Rodrigue GOVAN, Ph.D.

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Education

October 2021 – August 2025 **Ph.D. in Computer Science – *Data Science***
Doctoral School of Pacific (ED469), University of New Caledonia

- Thesis title: **"Deep Learning on Attributed Graphs for Mapping Leptospirosis Risk"**.
- Supervision:
  - Nazha SELMAOUI-FOLCHER, Full Professor in Computer Science in the Institute of Exact and Applied Sciences at the University of New Caledonia.
  - Philippe FOURNIER-VIGER, Distinguished Professor in Computer Science in the Big Data Institute at Shenzhen University, China.
- Fundings: Doctoral scholarship (50%), ANR-SPIraL (ANR-19-CE35-0006-02, 50%).
- Jury members:
  - Christophe MENKÈS [**Chair**], Sr. Research Scientist in Climatology at ENTROPIE, French National Institute of Research for Development (IRD, New Caledonia).
  - Thomas GUYET [**Reviewer**], Full Researcher in Computer Science at AIstroSight, Inria Research Centre, Lyon, France.
  - Luiz-Angelo STEFFENEL [**Reviewer**], Full Professor in Computer Science at LICIIS, University of Reims Champagne-Ardenne.
  - Cyrille GOARANT [**Examiner**], Research Scientist in Epidemiology at the Public Health Department, South Pacific Community.
  - Corina IOVAN [**Examiner**], *Research Scientist* in Ecology and Artificial Intelligence at ENTROPIE, French National Institute of Research for Development (IRD).
  - Nadia KABACHI [**Examiner**], Full Professor in Computer Science at ERIC, University Claude Bernard Lyon 1, France.
- Access to thesis manuscript (*written in French*): `hal.science/tel-05268357`

2017 – 2019 **M.Sc. in Applied Mathematics and Statistics**, University of Bordeaux

- Minor: Statistical and Stochastic Modeling.
- Final-year project: **"Object detection in satellites images using deep learning"**.

2014 – 2017 **B.Sc. in Applied Mathematics and Computer Science**, University of Bordeaux

- Minor: Business Administration.
- Final-year project: **"Object-oriented programming of a role-playing game in Java"**.

Experiences

September 2020 – December 2020 **Data Scientist**, Institute of Exact and Applied Sciences, UNC – Noumea, New Caledonia

- Modeling of data related to the quality of freshwater and groundwater in New Caledonia, in collaboration with the water service of the department of veterinary, food and rural affairs of New Caledonia.
- Descriptive and inferential analyses of physicochemical data.
- Implementation of a graphical interface (using Python and `dash`) for the visualization of the analyses.
- Deployment of the interface on a cloud computing platform.
- Contributions to the writing and publication of research articles.
- Tools used: Python (`sklearn`, `statsmodels`, `plotly`, `Jupyter`), QGIS, Microsoft Access, PostgreSQL, LaTeX.

August 2019 – February 2019

Data Scientist Intern, IDAIA Group – Bruges (Bordeaux), France

- Detection of residential swimming pools in satellite images using deep learning to complete the French land registry.
- Labeling of satellite images, creation of training datasets, and training of object detection models (Faster R-CNN, MobileNet, YOLO).
- Use of satellite images from the French National Institute of Geographic and Forest Information.
- Over 200M images (covering the entire country of France) processed.
- Parallelization of predictions on CPU and GPU.
- Estimation of the surface area of detected swimming pools using clustering methods.
- Tools used: Python (`sklearn`, `Tensorflow`, `PyTorch`, `plotly`, `tensorboard`, WandB.ai, `Jupyter Notebook`), QGIS, Linux, LaTeX.

Teaching activities

Qualifications

2026 – 2030

National qualification for Associate Professor positions – French National Council of Universities (CNU)

- Section 27: Computer Science;
- Section 61: Computer Engineering, Automation, and Signal Processing.

Teachings

Course name	Level	Tutorials	Labs	Total	Years
Algorithms and Programming II in Python	B.Sc. CS 1st year	×	34	34h	2022
Graph theory and Algorithms	B.Sc. CS 2nd year	12h	48h	60h	2022, 2023, 2024
Advanced databases	B.Sc. CS 2nd year	×	48h	48h	2022, 2023, 2024
Introduction to data analysis	B.Sc. CS 3rd year	4h	×	4h	2023
Applied statistics for geosciences	B.Sc. Geology 1st year	8h	×	8h	2024
				Total : 154h	

Internship supervision

November 2024 – January 2025

Front-End Developer – Waren Deramane (2nd year B.Sc. in Computer Science)

- Design and development of a graphical user interface for managing and visualizing spatio-temporal data.
- Tools used: Python (`Flask`), HTML, CSS, JavaScript, PostgreSQL, Docker.
- Supervision: 80% R. Govan, 20% N. Selmaoui-Folcher.

