

Sergio Peignier

Curriculum Vitae

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Education

- 2014–2017 **Ph.D.**, *INRIA - LIRIS*, Lyon, France.
Computer Science.
- 2013–2014 **M.Sci.**, *ENS*, Lyon, France.
Fundamental Computer Science, specialisation in Complex Systems.
- 2009–2014 **Engineering degree**, *INSA*, Lyon, France.
Bioinformatics and Modelling, **Honorable mention**.

Additional Training

- 2021 **Practical Reinforcement Learning**, *Higher School of Economics* | Coursera, Russia.
- 2021 **Mathematics for Machine Learning**, *Imperial College London* | Coursera, UK.
- 2021 **Bayesian Methods for Machine Learning (honorable mention)**, *Higher School of Economics* | Coursera, Russia.
- 2019 **Intensive English Seminar**, *Cambridge University (Erasmus+)*, UK.
- 2017 **Statistical Approaches to Automatic Text Mining**, *University Lumière*, Lyon 2, France.
- 2015 **History of Sciences**, *University Claude Bernard*, Lyon 1, France.
- 2015 **Advanced Lecture Course on Computational Systems Biology**, *COMPSYSBIO spring school*, Aussois, France.
- 2009 **Computer Assembly**, *CECOMP*, La Paz, Bolivia.

Work Experience

- 2018–Now **Associate Professor**, *INSA - BF2i*, Lyon, France, Bio-Informatics Department.
- Gene Regulatory Network Inference based on Ensemble Learning.
 - Gene Regulatory Network Inference based on Classification Algorithms.
 - Computer Vision and Hyper-spectral Image Processing to detect aphids and powdery mildew
- 2018 **Postdoctoral Research**, *CMLA - ENS*, Cachan, France, MLMDA team, Mathilde Mougeot and Nicolas Vayatis.
- Project: Industrial data analytics & Machine learning (industrial partners: Atos and CEA).
 - Research on Transfer-Learning methods and their industrial application.
 - Modelling temporal dynamics of diffusion networks.
- 2017 **Data Scientist**, *Atos Worldline*, Lille, France, High Performance and Volume R&D Team.
- Deep Learning Methods (LSTM and Autoencoders) for anomaly detection in time-series data.
 - Application to Toro Rosso F1 cars telemetry data for early detection of technical problems.

- 2014–2017 **Ph.D. Research**, *INRIA - LIRIS*, Lyon, France, BEAGLE team, supervised by Christophe Rigotti and Guillaume Beslon.
- European project EvoEvo that aims to study evolution and develop bio-inspired algorithms.
 - Evolutionary Subspace Clustering algorithm for dynamic data streams (SubMorphoStream).
 - K -medians Subspace Clustering algorithm for static datasets (KymeroClust).
 - Bio-inspired evolutionary Subspace Clustering algorithm for static datasets (Chameleoclust).
 - Wi-fi signals analyser based on Evolutionary Algorithms (EvoWave).
 - Evolutionary musical companion for dancers (EvoMove).
- 2016 **Visiting Researcher**, *Faculty of Sciences Universidad Mayor de San Andrés (UMSA)*, La Paz, Bolivia, Collaboration with Heriberto Castañeta Maroni.
- Analysis of high dimensional physical features of chemical compounds using Subspace Clustering.
- 2014 **M.Sci. Research**, *INRIA - LIRIS*, Lyon, France, BEAGLE team, supervised by Christophe Rigotti and Guillaume Beslon.
- Development of *in silico* models to study the evolution of bacteria genome structure.
 - Design of an evolvable Clustering algorithm that adapts to data by changing its genome structure.
- 2013 **Undergraduate Research**, *LBMC, ENS*, Lyon, France, Genetics of Intra-Species Variations team, Supervised by Gael Yvert.
- Design of computer driven statistical analysis of genetic regions involved in selective advantage of yeast populations under breeding.
 - Detection of genetic regions involved in bioethanol manufacturing for Lesaffre company.
- 2012-2013 **Undergraduate Research**, *Faculty of Sciences Universidad Mayor de San Andrés (UMSA)*, La Paz, Bolivia, Supervised by Heriberto Castañeta.
- Genetic Algorithms and Neural Networks methods for Q-SAR of chemical compounds adsorption.
 - Predictive Analysis of RNA secondary structure by Neural Network algorithms.

