Romain **Tavenard**

ASSISTANT PROFESSOR, UNIVERSITÉ DE RENNES 2

16, rue Louis Rossel, 35000 Rennes, France
37, married, father of 3

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Experience

Assistant Professor   *Rennes, France*

UNIVERSITÉ DE RENNES 2   *Since 2013*

• Littoral, Environnement, Télédétection, Géomatique (Geography) lab, headed by Prof. Samuel Corgne
• Statistics-Computer Science department (deputy director from 2014 to 2019)

Post-Doctoral Researcher   *Martigny, Switzerland*

IDIAP RESEARCH INSTITUTE   *2011 - 2013*

• Perception group, headed by Dr. Jean-Marc Odobez
• Swiss National Science Foundation (SNSF) scholarship

PhD Student and Teaching Assistant   *Rennes, France*

UNIVERSITÉ DE RENNES   *2007 - 2011*

• TexMex (multimedia) group, headed by Dr. Patrick Gros
• French ministry of research scholarship

Research Intern   *Amsterdam, Netherlands*

CENTRUM VOOR WISKUNDE EN INFORMATICA – CWI   *2006 - 2007*

• Intelligent and Autonomous Systems Department, headed by Prof. Éric Pauwels
• ENS Cachan scholarship (*Élève Normalien*)

Education

Inria / IRISA   *Rennes, France*

PhD DEGREE   *2007 - 2011*

• Title: "Indexing time series"
• Supervisor: Dr. Laurent Amsaleg (CNRS)
• Committee
  – Prof. Marie-Odile Cordier (Université de Rennes)
  – Prof. Philippe Joly (Université Paul Sabatier, Toulouse)
  – Prof. Hervé Glotin (Université Sud Toulon Var)
  – Dr. Stéphane Marchand Maillet (Université de Genève)
  – Dr. Patrick Gros (Inria)

École Normale Supérieure de Cachan   *Cachan, France*

ÉCOLE NORMALE SUPÉRIEURE DE CACHAN DIPLOMA   *2006 - 2008*

Université de Lyon / École Centrale de Lyon   *Lyon, France*

MSC DEGREE / ÉCOLE CENTRALE DE LYON DIPLOMA   *2003 - 2006*

Awards

"Prime d'Excellence Scientifique"   *France*

AWARD FOR SCIENTIFIC EXCELLENCE   *2017 - 2021*

Best poster award at IDA'17   *London, United Kingdom*

OBTAINED FOR PAPER "LEARNING DTW-PRESERVING SHAPELETS" [C9]   *2017*

Paper selected as cover paper for a journal issue

OBTAINED FOR PAPER "FUSED GROMOV-WASSERSTEIN DISTANCE FOR STRUCTURED OBJECTS" [J1] @ LINK   *2020*

Teaching

Administration

Deputy director of the Statistics-Computer Science department

Université de Rennes 2 *2014 - 2019*

- Also director *ad interim* between September 2017 and January 2018

C2i / Pix Coordinator

Université de Rennes 2 *2014 - 2020*

- In charge of the Pix (previously C2i) certification initiative at Université de Rennes 2

Master 1 Track Coordinator

Université de Rennes 2 *2020-*

- In charge of the "Data Science" track for the first year of the MSc in Statistics at Université de Rennes 2

Courses (selection)

Below is a selection of recent courses I have taught at Université de Rennes 2 and EDHEC Business School. When courses are taught jointly with colleagues, an asterisk is appended to the name of the course and the reported number of hours corresponds to my personal load. From my appointment as assistant professor at Université de Rennes 2 in 2013, my average teaching duty has been around 300 hours per year (*heures équivalent TD*).

Machine learning* (16 hours)   *Université de Rennes 2*

MSc in Statistics (M2) *2017 - 2020*

- In charge of the neural network / deep learning part of the course
- Joint course with Prof. Magalie Fromont

Deep learning (20 hours)   *EDHEC Business School (Lille)*

MSc in Data Analytics & Artificial Intelligence (M2) *2019 - 2020*

- Fully taught in English
- 100% remote version in 2020: Recorded classrooms, Google Colab notebooks

Text mining, Graph mining & Recommender systems* (10 hours)   *Université de Rennes 2*

MSc in Statistics (M2) *2017 - 2019*

- Main topics: neural networks, topic models, link analysis in graphs, collaborative filtering

Programming in Python (36 hours)   *Université de Rennes 2*

BSc level (L2) *2014 - 2020*

- Main topics: Python programming, Open Data and APIs

NoSQL databases (24 hours)   *Université de Rennes 2*

MSc in Statistics (M1) *2017 - 2020*

- Main topics: NoSQL, MongoDB

Databases (24 hours)   *Université de Rennes*

MSc level (M1) *2013 - 2017*

- SQL course for geography students

Service

Reviewer (selection)

