

Steven Golovkine

PHD IN APPLIED MATHEMATICS, STATISTICS

☎ (+33) 06 72 28 22 71 | ✉ steven_golovkine@icloud.com | 🏠 stevengolovkine.netlify.app | 📱 StevenGolovkine | 🎓 Steven Golovkine

Current Position

Postdoctoral Researcher on the FAST project

Limerick, Ireland

UNIVERSITY OF LIMERICK

Feb. 2022 - Present

- Develop novel, computationally efficient statistical models and algorithms for the modelling of multivariate sensor data.
- Demonstrate increased computational efficiency, so that the methodologies are applicable to modern, large-scale datasets.
- Supervisor: Norma Bargary (UL) and Andrew Simpkin (NUI Galway)

Experience

Data Scientist on the EMPOWER project

Paris, France

IRMES (INSEP)

Jun. 2021 - Jan. 2022

- Maximize the performance of elite female athletes by optimizing their training responses with adapted workloads in synergy with their physiology and menstrual cycle.
- Develop statistical models to determine athletes hormonal profiles and analyze responses to training and competition loads.
- Link: <https://labos-recherche.insep.fr/fr/empower>

Research Engineer

Guyancourt, France

TECHNOCENTRE, RENAULT

Jan. 2018 - Mar. 2021

- Develop clustering methods for the analysis of autonomous vehicle Advanced Driver-Assistance Systems data.
- Create a Python package for Functional Data Analysis: FDApy.
- Use of Google Cloud Platform (Compute Engine and BigQuery) for the analysis of vehicle data.
- Software: Python and R.

Data Scientist (Intern)

Guyancourt, France

TECHNOCENTRE, RENAULT

Apr. 2017 - Oct. 2017

- Implement a massive data analysis methodology for the validation of driving assistance systems.
- Software: Matlab.

Research Assistant

Fort Collins, USA

COLORADO STATE UNIVERSITY

Jun. 2016 - Aug. 2016

- Compare survey estimators for the *National Survey of College Graduation*.
- Software: R.

Education

PhD. in Applied Mathematics, Statistics

Guyancourt, France

TECHNOCENTRE, RENAULT AND CREST (ENSAI)

Jan. 2018 - Jun. 2021

- **Title:** Statistical methods for multivariate functional data
- **Supervisors:** Valentin Patilea (Ensaï, CREST), Nicolas Klutchnikoff (Univ Rennes, IRMAR)
- **Funding:** Partnership with Groupe Renault through a CIFRE convention.
- **Abstract:** The topic of this thesis is related to functional data analysis and is motivated by modern data from automobile industry. The standard functional data methods rely on the assumption that the curves are continuously observed, without error. However, in general, the real data is neither continuously nor exactly observed. Therefore, a crucial step is to recover the trajectories from noisy measurements at discrete random points. For that, we propose an original point of view: the local regularity of the process generating the curves. Thus, combining information both within and across trajectories, we propose a simple estimator for this local regularity. Given this estimate, we build a nearly optimal local polynomial smoother of the curves from a sample of noisy trajectories. Nonparametric estimators for the mean and the covariance functions of functional data, using the local regularity of the process, are derived. Moreover, we propose a model-based clustering algorithm for a general class of functional data for which the components could be curves or images. Results of both simulated and real data show the good performances of this method. A Python package, implementing the methods and publicly available, has been developed.
- **Keywords:** Adaptive optimal smoothing, functional data analysis, gaussian mixtures, Hölder exponent, local polynomials, model-based clustering, multivariate functional principal component analysis, traffic flow.
- **Defense:** June 18, 2021 in front of the jury composed of André Mas (Professor, Montpellier University, President), Sophie Dabo-Niang (Professor, Lille University, Reviewer), Alois Kneip (Professor, Bonn University, Reviewer), Vincent Feuillard (Statistical Expert, Renault, Examiner) and Claire Gormley (Professor, University College Dublin, Examiner).
- **Manuscript:** tel-03540827

MSc in Big Data

ENSAI (NATIONAL SCHOOL FOR STATISTICS AND DATA ANALYSIS)

- Dual degree program with Ensai engineering degree.
- Main topics: Statistics, Applied Mathematics, Computer Science.
- Training topics: assess, treat, and analyze massive amounts of heterogeneous data.
- Program taught entirely in English.

Rennes, France

Sept. 2016 - Oct. 2017

M.S. in Statistics (*Diplôme d'ingénieur*)

ENSAI (NATIONAL SCHOOL FOR STATISTICS AND DATA ANALYSIS)

- Training topics: Statistics, Econometrics and Computer Science.

Rennes, France

Sept. 2014 - Oct. 2017

Statistics of random processes

AARHUS UNIVERSITY

- ERASMUS exchange.

Aarhus, Denmark

Jan. 2016 - Jun. 2016

CPGE MPSI/MP

LYCÉE CLEMENCEAU

Reims, France

Sep. 2011 - Jun. 2014

Skills

Programming Python, **R**, Bash

Tools Google Cloud Platform, Git, Continuous Integration

Languages French (mother tongue), English (C1, fluent)

Teaching Experience

R for Statistical Data Science

MS6071

- Link: r-programming-course.netlify.app

University of Limerick

Sep. 2023 - Dec. 2023

Engineering maths 5

MA4006

- Vector fields and integration.