Awards

- 2018 **Best Paper Award**, *Information Systems*, International ACM Symposium On Applied Computing, Pau - SAC-2018.
- 2015 **Best Paper Award**, *Evolutionary Machine Learning*, International ACM conference on Genetic and Evolutionary Computation Conference, Madrid - GECCO-2015.

Publications

Peer-Review Journals

- [1] S. Peignier, P. Schmitt, F. Clevro. (2021) Data-Driven Gene Regulatory Network Inference Based on Classification Algorithms. *International Journal on Artificial Intelligence Tools*
- [2] M. Ribeiro Lopes, N. Parisot, K. Gaget, C. Huygens, S. Peignier, et al. (2020) Evolutionary Novelty in the Apoptotic Pathway of Aphids. *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*
- [3] A. Castellini, F. Masillo, M. Bicego, ..., S. Peignier, (2019). *Subspace Clustering for Situation Assessment in Aquatic Drones: a Sensitivity Analysis for State-Model Improvement, Cybernetics and Systems*, Taylor & Francis
- [4] Peignier, S., Zapata, P., (2019) Analysis of Fidel Castro Speeches Enhanced by Data Mining, *Digital Humanities Benelux Journal*
- [5] Peignier, S., Rigotti, C., and Beslon, G. (2018). Evolutionary Subspace Clustering Using Variable Genome Length. *Computational Intelligence*.
- [6] Abernot, J., Beslon, G., Peignier, S. and Rigotti, C. (2017). Evolving Instrument Based on Symbiont-Host Metaphor. *Journal of Creative Music Systems*

- [7] Peignier, S., and Castañeta, H. (2015). Analysis of subspace clustering of molecules using Chameleoclust, an evolutionary algorithm. *Revista Boliviana de Química*
- [8] Peignier, S., and Castañeta, H. (2012). Prediction of Optimal and Suboptimal Secondary Structure of RNA Molecules Using Artificial Intelligence. *Revista Boliviana de Química*

Books

- [1] Peignier S., Zapata P. (2017). *Análisis del Discurso Socialista Latinoamericano basado en Inteligencia Artificial [Analysis of Latin-American Socialist Speech Based on Artificial Intelligence]*. Instituto Internacional de Integración Convenio Andrés Bello

Conferences

- [1] S. Peignier, B. Sorin, F. Calevro. (2021) Gene Regulatory Network using Ensembles of Predictors. *IEEE International Conference on Tool with Artificial Intelligence*
- [2] M. Atiq, S. Peignier, M. Mougeot (2021) Budget Learning Based on Equivalent Trees and Genetic Algorithms. *IEEE International Conference on Tool with Artificial Intelligence*
- [3] N. Debs, S. Peignier, C. Douarre, T. Jourdan et al. (2021) Apprendre l'Apprentissage Automatique: un Retour d'Expérience. *Colloque de l'Enseignement des Technologies et des Sciences de l'Information et des Systèmes*
- [4] S. Peignier, A. Foncelle. (2020) Analyzing Open Data to Support Democracy: a Study Case Inspecting Electoral Fraud in Bolivian General Elections. *Digital Humanities BeNeLux Conference*
- [5] A. Castellini, F. Masillo, M. Bicego, ..., S. Peignier, (2019). Subspace Clustering for Situation Assessment in Aquatic Drones. *ACM Symposium on Applied Computing SIGAPP*
- [6] L. Minvielle, M. Atiq, S. Peignier, M. Mougeot. (2019) Transfer Learning on Decision Tree with Class Imbalance. *IEEE International Conference on Tool with Artificial Intelligence*
- [7] S. Peignier, P. Schmitt, F. Calevro. (2019) Data-Driven Gene Regulatory Network Inference Based on Classification Algorithms. *IEEE International Conference on Tool with Artificial Intelligence*
- [8] S. Peignier, P. Zapata. (2018) What can Reveal 1018 Speeches of Fidel Castro? *Digital Humanities BeNeLux Conference*
- [9] Peignier, S., Rigotti, C., Rossi, A., and Beslon, G. (2018) Weight-based search to find clusters around medians in subspaces. *ACM Symposium on Applied Computing Data Mining Track. **Best Paper in Information Systems***
- [10] Peignier, S., Rigotti, C., and Beslon, G. (2017) EvoMove: Evolutionary-based living musical companion. *European Conference on Artificial Life*
- [11] Abernot, J., Beslon, G., Peignier, S. and Rigotti, C. (2016) A commensal architecture for evolving living instruments. In *Proceedings of the Conference on Computer Simulation of Musical Creativity*
- [12] Peignier, S., Rigotti, C., and Beslon, G. (2015) Subspace clustering using evolvable genome structure. In *Proceedings of the ACM Genetic and Evolutionary Computation Conference. **Best Paper in Evolutionary Machine Learning***
- [13] Peignier, S., Rigotti, C., and Beslon, G. (2015) Subspace Clustering for all Seasons. In *EvoEvo satellite workshop of the European Conference on Artificial Life*

