on Chondrichthyes). Fundación SQUALUS. Santa Marta, Colombia.

2010

* Coordinator of the "II Encuentro colombiano sobre condrictios" (II Colombian meeting on Chondrichthyes). Fundación SQUALUS. Cali, Colombia.

Continuing and complementary education

Internships

2009

* Animal histology and histotechniques. Universidad Industrial de Santander. Bucaramanga, Colombia.

Workshops

2009

* Taller Latinoamericano de Evolución Molecular - TLEM09 - (Latin American workshop in molecular evolution). Centro de Ciencias Genómicas-UNAM. Cuernavaca, Mexico
* Propuesta de ajuste al régimen de acceso a recursos genéticos (Proposal for the adjustment of the access to genetic resources). Universidad Nacional de Colombia. Palmira, Colombia.

2008

* Introducción a la genética de la conservación y sus aplicaciones (Introduction to conservation genetics and its applications). Comisión Permanente del Pacífico Sur (CPPS).Guayaquil, Ecuador.

2007

* Talleres regionales en bioseguridad socialización del protocolo de Cartagena y normativa vigente en Colombia (Regional biosafety workshops - socialization of Cartagena's protocol and current Colombian norms). Alexander Von Humboldt Institute. Cali, Colombia.

2004

* Taller de capacitación en trabajo con comunidades, herramientas de diagnóstico rápido participativo (Workshop in communal work: tools for rapid participative diagnosis). Corporación La Caiba and SQUALUS foundation. Cali, Colombia

Courses

2008

* Enric Cortés (NOAA). Técnicas cuantitativas para el análisis de explotación y conservación de poblaciones de peces (Quantitative techniques for the analysis of the exploitation and conservation of fishes). International course. Universidad del Valle. Cali, Colombia.

* Enric Cortés (NOAA). Biología, ecología reproductiva y pesquería de elasmobranquios (Biology, reproductive ecology, and fisheries of elasmobranches). International course. Universidad del Valle. Cali, Colombia.

2003

* LABHERP GUECOS. Sistemática Filogenética (Phylogenetic systematics). Universidad del Valle. Cali, Colombia.
* Aplicación de Marcadores Moleculares Como Herramientas en Evolución, Ecología y Conservación (Application of molecular markers as tools in evolution, ecology, and conservation). Universidad Nacional de Colombia. Bogotá, Colombia.

Certificates

2001

* NAUI Rescue diver certification. NAUI Cod. leap060182sermsd
* NAUI Master scuba diver certification. NAUI Cod. 33999
* NAUI advanced scuba diving certification. NAUI Cod. 33999

1997

* NAUI scuba diving certification. NAUI Cod. 13230

Software

Project	**Analysis of protein structure variation, and classification of protein structures**
Role	**Main contributor**
Language	**Python & R**
Availability	**https://github.com/jshleap/StructBio**
	This project is composed of python and R scripts to manipulate, analyze, and simulate protein and shapes. It also contains some utility scripts. See the readme file in the GitHub repository for more details.
Project	**Modularity analysis of shapes**
Role	**Main contributor**
Language	**Python**
Availability	**https://github.com/jshleap/Moduler**
	In this project I include the classes and methods necessary to do a graph-based clustering with significance test of the partition. This project also includes power and bootstrap tests. If the script is run as main, it will return a membership vector of significant clusters, and the support (power, bootstrap) if required
Project	**SPOCK: an automated Search Protocol for Orthologs of Components of Key molecular systems**
Role	**Co-lead bioinformatician**
Language	**Python**
Availability	**In development**
	This packages provides functionalities to accurately identify gene orthologs and their functions to aid manual curation during functional annotation of genomes. It is scheduled to be released in mid 2019
Project	**Cristescu Lab Tools**
Role	**Lead bioinformatician**
Language	**Python & Bash**
Availability	**https://github.com/CristescuLab/Scripts**
	This is a repository of useful scripts to manipulate data

Project	**Biogeographic tools for the analysis of diverisity and genetic data**
Role	**Main contributor**
Language	**Python**
Availability	**https://github.com/jshleap/Biogeography**

This project is composed mainly by a single script to deal with downloaded zip GBIF files. In the future version some interaction with the BOLD systems will be included, as well as some biogeographical calculations. This script is currently being developed, although any comments and/or contributions are appreciated.

Project	**Phylogenetic supertree reconstruction utilities**
Role	**Main contributor**
Language	**Python**
Availability	**https://github.com/jshleap/Phylogenetics**

This project is composed of 5 python scripts to fetch sequences (SeqFetcher.py), run Garli to create multiple single gene trees (GarliRunner.py), create a supermatrix, and infer a supertree from it (SuperMatrix.py) and some utility scripts (mergeFasta.py,multi2single.py) to handle fasta and tree files.

Project	**Utilities for bioinformatics**
Role	**Contributor**
Language	**Python**
Availability	**https://github.com/LabBlouin/LabBlouinTools**

This collective project is composed of python scripts to manipulate sequences and structures, create homology modeled structures, fetch PDBs, among other utilities. It is intended to be modular so the functions can be imported easily.

Project	**Utilities for protein contact inference**
Role	**Contributor**
Language	**Python**
Availability	**https://github.com/jshleap/Collaboration**

This collective project is composed of python scripts to create a contact map of a protein structure. It also contains some testing and utility scripts.

Skills

Spoken Languages	Spanish, English
Computer Languages	Python, R, BASH, LaTeX
General Tools	SVN, VMD, WingIDE, HPC, AWK, GIT, Torque, Slurm
Bioinformatic Tools	BLAST databases and tools, RaxML, structural and sequence alignmers, VMD, Pymol, NGS assembly (RAY, MIRA), MAKER (genome annotation), gene prediction (Augustus), FoldX, Gromacs, GeneAlex, Structure, Arlequin, GenGIS, PLINK, VCFtools, IMPUTE2, GERMLINE, ShapeIT, MSprime, LDpred FlashPCA, Trimmomatic, FLASH, SeqKit, Fastx toolkit, FastQC, Cutadapt, DADA2, PEAR, ANVI'O
Lab workbench	DNA extraction and quantitation, PCR, gel electrophoresis, animal histotechnology, Light microscopy
Field work	Master Scuba Diver (NAUI), experience inshore and offshore sampling including long line, tidal nets, gill nets, dragnets, and trawling.

Updated: Wednesday 16th October, 2019