OVER THE LAST 4 YEARS

- Grant proposal: ANR generic call (France), NWO KLEIN call (The Netherlands)
- Journals: DAMI, KAIS, Machine Learning (Springer), TGRS, TPAMI (IEEE), JMLR
- Conferences: NIPS, AISTATS, IJCAI, ECML/PKDD, KDD

PhD committee member

VERA SHALAEVA (EXAMINER)

Session chair

ECML/PKDD CONFERENCE   *2019*

Co-chair of a satellite workshop at ECML/PKDD

TIME SERIES WORKSHOP (AALTD, 2ND TO 5TH EDITIONS)   *2016 - 2020*

- Organization of a time series classification contest jointly with the workshop (2016, 22 participants)
- Co-editor of post-workshop LNCS proceedings [P1]

Event co-chair (with Dr. Thomas Corpetti & Prof. Nicolas Courty)   *Observatoire des Sciences de l'Univers, Rennes*

"TIME SERIES DAY"   *2013*

- Invitation of selected speakers, Practical organization

Supervision of research activities (selection)

Pierre Gloaguen

POST-DOCTORAL FELLOW   *2017 - 2019*

- Anomaly Detection in Trajectory Data
- Keywords: *Topic models, Continuous time modelling, Variational training*
- co-supervised with Prof. Chloé Friguet & Prof. Laetitia Chapel

Yichang Wang

PHD STUDENT   *2018 - 2021*

- Explainable Time Series Analysis [C1]
- Keywords: *shapelets, time series classification, explainable AI*
- co-supervised with Prof. Élisa Fromont, Prof. Rémi Emonet & Prof. Simon Malinowski

Titouan Vayer

PHD STUDENT   *2017 - 2020*

- Optimal Transport for Structured Data [C2, C3, J1]
- Keywords: *domain adaptation, graphs, time series, model regularization*
- co-supervised with Prof. Laetitia Chapel & Prof. Nicolas Courty

Adeline Bailly

PHD STUDENT   *2015 - 2018*

- Time Series Classification with Application to Remote Sensing [J3, J4, J5, C10, C11, C14]
- Keywords: *domain adaptation, local features, adversarial training*
- co-supervised with Prof. Laetitia Chapel

François Painblanc

MSc STUDENT (2019), THEN PHD STUDENT   *2019-2022*

- Time series generation using continuous time models
- Keywords: *Neural ODEs, Generative models, Recurrent neural Networks (RNNs)*
- co-supervised with Prof. Laetitia Chapel, Prof. Chloé Friguet & Prof. Pierre Gloaguen

Arthur Le Guennec

MSc STUDENT   *2016*

- Data Augmentation for Time Series Classification using CNNs [C12]
- Keywords: *Convolutional Neural Networks (CNNs), Data Augmentation*
- co-supervised with Prof. Simon Malinowski

Arnaud Lods

MSc STUDENT   *2017*

- Unsupervised Feature Extraction for Time Series [C9]
- Keywords: *Shapelets, CNNs, Siamese networks, Dynamic Time Warping (DTW)*
- co-supervised with Prof. Simon Malinowski

Anh N'Guyen

MSc student   *2014*

- Time Series Classification
- Keywords: *Local Features*
- co-supervised with Prof. Laetitia Chapel

Noé Brucy & Léo Henry

Master project   *2016-2017*

- Deep Learning for Model Inversion in Geo-hydrology
- co-supervised with Dr. Thomas Corpetti & Dr. Alain Crave (Geomorphology)

Management of research projects

Machine learning tools for time series (MATS)   *France, Ongoing*

Agence Nationale de la Recherche – ANR   *2019 - 2023*

- Principal Investigator

Bringing Optimal Transport and Machine Learning Together (OATMIL)   *France, Ongoing*

Agence Nationale de la Recherche – ANR   *2017 - 2021*

- Collaborator

Analysis of boat trajectory data (SESAME)   *France, Past*

Agence Nationale de la Recherche – ANR, ASTRID call (funded by Direction Générale de l'Armement)   *2017 - 2020*

- Work-package manager, local Principal Investigator

Spatio-Temporal Analysis by Recognition within Complex Images for Remote Sensing of Environment (ASTERIX)   *France, Past*

Agence Nationale de la Recherche – ANR   *2013 - 2017*

- Collaborator

Action recognition in videos using topic models (PROMOVAR)   *Switzerland, Past*

Swiss National Science Foundation – SNSF, post-doctoral fellowship   *2011 - 2013*

- Participated in the writing of the proposal and deliverables, recipient of the fellowship

Publications and software

Software

When publications are cited more than 10 times, the number of citations (according to Google Scholar on September, 25th, 2020) is reported.