Technical Reports

- [1] Peignier, S., (2017) Study of Telemetry Measures for Toro Rosso Formula One Racing Team. *Atos Worldline Confidential Technical Report. p.61.*

- [2] Abernot, J., Beslon, G., Peignier, S. and Rigotti, C. (2016) Deliverable 5.2 EvoEvo project. FP7 funding, <http://evoevo.eu/>. p.28.
- [3] Abernot, J., Beslon, G., Peignier, S. and Rigotti, C. (2016) Deliverable 5.1 EvoEvo project. FP7 funding, <http://evoevo.eu/>. p.42.

Posters

- 2021 A. Motes de Oca, A. Kalogeratos, S. Peignier, M. Mougeot. Industrial Data Analytics and Machine Learning - Centre Borelli, Implementation and Tuning of Neural Decision Trees.
- 2018 L. Minvielle, M. Atiq, S. Peignier, M. Mougeot, N. Vayatis. CMLA - ENS Paris-Saclay, Transfer Learning Summer School, Transfer Learning to Detect Falls.
- 2018 M. Atiq, L. Minvielle, S. Peignier, M. Mougeot, N. Vayatis. CMLA - ENS Paris-Saclay, Transfer Learning Summer School, Transfer Learning on Equivalent Decision Trees.
- 2016 S. Peignier, LIRIS, Journée des Thèses du LIRIS (2016): Subspace Clustering Based On Bio-Inspired Evolutionary Algorithm.

Oral Presentations

Invited Talks

- 2021 V. Lacotte, S. Peignier. BAPOA, Détection de Pucerons par Imagerie Hyperspectrale en Conditions de Laboratoire.
- 2021 V. Lacotte, S. Peignier. ANR - GreenShield, Élaboration d'une Base de Données Hyper-spectrale de Pucerons.
- 2018 S. Peignier. CMLA - ENS Paris-Saclay, Transfer Learning Summer School, The Biological Way of Transfer.
- 2017 S. Peignier. Electrical Engineering Department UMSA, La Paz Bolivia: Minería de datos dinámicos y estáticos mediante algoritmos evolutivos de subspace clustering
- 2017 S. Peignier. Linguistics Department UMSA, La Paz Bolivia: Breve introducción al procesamiento de lenguajes naturales y a la minería de datos basada en inteligencia artificial.
- 2016 S. Peignier. BeyondLab Math-Info event (Industrial transfer event): EvoEvo (Evolution of Evolution).

Contributed Talks

- 2017 LIRIS, DM2L Team: Subspace Clustering Using Bio-Inspired Algorithms.
- 2016 LIRIS, DM2L Team: Subspace Clustering Using Evolvable Genome Structure.

Other Talks

- 2017 Presentation to IT manager board from Toro Rosso F1 (customer).
- 2017 Presentation to commercial manager board from Atos Italy (commercial partner).

