

Associate Professor

Department of Mathematics
University of Salzburg
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Director IDA Lab Salzburg

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PROFILES

Google scholar profile
Scopus Author ID: 25652347200
ORCID: 0000-0002-7131-1944

PERSONAL
INFORMATION

Date of Birth: 14.01.1977
Place of Birth: Lienz, Tirol (Austria)
Citizenship: Austria

RESEARCH
INTERESTS

Probability Theory & Mathematical Statistics, Fractals, Analysis

- Copulas and Dependence Modeling
- Multivariate and Nonparametric Statistics
- Dynamical Systems (in discrete time)
- Fractals, Singular Functions and Iterated Function Systems
- Markov Operators and Kernels
- Statistics with Imprecise Data
- Lineability, spaceability, etc.

Applied Statistics & Data Science

- Probabilistic fundamentals of Machine Learning
- Forecasting and Regression Techniques
- Feature Selection
- Dependence Modeling of processes
- Automatic Reporting with R and MikTeX (kniTR, Sweave)
- Interactive Dashboards with R-shiny, interactive graphics with plotly

PEER-REVIEWED
JOURNAL
PUBLICATIONS -
MATHEMATICS
(SORTED BY
ACCEPTANCE DATE)

- [40] T. Kasper, S. Fuchs, **W. Trutschnig**: On weak conditional convergence of bivariate Archimedean and Extreme Value copulas, and consequences to nonparametric estimation, to appear in *Bernoulli* (2020)
- [39] S. Fuchs, **W. Trutschnig**: On quantile-based co-risk measures and their estimation, to appear in *Dependence Modeling* (2020)
- [38] F. Durante, J. Fernández Sánchez, C. Ignazzi, **W. Trutschnig**: On extremal problems for pairs of uniformly distributed sequences and integrals with respect to copula measures, *Uniform Distribution Theory* **15**(2), 99–112 (2020), doi:10.2478/udt-2020-0013
- [37] J. Fernández Sánchez, J.B. Seoane-Sepúlveda, **W. Trutschnig**: Lineability, algebrability, and sequences of random variables, to appear in *Mathematische Nachrichten* (2020)
- [36] J. Fernández Sánchez, D.L. Rodríguez-Vidanes, J.B. Seoane-Sepúlveda, **W. Trutschnig**: Lineability, differentiable functions and special derivatives, *Banach Journal of Mathematical Analysis* **15**, 18 (2021), doi:10.1007/s43037-020-00103-9
- [35] L. Bernal-González, J. Fernández Sánchez, J.B. Seoane-Sepúlveda, **W. Trutschnig**: Highly tempering infinite matrices II: From divergence to convergence via Toeplitz-Silverman matrices, *Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas* **114**, 202 (2020), doi:10.1007/s13398-020-00934-z

- [34] R.R. Junker, F. Griessenberger, **W. Trutschnig**: Estimating scale-invariant directed dependence of bivariate distributions, *Computational Statistics and Data Analysis* **153**, 107058 (2021), doi:10.1016/j.csda.2020.107058
- [33] J. Fernández Sánchez, D.L. Rodríguez-Vidanes, J.B. Seoane-Sepúlveda, **W. Trutschnig**: Lineability and integrability in the sense of Riemann, Lebesgue, Denjoy, and Khintchine, *Journal of Mathematical Analysis and Applications* **492**(1), 124433 (2020), doi:10.1016/j.jmaa.2020.124433
- [32] N. Kamnitui, **W. Trutschnig**: On some properties of reflected maxmin copulas, *Fuzzy Sets and Systems* **393**, 53-74 (2020), doi:10.1016/j.fss.2019.07.007
- [31] J. Fernández Sánchez, **W. Trutschnig**: Nested square roots of 2 revisited, *American Mathematical Monthly* **127**(4), 344-351 (2020), doi:10.1080/00029890.2020.1707059
- [30] T. Mroz, **W. Trutschnig**: A sharp inequality for Kendall's τ and Spearman's ρ of Extreme-Value Copulas, *Dependence Modeling* **6**, 369-376 (2018), doi:10.1515/demo-2018-0021
- [29] N. Kamnitui, Ch. Genest, P. Jaworski, **W. Trutschnig**: On the size of the class of bivariate extreme-value copulas with a fixed value of Spearman's rho or Kendall's tau, *Journal of Mathematical Analysis and Applications* **472**(1), 920-936 (2019), doi:10.1016/j.jmaa.2018.11.057
- [28] F. Durante, J. Fernández Sánchez, **W. Trutschnig**: Spatially homogeneous copulas, *Annals of the Institute of Statistical Mathematics* **72**(2), 607-626 (2020), doi:10.1007/s10463-018-0703-8
- [27] M. Coblentz, O. Grothe, M. Schreyer, **W. Trutschnig**: On the Length of Copula Level Curves, *Journal of Multivariate Analysis* **167**, 347-365 (2018), doi:10.1016/j.jmva.2018.06.001
- [26] N. Kamnitui, J. Fernández Sánchez, **W. Trutschnig**: Maximum asymmetry of copulas revisited, *Dependence Modeling* **6**(1), 47-62 (2018), doi:10.1515/demo-2018-0003
- [25] J. Fernández Sánchez, **W. Trutschnig**: A note on singularity of a recently introduced family of Minkowski's question-mark functions, *Comptes rendus Mathématique* **355**(9), 956-959 (2017), doi:10.1016/j.crma.2017.09.009
- [24] F. Durante, J. Fernández Sánchez, **W. Trutschnig**: Baire category results for quasi-copulas, *Dependence Modeling* **4**, 215-223 (2016), doi:10.1515/demo-2016-0012
- [23] **W. Trutschnig**, M. Schreyer, J. Fernández Sánchez: Mass distributions of two-dimensional extreme-value copulas and related results, *Extremes* **19**, 405-427 (2016), doi:10.1007/s10687-016-0249-1
- [22] M. Schreyer, R. Paulin, **W. Trutschnig**: On the exact region determined by Kendall's tau and Spearman's rho, *Journal of the Royal Statistical Society: Series B (Statistical Methodology)* **79** (2), 613-633 (2017), doi:10.1111/rssb.12181
- [21] J. Fernández Sánchez, **W. Trutschnig**: Singularity aspects of Archimedean copulas, *Journal of Mathematical Analysis and Applications* **432**, 103-113 (2015), doi:10.1016/j.jmaa.2015.06.036
- [20] F. Durante, J. Fernández Sánchez, **W. Trutschnig**: A typical copula is singular, *Journal of Mathematical Analysis and Applications* **430**, 517-527 (2015), doi:10.1016/j.jmaa.2015.05.009
- [19] F. Durante, J. Fernández Sánchez, **W. Trutschnig**: Baire category results for exchangeable copulas, *Fuzzy Sets and Systems* **284**, 146-151 (2016), doi:10.1016/j.fss.2015.04.010
- [18] F. Durante, J. Fernández Sánchez, **W. Trutschnig**: Solution to an open problem about a transformation on the space of copulas, *Dependence Modeling* **2**, 65-72 (2014), doi:10.2478/demo-2014-0005
- [17] F. Durante, J. Fernández Sánchez, **W. Trutschnig**: On the singular components of a copula, *Journal of Applied Probability* **52**, 1175-1182 (2015), doi:10.1239/jap/1450802760
- [16] F. Durante, J. Fernández Sánchez, **W. Trutschnig**: Multivariate copulas with hairpin support, *Journal of Multivariate Analysis* **130**, 323-334 (2014), doi:10.1016/j.jmva.2014.06.009