⊙ tslearn: A Python machine learning toolkit for time series [J2]   *BSD-2-Clause license*

Creator and main developper   *Since May 2017*

- More than 10,000 single lines of Python/Cython code
- 20 contributors (4 active maintainers including myself)
- 94% of code coverage, automatic build tests, exhaustive documentation
- More than 1,000 "stargazers" on GitHub with background in machine learning, finance, astronomy, *etc.*

Journal articles

[J1]   T. Vayer, L. Chapel, R. Flamary, R. Tavenard, N. Courty. Fused Gromov-Wasserstein Distance for Structured Objects. *Algorithms*, 2020, 13, 212. ⏐@ web

[J2]   R. Tavenard, J. Faouzi, G. Vandewiele, F. Divo, G. Androz, C. Holtz, M. Payne, R. Yurchak, M. Rußwurm, K. Kolar, and E. Woods. tslearn: A machine learning toolkit dedicated to time-series data. *Journal of Machine Learning Research*, 2020. Cited 43 times. ⏐@ web

[J3]   A. Bailly, L. Chapel, R. Tavenard, and G. Camps-Valls. Nonlinear Time-Series Adaptation for Land Cover Classification. *IEEE Geoscience and Remote Sensing Letters*, 2017. ⏐ HAL @ DOI

[J4]   Z. Zhang, R. Tavenard, A. Bailly, X. Tang, P. Tang, and T. Corpetti. Dynamic Time Warping Under Limited Warping Path Length. *Information Sciences*, 393:91 – 107, July 2017. Cited 31 times. ⏐ HAL @ DOI

[J5]   A. Bailly, S. Malinowski, R. Tavenard, L. Chapel, and T. Guyet. Dense Bag-of-Temporal-SIFT-Words for Time Series Classification. In *Advanced Analysis and Learning on Temporal Data*. Springer, 2016. Cited 25 times. ⏐ HAL @ DOI

[J6]   R. Dupas, R. Tavenard, O. Fovet, N. Gilliet, C. Grimaldi, and C. Gascuel-Odoux.   Identifying seasonal patterns of phosphorus storm dynamics with dynamic time warping. *Water Resources Research*, 51(11):8868–8882, 2015. Cited 26 times. ⤓ HAL @ DOI

[J7]   R. Tavenard and L. Amsaleg. Improving the Efficiency of Traditional DTW Accelerators. *Knowledge and Information Systems*, 42(1):215–243, Jan. 2015. Cited 15 times. ⤓ HAL @ DOI

[J8]   A. Aubert, R. Tavenard, R. Emonet, A. De Lavenne, S. Malinowski, T. Guyet, R. Quiniou, J.-M. Odobez, P. Mérot, and C. Gascuel-Odoux. Clustering Flood Events from Water Quality Time-Series using Latent Dirichlet Allocation Model. Cited 22 times. *Water Resources Research*, 49(12):8187–8199, 2013. ⤓ HAL @ DOI

[J9]   A. A. Salah, E. Pauwels, R. Tavenard, and T. Gevers.   T-Patterns Revisited: Mining for Temporal Patterns in Sensor Data.   *Sensors*, 10(8):7496–7513, 2010. Cited 24 times. ⤓ HAL @ DOI

[J10] R. Tavenard, L. Amsaleg, and G. Gravier.   Model-based similarity estimation of multidimensional temporal sequences.   *Annals of Telecommunications*, 64(5):381–390, June 2009. ⤓ HAL @ DOI

INTERNATIONAL PEER-REVIEWED CONFERENCE ARTICLES

[C1]   Y. Wang, R. Emonet, E. Fromont, S. Malinowski, and R. Tavenard.   Adversarial Regularization for Explainable-by-Design Time Series Classification. Accepted for publication in *International Conference on Tools with Artificial Intelligence*, 2020.

[C2]   T. Vayer, L. Chapel, R. Flamary, R. Tavenard, and N. Courty.   Optimal Transport for structured data with application on graphs.   In *International Conference on Machine Learning*, Long Beach, United States, June 2019. Cited 38 times. ⤓ arXiv @ web

[C3]   T. Vayer, R. Flamary, R. Tavenard, L. Chapel, and N. Courty. Sliced Gromov-Wasserstein. In *Conference on Neural Information Processing Systems*, Vancouver, Canada, December 2019. Cited 11 times. ⤓ @ web

[C4]   M. Guilleme, S. Malinowski, R. Tavenard, and X. Renard. Localized Random Shapelets. In *International Workshop on Advanced Analysis and Learning on Temporal Data*, Germany, 2019. ⤓ HAL @ DOI

[C5]   M. Rußwurm, R. Tavenard, S. Lefèvre, and M. Körner.   Early Classification for Agricultural Monitoring from Satellite Time Series.   In *AI for Social Good Workshop at International Conference on Machine Learning*, USA, 2019. @ HAL

