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

POST-DOCTORAL RESEARCHER | Department of Statistics, Columbia University — March 2017 – Today
New York, USA
- Supervisor: Prof. Richard Davis
- Obtained a Swiss NSF's 18 months 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 AND PREPRINTS

Vatter, T., Chavez-Demoulin, V., 2015. "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

Ackerer, D.**, Vatter, T.,** 2017. "Dependent Defaults and Losses with Factor Copula Models." *Dependence Modeling.* To appear. arXiv: 1610.03050 2017

Vatter, T., Nagler, T., 2017. "Generalized Additive Models for Pair-Copula Constructions." *Journal of Computational and Graphical Statistics.* Second revision. arXiv: 1608.01593 2017

IN PREPARATION

Vatter, T., Nagler, T., 2018. "Solving Estimating Equations with Copulas " 2018

Tagasovska, N.**, Vatter, T.**, Chavez-Demoulin, V., 2018. "Nonparametric Copula-based Causal Discovery " 2018

De Treville, S., Hofstetter, J.**, Vatter, T.,** 2018. "Using Point-of-Sale Data To Improve Shelf Replenishment Performance " 2018

OPEN-SOURCE SOFTWARE

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

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 2017).
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

COPULADAG
R package for copula-based causal discovery and directed acyclic graphs (see Tagasovska, Vatter, and Chavez-Demoulin 2018)
https://github.com/tvatter/copulaDAG

MDMD
R package that provides tools to model multivariate discrete mixture distributions
https://github.com/tvatter/mdmd

EECOP
R package that provides tools to solve estimating equations with copulas (see Vatter and Nagler 2018)
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

GRANTS

EARLY POSTDOC.MOBILITY
18 months research grant from the Swiss NSF for the project "Solving Estimating Equations with Copulas" 2017

TALKS

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. 2014
Parallel Computing: an Overview. *PhDNet Seminars at HEC Lausanne*, Switzerland.

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

TEACHING ACTIVITIES

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) • Computational Statistics and Data Analysis (CSDA)
- Journal of Operations Management (JOM) • Statistical Methods & Applications (SMA)
- Statistics and Computing

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

REFERENCES

VALERIE CHAVEZ-DEMOULIN | Professor of Statistics
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RICHARD DAVIS | Howard Levene Professor of Statistics
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Duke University
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