Open-Source Software

- 2020 GReNaDIne: Data-Driven Approaches to Infer Gene Regulatory Networks (Python package).
- 2019 DPD Dendrogram Prototypical Discourse Generator (Python package).
- 2017 EvoMove Musical Personal Companion (Python).
- 2017 SubCMedians Subspace Clustering (Python package).
- 2017 NavesDog RSS reader with Naive Bayes Powered Recommendations (Python).
- 2016 SubCMedians Subspace Clustering (Knime-Java package).

- 2016 EvoWave Wifi Context Analysis (Python).
- 2016 Chameleoclust+ Evolutionary Subspace Clustering (Python package).

Reviewing tasks

- 2021 Reviewer for Scientific Reports Journal (IF = 4.379)
- 2021 Reviewer for the Information Sciences Journal - Elsevier (IF = 5.524)
- 2019 Reviewer for the Digital Humanities BeNeLux Conference.

Teaching Experience

Ph.D. Students Supervision

- 2021–Now **Lisa Chabrier**, *Delta-Regulons Inference*, M2, INSA Lyon.

Internship Students Supervision

- 2021 **Lisa Chabrier**, *Preprocessing Techniques for Arboreto Gene Regulatory Network Inference*, Co-advisor with C. Rigotti and A. Crombach, M2, Sorbonne-Paris.
- 2020 **Baptiste Sorin**, *Gene Regulatory Network based on Ensemble Learning*, M1, INSA-Lyon.
- 2020 **Mélanie Sawaryn**, *Text Mining and Automated Graph-Based Summaries*, M1, INSA-Lyon.
- 2019 **Pauline Schmitt**, *Gene Regulatory Network based on Classification*, M1, INSA-Lyon.

5th Year Bioinformatics and Modelling Dept. (Master 2)

- 2018–Now **Stochastic Processes**, INSA, Lyon.
- 2018–Now **Projects Supervision**, INSA, Lyon.
- 4th Year Bioinformatics and Modelling Dept. (Master 1)
- 2018–Now **Gene Regulatory Network Inference**, INSA, Lyon.
- 2020–Now **String-Searching Algorithms**, INSA, Lyon.
- 2018–Now **Artificial Intelligence**, INSA, Lyon.
- 2018–Now **Software Development Project**, INSA, Lyon.
- 2018–2020 **Theoretical Computer Sciences and Graph Theory**, INSA, Lyon.
- 2018–2020 **Software Deployment (Docker)**, INSA, Lyon.

3th Year Bioinformatics and Modelling Dept. (License 3)

- 2020–Now **Introduction to Mathematics (Differential Equations)**, INSA, Lyon.
- 2020–Now **Introduction to Computer Sciences (Data-Mining)**, INSA, Lyon.
- 2018–Now **Linear Algebra and Matrix Analysis**, INSA, Lyon.
- 2018–Now **Data Bases and SQL**, INSA, Lyon.
- 2014–2016 **Modelling of Biological Systems using MATLAB**, INSA, Lyon.
- 2014–2016 **Algorithmic and Programming on Python**, INSA, Lyon.

Academic tutoring in mathematics and programming (License 1 and 2)

- 2012–2014 **Academic Tutoring**, *Passerelle Program*, INSA, Lyon.

Technical skills

- OS Linux, Microsoft Windows, OSX
- Programming Python (scikit-learn, scikit-image, keras, tensorflow, networkx, pandas, numpy, seaborn), C, C++, R, Matlab, Java, \LaTeX , html, CSS

Databases MySQL, SQLite, Neo4J

Language Skills

French (native), **Spanish** (native), **English** (Fluent, TOEIC 2013)

Portuguese (Very good command, B1 2014), **Italian** (Good command, B1 2013)

Extramural Activities

- 2018 Writing of data science definitions for the Data Analytics Post website (<https://dataanalyticspost.com/>) from the MVA master at ENS Paris-Saclay.
- 2014 Development of the "Informatique Sensorielle" project for artistic exploration using Neural Networks. Participation in the 4th RADART meeting.