University of Limerick

Feb. 2023

Duration models

M.S IN STATISTICS

- Theoretical and practical (with **R**) sessions.

Ensai

Apr. 2021 - Jun 2021

Linear regression

M.S IN STATISTICS

- Theoretical and practical (with **R**) sessions.

Ensai

Sep. 2019 - Nov. 2021

Scientific production

ARTICLES

Comment: Multivariate Functional Principal Component Analysis for Data Observed on Different (Dimensional) Domains

GOLOVKINE S., GUNNING E., SIMPKIN A. J. & BARGARY N.

submitted

2023

On the use of the Gram matrix for multivariate functional principal components analysis

GOLOVKINE S., GUNNING E., SIMPKIN A. J. & BARGARY N.

arXiv preprint

2023

- Link: [arXiv:2306.12949](https://arxiv.org/abs/2306.12949)

Analysing kinematic data from recreational runners using functional data analysis

submitted

GUNNING E., GOLOVKINE S., SIMPKIN A. J., BURKE A., DILLON S., GORE S., MORAN K., O'CONNOR S., WHYTE E. & BARGARY N.

2023

Learning the smoothness of noisy curves with application to online curve estimation

EJS

GOLOVKINE S., KLUTCHNIKOFF N. & PATILEA V.

2022

- DOI: 10.1214/22-EJS1997

Clustering multivariate functional data using unsupervised binary trees

CSDA

GOLOVKINE S., KLUTCHNIKOFF N. & PATILEA V.

2021

- DOI: 10.1016/j.csda.2021.107376

Adaptive optimal estimation of irregular mean and covariance functions

arXiv preprint

GOLOVKINE S., KLUTCHNIKOFF N. & PATILEA V.

2021

- Link: arXiv:2108.06507

FDAPy: a Python package for functional data

arXiv preprint

GOLOVKINE S.

2021

- Link: arXiv:2101.11003

CONFERENCE PROCEEDINGS

Functional multilevel modelling of the influence of the menstrual cycle on the performance of female cyclists

IWSM

GOLOVKINE S., CHASSARD T., MEIGNIÉ A., BRUNET E., TOUSSAINT J.-F. & ANTERO J.

2023

- Link: Proceedings of the 37th International Workshop on Statistical Modelling

Clustering multivariate functional data using unsupervised binary trees

EYSM

GOLOVKINE S., KLUTCHNIKOFF N. & PATILEA V.

2021

- Link: 22nd European Young Statisticians Meeting - Proceedings

Lissage de données fonctionnelles par estimation de leur régularité locale

JDS

GOLOVKINE S., KLUTCHNIKOFF N. & PATILEA V.

2020

- Link: Proceedings of the 52èmes Journées de Statistiques de la Société Française de Statistique

SOFTWARES

FDAPy (<https://github.com/StevenGolovkine/FDAPy>)

PYTHON PACKAGE

denoisr (<https://github.com/StevenGolovkine/denoisr>)

R PACKAGE

funestim (<https://github.com/StevenGolovkine/funestim>)

R PACKAGE

Conferences

WITH TALK

Sep. 2023	NSHPC , National Sport and Human Performance Conference 2023	Limerick, Ireland
Jul. 2023	IWSM , 37th International Workshop on Statistical Modelling	Dortmund, Germany
Jul. 2023	JDS , 54rd Statistical Days	Brussels, Belgium
May 2023	CASI , 43rd Conference on Applied Statistics in Ireland	Killarney, Ireland
Aug. 2022	SDS , CSDA & EcoSta Workshop on Statistical Data Science (invited)	Bologna, Italy
Jun. 2022	JDS , 53rd Statistical Days	Lyon, France
Feb. 2022	YSP , 10th Young Statisticians and Probabilists day (invited)	Virtual Conference
Dec. 2021	CMStatistics , 14th conference on Computational and Methodological Statistics (invited)	Virtual Conference
Sep. 2021	EYSM , 22nd European Young Statisticians Meetings (invited)	Virtual Conference
Jun. 2021	JDS , 52nd Statistical Days	Virtual Conference
Mar. 2021	Mathematics Seminars , Hunter College (invited)	Virtual Conference
Dec. 2020	CMStatistics , 13th conference on Computational and Methodological Statistics (invited)	Virtual Conference
Nov. 2020	StatMod2020 , Statistical Modeling with Applications (invited)	Virtual Conference
Jun. 2019	JDS , 51st Statistical Days	Nancy, France
Mar. 2019	MASCOT-NUM , Annual Conference	Rueil-Malmaison, France

ATTENDED

Jun. 2019	DS³ , Data Science Summer School	Saclay, France
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Student supervision

POSTGRADUATE STUDENTS

2023	McDermott H. , The home advantage in rugby.	University of Limerick
2022	Harrington T. , Bayesian analysis for sport data.	University of Limerick
2022	Scanlon S. , Does grid position affect who wins the race in F1?	University of Limerick

UNDERGRADUATE STUDENTS

2020	Manaa A., Maissoro H. & Samaila Z. , Classification de courbes après recalage.	ENSAI
2020	Gervillie R., Li J.-U. & Rousseaux F. , Détection de points d'impact dans des courbes.	ENSAI