Thibault Vatter

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https://tvatter.github.io

EDUCATION

PHD IN STATISTICS | HEC, University of Lausanne (HEC Lausanne) — Sep 2012 – Mar 2016
Lausanne, Switzerland
- Thesis: Generalized Additive Models For Multivariate Distributions
- Advisor: Prof. Valérie Chavez-Demoulin (HEC Lausanne)

MS IN PHYSICS | Swiss Federal Institute of Technology, Lausanne (EPFL) — Sep 2010 – Aug 2012
Lausanne, Switzerland
- Minor in Financial Engineering, Swiss Finance Institute
- Thesis: Views Integration in a Quantitative Portfolio Allocation

BS IN PHYSICS | Swiss Federal Institute of Technology, Lausanne (EPFL) — Sep 2006 – Aug 2010
Lausanne, Switzerland

ACADEMIC APPOINTMENTS

ASSISTANT PROFESSOR | Department of Statistics, Columbia University — July 2018 – Present
New York, USA

POST-DOCTORAL RESEARCHER | Department of Statistics, Columbia University — Mar 2017 – Jun 2018
New York, USA
- Supervisor: Prof. Richard Davis
- Obtained a Swiss NSF's grant for the project "Solving Estimating Equations With Copulas"

POST-DOCTORAL RESEARCHER | opLab, HEC Lausanne — Aug 2016 – Dec 2016
Lausanne, Switzerland
- Supervisor: Prof. Suzanne de Treville
- Analyzed 1.5 years of intra-daily sales for >4'000 products in 10 retail stores.
- Developed a forecasting system of peak intra-daily demand using quantile regression forests.

POST-DOCTORAL RESEARCHER | Chair of Statistics, EPFL — May 2016 – Dec 2016
Lausanne, Switzerland
- Supervisor: Prof. Anthony C Davison
- Worked on the homogenization of climate records.
- Developed a method combining robust statistics and generalized additive models to detect and correct non-climatic inhomogeneities (e.g., relocations or instrumentation upgrades).

VISITING SCHOLAR | Yu Research Group, UC Berkeley — Sep 2012 – Mar 2013
Berkeley, CA
- Supervisor: Prof. Bin Yu
- Analyzed intra-daily foreign exchange rates data using time-frequency decompositions.
- Developed a tool to extract trends and periodic patterns in high-frequency financial data.

INDUSTRY EXPERIENCE

JUNIOR QUANT ENGINEER | swissQuant Group AG — Sep 2015 – Apr 2016
Zurich, Switzerland
- Worked as a consultant for the Chicago Mercantile Exchange to develop a risk model for >1'000 futures, vanilla, and exotic products on energy commodities.
- Dealt with alpha research and day-to-day operations of a quant fund in the asset management division.

GRADUATE RESEARCH INTERN | Swissquote Bank Ltd — Feb 2012 – Aug 2012
Gland, Switzerland
- Worked on methods to combine an investor's subjective market views and quantitative portfolio allocation (from Black-Litterman to Meucci).
- Prototyped the methods to prepare their integration within the bank's digital wealth management tool.

SEMESTER PROJECTS | Swissquote Bank Ltd — Sep 2010 – Jun 2011
Gland, Switzerland
- Modeled the dependence structure of daily equity returns with graph-theoretic tools.
- Developed filtering and visualization tools for large correlation matrices.

PUBLICATIONS

PUBLISHED

Vatter, **T.** & Nagler, T. (2018). Generalized Additive Models for Pair-Copula Constructions. *Journal of Computational and Graphical Statistics*, *27*(4), 715–727 — 2018

Kulkarni, V., Tagasovska, N., **Vatter**, **T.**, & Garbinato, B. (2018). Generative Models for Simulating Mobility Trajectories. In *Neurips 2018 workshop on control and decision making in spatiotemporal domain* — 2018

Ackerer, D. & **Vatter**, **T.** (2017). Dependent Defaults and Losses with Factor Copula Models. *Dependence Modeling*, *5*, 375–399 — 2017

Vatter, **T.** & Chavez-Demoulin, V. (2015, October). Generalized additive models for conditional dependence structures. *Journal of Multivariate Analysis*, *141*, 147–167 — 2015

Vatter, **T.**, Wu, H.-T., Chavez-Demoulin, V., & Yu, B. (2015). Non-Parametric Estimation of Intraday Spot Volatility: Disentangling Instantaneous Trend and Seasonality. *Econometrics*, *3*(4), 864–887 — 2015

PREPRINTS

Nagler, T. & **Vatter**, **T.** (2019). Solving Estimating Equation With Copulas. arXiv: 1801.10576 — 2019

Tagasovska, N., **Vatter**, **T.**, & Chavez-Demoulin, V. (2019). Nonparametric Quantile-Based Causal Discovery. *Submitted to the International Conference on Machine Learning Research (ICML2019)*. arXiv: 1801.10579 — 2019