November 2024 – January 2025

Back-End Developer – Saïden Tidjine (2nd year B.Sc. in Computer Science)

- Design and development of a spatio-temporal database to support data analysis and management.
- Tools used: Python (`FastAPI`), PostgreSQL/PostGIS, Docker.
- Supervision: 80% R. Govan, 20% N. Selmaoui-Folcher.

October 2022 – February 2023

Tutored project, Data Analyst – Mathilde Nyikeine, Jean-François Quinquis et Duc Huy Dimitri Tran (2nd year M.Sc. Computer Science Applied to Business Management)

- Spatio-temporal analysis of physico-chemical data.
- Development of a QGIS-integrated tool for displaying the analyzed data.
- Tools used: QGIS, PostgreSQL/PostGIS, Python.
- Supervision: 40% R. Govan, 60% N. Selmaoui-Folcher.

Technical skills

Operating systems	macOS, Linux (Ubuntu, Debian, Raspberry Pi OS), Windows
Programming languages	Python, R, SQL, Matlab, Java, PHP, HTML, CSS, Shell Unix, LaTeX
Specific librairies	PyTorch, scikit-learn, dash, rasterio
Management and deployment tools	SLURM, Docker, GitHub/GitLab
Databases	MySQL, PostgreSQL/PostGIS
Proficiencies in	Machine Learning, Data Mining, Databases, Data processing, Dashboard implementation and deployment

Projects

18–20 June 2021 **Hackathon (CASSINI.eu, 1st Edition)** – University of New Caledonia

- European entrepreneurship-oriented Hackathon.
- Hackathon's theme: "Digitizing Green Spaces".
- Proposed project: SANDLESS (**S**oftware to **A**nalyze **N**atural **D**ata to **L**ower **E**cological **S**tress with **S**atellites), a software analyzing satellites, social, economical and environmental data of cities from all over the world in order to help decision-makers to build their own city.
- French rank: 1st.
- European (final) rank: 3rd.

October 2018 – January 2019 **Big Data Project** – University of Bordeaux

- Kaggle-like contest organized by the INSA-Toulouse engineering school in collaboration with Airbus Defence and Space.
- Contest including universities and engineering schools in France.
- Objective: To determine, by using satellite images, whether or not the image contains a wind turbine.
- Tools used: Python, Tensorflow, Keras.
- Final rank: 7/64 teams (with a 97.7% accuracy).

Reviewing activities

As a reviewer	*International Journal of Biometeorology* (IJBM2025)
As a sub-reviewer	*International Conference on Big Data and Artificial Intelligence* (BDA2023), *Pacific Rim International Conference on Artificial Intelligence* (PRICAI2025)

Publications and Communications

Journal papers with peer review

[3] **Govan, R.**, Scherrer, R., Fougeron, B., Laporte-Magoni, C., Thibeaux, R., Genthon, P., Fournier-Viger, P., Goarant, C., and Selmaoui-Folcher, N. (2025). **Spatio-temporal risk prediction of leptospirosis: A machine-learning-based approach**. *PLOS Neglected Tropical Diseases*, 19(1), e0012755.
DOI: 10.1371/journal.pntd.0012755

[2] Thibeaux, R., Genthon, P., **Govan, R.**, Selmaoui-Folcher, N., Tramier, C., Kainiu, M., Soupé-Gilbert, M.-E., Wijesuriya, K., and Goarant, C. (2024). **Rainfall-driven resuspension of pathogenic Leptospira in a leptospirosis hotspot**. *Science of The Total Environment*, 911, 168700.
DOI: 10.1016/j.scitotenv.2023.168700

[1] Scherrer, R., **Govan, R.**, Quiniou, T., Jauffrais, T., Lemonnier, H., Bonnet, S., and Selmaoui-Folcher, N. (2022). **Real-Time Automatic Plankton Detection, Tracking and Classification on Raw Hologram**. In: *International Meeting on Computational Intelligence Methods for Bioinformatics and Biostatistics* (pp. 25-39). Springer, Cham.
DOI: 10.1007/978-3-031-20837-9_3

International conferences with peer review

[5] **Govan, R.**, Scherrer, R., Fournier-Viger, P., and Selmaoui-Folcher, N. (2025). **SpaPool: Soft Partition Assignment Pooling for Graph Neural Networks**. In: Leung, C.K., Dignös, A., Kotsis, G., Tjoa, A.M., Khalil, I. (eds) *Big Data Analytics and Knowledge Discovery. DaWaK 2025.* Lecture Notes in Computer Science, vol 16048. Springer, Cham.
DOI: 10.1007/978-3-032-02215-8_27

