Sothea Has — Ph.D. in Applied Mathematics

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SKILL SUMMARY

Postdoc Applying statistical and machine learning methods (ML) in atmospheric science: gravity waves.
Ph.D. Solid theoretical knowledge: supervised/unsupervised/deep learning, aggregation and modeling.
Teaching Statistics, data analysis, data modeling, algorithms and programming: C++, Python, Pytorch, R, ...
Qualification Qualified as a **maître de conférences** (associate professor) in France from February 2024.

EXPERIENCES

2023-Present — **Centre national de la recherche scientifique (CNRS) - LPSM**
Postdoc — **Build and maintain `gradientcobra` python library**
Python ML library for implementing various aggregation methods in supervised predictions.

2022-Present — **CNRS - LPSM Université Paris Cité, ENS - LMD Université Sorbonne and École Polytechnique**
Postdoc — **Improving parametrizations in climate modeling using statistical and machine learning**.
- Modeling balloon-observed Gravity Wave Momentum Fluxes (GWMF) from Strateole 2 mission.
- Extracting important features for GWMF reconstruction.
- Interpreting and providing information of the stochastic component of GWMFs.

2018 - 2022 — **LPSM (UMR 8001) - Sorbonne Université**
Ph.D. — **Theoretical study and applications of machine learning methods.**
- Energy data modeling using supervised and unsupervised machine learning algorithms.
- Aggregation method for regression problems.
- Aggregation method in high dimension.

2018 - Present — **UFR Mathematics Université de Paris**
Teaching — **Master 1 and Master 2**
- Practical class of Data Analysis with `R` and `Rstudio`, Master 1 ISIFAR.
- Practical class of Data Mining with `R` and `Rstudio`, Master 2 ISIFAR.
- Practical class of Exploratory Data Analysis with `R` and `Rstudio`, Master 1 EDA.
- Practical class of Algorithm and Programming with `Python`, Licence 2 MIASHS.
- Practical class of Big Data Technologies with `Python` and `Spark`, Master 1 MATINF.
- Tutorial class of Statistical Inference and Data Modeling, Master 2 M2MO.

2018 — **LPSM (UMR 8001) Université de Paris**
M2 internship — **Predictive models based on clustering with Bregman divergences and local predictions**
- Analyzing the sensitivity of K-means clustering with Bregman divergences.
- Constructing local models on different configurations of clusters.

2017 — **Laboratory of TELECOM SudParis**
M1 internship — **Study of optimization problems with marginal simulated annealing algorithm**

PUBLICATIONS

2024 — **Estimating balloon-observed gravity wave momentum fluxes using ML & input from reanalysis.**
Status — *Accepted for publication at JGR: Atmosphere, with R. Plougonven, A. Fischer, R. Rani, F. Lott, A. Hertzog, A. Podglajen, M. Corcos.*

2023 **Gradient COBRA: A kernel-based consensual aggregation for regression.**
Status *Published at Journal of Data Science Statistics and Visualisation, single author.*

2022 **A consensual aggregation on randomly projected high-dimensional features of predictions.**
Status *Published in HAL, single author.*

2022 **Machine learning methods applied to the global modeling of event-driven pitch angle diffusion coefficients during high-speed streams.**
Status *Published in Frontiers Physics, with G. Kluth, J.F. Ripoll, A. Fischer, M. Mougeot, and E. Camporeale.*

April 2021 **KFC: A clusterwise supervised learning procedure based on aggregation of distances.**
Status *Published in Journal of Statistical Computation and Simulation, with A. Fischer and M. Mougeot.*

EDUCATION

2022 - Present **CNRS, LPSM - Université Paris Cité and LMD - École Normale Supérieure, France**
Title **Postdoctoral researcher in atmospheric science**
Research topic Reconstruct Gravity Wave Momentum Flux using statistical and machine learning methods.

2018 - 2022 **Sorbonne University Pierre and Marie Curie - Paris 6, France**
Title **Ph.D. in Applied Mathematics**
Research topic Consensual aggregation and distance measurements for statistical learning.
Theoretical contributions and applications to the field of energy.

2018 **University Paris Diderot - Paris 7, France**
Title **Master's degree in Random Modelling and Data Science (M2MO)**
Project Data Science for Company, Massive Data Processing (`R`-programming).
Courses Statistical Learning, Statistical Modeling, Diffusion Statistics, Stochastic Calculus.
Machine Learning (`Python`), Monte Carlo Method (`C++`).

2018 **École Nationale Supérieure d'Informatique pour l'Industrie et l'Enterprise - ENSIIE, France**
Title **Engineering's degree in Applied Mathematics**
Project Time Series, Simulation Methods, Research Project in Finance, Machine Learning.
Courses Stochastic Process, Operation Research, Stochastic Calculus in Finance.
Data Analysis, Numerical Methods for PDE, `C++`.

2015 **Royal University of Phnom Penh - RUPP, Cambodia**
Title **Bachelor's degree in pure mathematics**

LANGUAGES & PROGRAMMING

Languages Khmer (Mother tongue), English (fluent), French (conversational)
Programming **R**: `tensorflow`, `caret`, `tidyverse`, `dplyr`, `ggplot`, `plotly`, ...
Python: `Numpy`, `Pandas`, `TensorFlow`, `Scikit-learn`, `PySpark`, `PyTorch`, ...
Others: SQL, C++, Matlab, Scilab, LaTeX.

PERSONAL INTEREST

Reading Mathematics, Behavioral science and meditation.
Sport Volleyball, basketball and football.
Other interest Music, guitar, and drawing.