IN PREPARATION

Tagasovska, N., **Vatter**, **T.**, & Ackerer, D. (2019). Vine Copula Autoencoders — 2019

Ackerer, D., **Vatter**, **T.**, & Tagasovska, N. (2019a). Autoencoded Scenario Generation — 2019

Ackerer, D., **Vatter**, **T.**, & Tagasovska, N. (2019b). Deep Smoothing of the Implied Volatility Surface — 2019

Vatter, **T.**, Nagler, T., & Ackerer, D. (2019). High-Dimensional Vine Copulas with Financial Applications — 2019

de Treville, S., Hofstetter, J., & **Vatter**, **T.** (2019). Using Point-of-Sale Data To Improve Shelf Replenishment Performance — 2019

GRANTS

EARLY POSTDOC.MOBILITY

18 months research grant from the Swiss NSF for the project "Solving Estimating Equations with Copulas" — 2017

TALKS

Solving Estimating Equations with Copulas. *Statistics Seminar*, MIT, Boston. — 2018

Solving Estimating Equations with Copulas. *Seminar on Statistics and Risk Management*, Munich, Germany. — 2018

Generalized Additive Models for Pair-Copula Constructions. *Conference of the ERCIM WG on Methodological and Computational Statistics*, London, England. — 2017

Dependent Defaults and Losses with Factor Copula Models. *Dependence Modeling in Finance, Insurance and Environmental Science*, Munich, Germany. — 2016

Dependent Defaults and Losses with Factor Copula Models. *Quant Seminar, swissQuant Group AG*, Zurich, Switzerland. — 2015

Easy Ways to Speed Up Your Computations: an Overview on R Packages `parallel` and `Rcpp`. *Young Researchers' Conference in Applied Probability and Statistics*, Neuchâtel, Switzerland. — 2015

Generalized Additive Models for Conditional Dependence Structures. *Mathematische Statistik Seminar at the Technische Universität München*, Munich, Germany. — 2014

Generalized Additive Models for Conditional Dependence Structures. *Conference of the ERCIM WG on Methodological and Computational Statistics*, Pisa, Italy. — 2014

Getting Into R for Non-Statisticians.*PhDNet Seminars at HEC Lausanne*, Switzerland.
Parallel Computing: an Overview. *PhDNet Seminars at HEC Lausanne*, Switzerland. — 2014

Conditional Copulas: from Generalized Additive Models to Pair-Copula Constructions. *ISI PhD Days at HEC Lausanne*, Switzerland. — 2014

Non-Parametric Estimation of Intraday Spot Volatility: Disentangling Instantaneous Trend and Seasonality. *International Conference on Computation and Financial Econometrics*, London, England. 2013

Generalized Additive Modelling for Conditional Copulas. *Young Researchers' Conference in Applied Probability and Statistics*, Lausanne, Switzerland. 2013

Generalized Additive Modelling for Conditional Copulas. *Séminaires Statistiques de l'IRAM at Université de Strasbourg*, Strasbourg, France. 2013

Adaptive and Non-Parametric Intraday Seasonality Modeling. *Coleman Fung Risk Management Research Center at UC Berkeley*, Berkeley, USA. 2013

Adaptive and Non-Parametric Intraday Seasonality Modeling. *Bin Yu Research Group at UC Berkeley*, Berkeley, USA. 2013

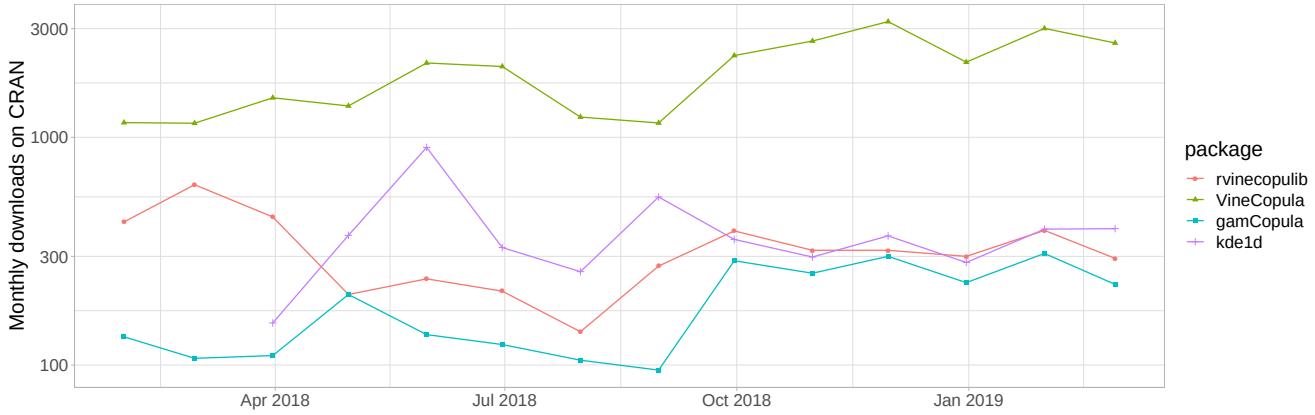
POSTERS

Generalized Additive Models for Pair-Copula Constructions. *CRM-CANSSI Workshop on dependence modeling tools for risk management*, Montreal, Canada. 2017