[C6]   D. Guijo-Rubio, P. Gutiérrez, R. Tavenard, and A. Bagnall. A Hybrid Approach to Time Series Classification with Shapelets. In *Proceedings of the Intelligent Data Engineering and Automated Learning*, pages 137–144, United Kingdom, 2019. ⤓ HAL @ DOI

[C7]   R. C. Sperandio, S. Malinowski, L. Amsaleg, and R. Tavenard.   Time Series Retrieval using DTW-Preserving Shapelets.   In *International Conference on Similarity Search and Applications*, Lima, Peru, October 2018. ⤓ HAL @ DOI

[C8]   B. B. Damodaran, N. Courty, and R. Tavenard.   Randomized Nonlinear Component Analysis for Dimensionality Reduction of Hyperspectral Images.   In *IEEE International Geoscience and Remote Sensing Symposium*, Houston, United States, July 2017. ⤓ HAL @ DOI

[C9]   A. Lods, S. Malinowski, R. Tavenard, and L. Amsaleg.   Learning DTW-Preserving Shapelets.   In *International Symposium on Intelligent Data Analysis*, pages 198–209, London, United Kingdom, Oct. 2017. ⤓ HAL @ DOI

[C10] R. Tavenard, S. Malinowski, L. Chapel, A. Bailly, H. Sanchez, and B. Bustos.   Efficient Temporal Kernels between Feature Sets for Time Series Classification.   In *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery*, Skopje, Macedonia, Sept. 2017. ⤓ HAL @ DOI

[C11] A. Bailly, D. Arvor, L. Chapel, and R. Tavenard. Classification of MODIS Time Series with Dense Bag-of-Temporal-SIFT-Words: Application to Cropland Mapping in the Brazilian Amazon.   In *IEEE International Geoscience and Remote Sensing Symposium*, Beijing, China, July 2016. ⤓ HAL @ DOI

[C12] A. Le Guennec, S. Malinowski, and R. Tavenard. Data Augmentation for Time Series Classification using Convolutional Neural Networks. In *ECML/PKDD Workshop on Advanced Analytics and Learning on Temporal Data*, Riva Del Garda, Italy, Sept. 2016. Cited 108 times. ⤓ HAL @ web

[C13] R. Tavenard and S. Malinowski.   Cost-Aware Early Classification of Time Series.   In *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery*, pages 632–647, Riva del Garda, Italy, Sept. 2016. Cited 22 times. ⤓ HAL @ DOI

[C14] A. Bailly, S. Malinowski, R. Tavenard, T. Guyet, and L. Chapel. Bag-of-Temporal-SIFT-Words for Time Series Classification. In *ECML/PKDD Workshop on Advanced Analytics and Learning on Temporal Data*, Porto, Portugal, Sept. 2015. Cited 17 times. ⤓ HAL @ ISSN

[C15] S. Malinowski, T. Guyet, R. Quiniou, and R. Tavenard.   1d-SAX: A Novel Symbolic Representation for Time Series.   In *International Symposium on Intelligent Data Analysis*, pages 273–284, United Kingdom, 2013. Cited 61 times. ⤓ HAL @ DOI

[C16] R. Tavenard, R. Emonet, and J.-M. Odobez. Time-Sensitive Topic Models for Action Recognition in Videos. In *IEEE International Conference on Image Processing*, Melbourne, Australia, Sept. 2013. Cited 10 times. ⤓ HAL @ DOI

[C17] H. Jégou, R. Tavenard, M. Douze, and L. Amsaleg.   Searching in one billion vectors: re-rank with source coding.   In *IEEE International Conference on Acoustics, Speech and Signal Processing*, pages 861–864, Prague, Czech Republic, May 2011. Cited 225 times. ⤓ HAL @ DOI

[C18] R. Tavenard, H. Jégou, and L. Amsaleg.   Balancing clusters to reduce response time variability in large scale image search.   In *International Workshop on Content-Based Multimedia Indexing*, Madrid, Spain, June 2011. Cited 27 times. ⤓ HAL @ DOI

[C19] E. Pauwels, A. A. Salah, and R. Tavenard. Sensor Networks for Ambient Intelligence. In *IEEE Workshop on Multimedia Signal Processing*, Chania, Greece, Oct. 2007. Cited 63 times. ⎙ HAL @ DOI

[C20] R. Tavenard, A. A. Salah, and E. Pauwels. Searching for Temporal Patterns in AmI Sensor Data. In *Constructing Ambient Intelligence*, pages 53–62, Darmstadt, Germany, Nov. 2007. Cited 22 times. ⎙ HAL @ DOI

Proceedings (as editor)

[P1] V. Lemaire, S. Malinowski, A. Bagnall, A. Bondu, T. Guyet, and R. Tavenard Advanced Analytics and Learning on Temporal Data. 4th ECML PKDD Workshop, AALTD 2019, Würzburg, Germany, September 20, 2019. @ DOI