[4] **Govan, R.**, Selmaoui-Folcher, N., Giannakos, A., and Fournier-Viger, P. (2023). **Co-location Pattern Mining Under the Spatial Structure Constraint**. In: Strauss, C., Amagasa, T., Kotsis, G., Tjoa, A.M., Khalil, I. (eds) *Database and Expert Systems Applications. DEXA 2023.* Lecture Notes in Computer Science, vol 14146. Springer, Cham.
DOI: 10.1007/978-3-031-39847-6_13

[3] Tokotoko, J., **Govan, R.**, Lemonnier, H., and Selmaoui-Folcher, N. (2022). **Multiscale and Multivariate Time Series Clustering: A New Approach**. In: Ceci, M., Flesca, S., Masciari, E., Manco, G., Raś, Z.W. (eds) *Foundations of Intelligent Systems. ISMIS 2022.* Lecture Notes in Computer Science(), vol 13515. Springer, Cham.
DOI: 10.1007/978-3-031-16564-1_27

[2] Scherrer, R., **Govan, R.**, Quiniou, T., Jauffrais, T., Lemonnier, H., Bonnet, S., and Selmaoui-Folcher, N. (2021). **Automatic Plankton Detection and Classification on Raw Hologram with a Single Deep Learning Architecture**. In: *CIBB 2021 Computational Intelligence Methods for Bioinformatics and Biostatistics.*
URL: hal-03565469

[1] Tokotoko, J., Selmaoui-Folcher, N., **Govan, R.**, and Lemonnier, H. (2021). **TSX-Means: An Optimal K Search Approach for Time Series Clustering**. In: Strauss, C., Kotsis, G., Tjoa, A.M., Khalil, I. (eds) *Database and Expert Systems Applications. DEXA 2021.* Lecture Notes in Computer Science(), vol 12924. Springer, Cham.
DOI: 10.1007/978-3-030-86475-0_23

National conferences with peer review

[3] **Govan, R.**, Scherrer, R., Fournier-Viger, P., and Selmaoui-Folcher, N. (2025). ***Pooling* de *Graph Neural Networks* : une approche dense mais adaptative**. In: *CNIA 2025-Conférence Nationale en Intelligence Artificielle*, PFIA (No. 55-63).
URL: hal-05197596v1

[2] **Govan, R.**, Scherrer, R., Goarant, C., Cannet, A., Fournier-Viger, P., and Selmaoui-Folcher, N. (2025). **Cartographie du risque épidémiologique : Le défi des données fortement déséquilibrées**. In: *Revue des Nouvelles Technologies de l'Information, 25èmes Journées Francophones Extraction et Gestion des Connaissances, EGC 2025*, vol. RNTI-E-41. (pp. 159-170).
URL: hal-04945686

[1] **Govan, R.**, Selmaoui-Folcher, N., Giannakos, A., and Fournier-Viger, P. (2023). **Extraction de co-localisations sous contrainte de la structure spatiale**. In: *CNIA 2023-Conférence Nationale en Intelligence Artificielle*, PFIA (No. 53-61).
URL: hal-04945686

Posters and Workshops with peer review

[2] Genthon, P., Thibeaux, R., Selmaoui-Folcher, N., **Govan, R.**, Kainiu, M., Soupé-Gilbert, M.-E., and Goarant, C. (2025). **Leptospirosis: a critical zone disease?** In : *3rd OZCAR TERENO International Conference, Advancing Critical Zone Science.* (Vol. 2025, pp. S14-P2).
URL: hal-05387574

[1] Genthon, P., Thibeaux, R., Selmaoui-Folcher, N., **Govan, R.**, Kainiu, M., Soupé-Gilbert, M. E., and Goarant, C. (2024). **Leptospira in Rivers of a Leptospirosis Hotspot: Scale Effects**. In: *AGU Fall Meeting Abstracts* (Vol. 2024, No. 1055, pp. H13D-1055).
URL: 2024AGUFMH13D.1055G

Project reports and thesis

[2] **Govan, R.** (2025). **Deep Learning on Attributed Graphs for Mapping Leptospirosis Risk**. Ph.D. thesis. University of New Caledonia.
URL: tel-05268357

[1] **Govan, R.** (2019). **Deep Learning: Residential pool detection in France**. M.Sc. thesis. University of Bordeaux, France.

Other communications

[3] **Govan, R.**, Parmentier, J.-B., and Quiniou T. (2025). **Discovering an interactive 3D model of New Caledonia**. In : *8th Edition of Science Evening, Science Fair 2025.* University of New Caledonia.

[2] **Govan, R.** (2023). **Scientific research at the service of data**. In : *7th meetup dedicated to data.* ISI-NC, OoTech. New Caledonia.

[1] **Govan, R.** (2022). **Evolving and Dynamic Attributed Graphs: Application to the Risk Mapping of Leptospirosis in New Caledonia**. In : *15th Edition of "Doctoriales".* Doctoral School of Pacific (ED469). University of New Caledonia.

Professional and academic references

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