Generalized Additive Models for Conditional Dependence Structures. *CRM-CANSSI Workshop on New Horizons in Copula Modeling*, Montreal, Canada. 2014

Generalized Additive Models for Conditional Dependence Structures. *Summer School of the CUSO Statistics and Applied Probability*, Leukerbad, Switzerland. 2014

OPEN-SOURCE SOFTWARE



RVINECOPULIB
R package that provides an interface to vinecopulib
https://cran.r-project.org/web/packages/rvinecopulib

GAMCOPULA
R package that provides tools to apply generalized additive models to bivariate dependence structures and non-simplified vine copulas (see **Vatter** and Chavez-Demoulin, 2015; **Vatter** and Nagler, 2018).
https://cran.r-project.org/web/packages/gamCopula

VINECOPULA
R package that provides tools for the statistical analysis of vine copula models
https://cran.r-project.org/web/packages/VineCopula

KDE1D
R package that provides tools for univariate kernel density estimation
https://cran.r-project.org/web/packages/kde1d/index.html

VINECOPULIB
High-performance C++ library for vine copula modeling based on `Boost` and `Eigen`
https://github.com/vinecopulib/vinecopulib

COPULADAG
R package for copula-based causal discovery and directed acyclic graphs (see Tagasovska et al., 2019)
https://github.com/tvatter/copulaDAG

EECOP
R package that provides tools to solve estimating equations with copulas (see Nagler and **Vatter**, 2019)
https://github.com/tvatter/eecop

MGPANCESTRY
Python code to scrap the Mathematical Genealogy Project for a scholar's ancestry.
https://github.com/tvatter/mgpancestry

INTRADAYSST
MATLAB and C code that provides tools to extract trends and seasonality from intraday financial data, companion code for the paper by Vatter et al. (2015).
https://github.com/tvatter/intradaySST

TEACHING ACTIVITIES

ASSISTANT PROFESSOR | Columbia University — Jul 2019 – Present
New York, USA
- Taught GU4204 and GR5204 "Statistical Inference".
- Taught GU4221 and GR5221 "Time Series".
- Created the syllabus, course material, exercises and exams.

AJUNCT FACULTY | HEC Lausanne — Feb 2018 – Jun 2018
Lausanne, Switzerland
- Taught "Data Science for Business Analytics".
- Created the syllabus, course material, exercises and exams.

LECTURER | Columbia University — Sep 2017 – Dec 2017
New York, USA
- Taught GU4700 "Mathematical Methods for Political Science".
- Created the syllabus, course material, exercises and exams.

FIRST ASSISTANT | EPFL — Sep 2016 – Dec 2016
Lausanne, Switzerland
- Assisted prof. Amin Shokrollahi in teaching linear algebra to 200 first-year students.
- Taught four ex-cathedra classes.
- Worked on the preparation of the sections.

FIRST ASSISTANT | HEC Lausanne — Mar 2013 – Aug 2015
Lausanne, Switzerland
- Assisted prof. Valérie Chavez-Demoulin in teaching statistics to 900 first-year students.
- Handled the exams by creating and managing multiple choice questionnaires with automated marking.
- Modernized the syllabus towards on statistical computing using a browser-based RStudio interface.

TEACHING ASSISTANT | EPFL — Sep 2007 – Jun 2010
Lausanne, Switzerland
- Assisted various professors by preparing and supervising exercise sessions.
- C++ (for Prof. Jean-Cédric Chappelier)
- Fluid Mechanics, Electromagnetism, Oscillations and Wave Phenomena (for Prof. Marco Grioni)
- Classical Mechanics and Thermodynamics (for Prof. Cécile Hébert)
- Classical Mechanics and Thermodynamics (for Prof. Rolf Gruetter)
- Physics Laboratory (for Dr. François Patthey) .

OTHER

REVIEWING ACTIVITIES
• Journal of Multivariate Analysis (JMVA) • The Annals of Applied Statistics (AOAS)
• Computational Statistics and Data Analysis (CSDA) • Biometrics
• Journal of Operations Management (JOM) • Econometrics and Statistics (ECOSTA)
• Dependence Modeling (DEMO) • Statistical Methods & Applications (SMA)
• Statistics and Computing (STCO)

PROGRAMMING SKILLS
• R • Python • C++ • SQL • LaTeX • Git • Markdown • Mathematica • MATLAB

LANGUAGES
• English (full professional proficiency) • French (native) • German (basic)

OTHER
• Air sports (obtained a private pilot licence on a Robin DR400)
• Mountain sports