- [15] J. Fernández Sánchez, **W. Trutschnig**: Conditioning based metrics on the space of multivariate copulas and their interrelation with uniform and levelwise convergence and Iterated Function Systems, *Journal of Theoretical Probability* **28**, 1311-1336 (2015), doi:10.1007/s10959-014-0541-4
- [14] J. Fernández Sánchez, **W. Trutschnig**: Some members of the class of (quasi-)copulas with given diagonal from the Markov kernel perspective, *Communications in Statistics - Theory and Methods* **45**, 1508-1526 (2016), doi:10.1080/03610926.2013.864856
- [13] **W. Trutschnig**, J. Fernández Sánchez: Copulas with continuous, strictly increasing singular conditional distribution functions, *Journal of Mathematical Analysis and Applications* **410**, 1014-1027 (2014), doi:10.1016/j.jmaa.2013.09.032
- [12] F. Durante, J. Fernández Sánchez, **W. Trutschnig**: On the interrelation between Dempster-Shafer Belief Structures and their Belief Cumulative Distribution Functions, *Knowledge-Based Systems* **52**, 107-113 (2013), doi:10.1016/j.knosys.2013.07.012
- [11] E. de Amo, M. Díaz Carrillo, J. Fernández Sánchez, **W. Trutschnig**: Some results on homeomorphisms between fractal supports of copulas, *Nonlinear Analysis Series A: Theory, Methods & Applications* **85**, 132-144 (2013), doi:10.1016/j.na.2013.02.027
- [10] **W. Trutschnig**: On Cesáro convergence of iterates of the Star Product of Copulas, *Statistics and Probability Letters* **83**, 357-365 (2013), doi:10.1016/j.spl.2012.09.025
- [9] **W. Trutschnig**, J. Fernández Sánchez: Some results on shuffles of two-dimensional copulas, *Journal of Statistical Planning and Inference* **143**, 251-260 (2013), doi:10.1016/j.jspi.2012.07.017
- [8] **W. Trutschnig**, J. Fernández Sánchez: Idempotent and multivariate copulas with fractal support, *Journal of Statistical Planning and Inference* **142**, 3086-3096 (2012), doi:10.1016/j.jspi.2012.06.012
- [7] **W. Trutschnig**: Some results on the convergence of (quasi-) copulas, *Fuzzy Sets and Systems* **191**, 113-121 (2012), doi:10.1016/j.fss.2011.06.013
- [6] **W. Trutschnig**: On a strong metric on the space of copulas and its induced dependence measure, *Journal of Mathematical Analysis and Applications* **384**, 690-705 (2011), doi:10.1016/j.jmaa.2011.06.013
- [5] A. Colubi, G. González-Rodríguez, M.A. Gil, **W. Trutschnig**: Nonparametric criteria for supervised classification of fuzzy data, *International Journal of Approximate Reasoning* **52**, Issue 9, 1272-1282 (2011), doi:10.1016/j.ijar.2011.05.007
- [4] **W. Trutschnig**: Characterization of the sendograph-convergence of fuzzy vectors by means of their L_p - and levelwise convergence, *Fuzzy Sets and Systems* **161** (8), 1064-1077 (2010), doi:10.1016/j.fss.2009.07.005
- [3] **W. Trutschnig**, G. González-Rodríguez, A. Colubi, M.A. Gil: A new family of metrics for compact, convex (fuzzy) sets based on a generalized concept of mid and spread, *Information Sciences* **179**, 3964-3972 (2009), doi:10.1016/j.ins.2009.06.023
- [2] G. González-Rodríguez, A. Colubi, **W. Trutschnig**: Simulation of fuzzy random variables, *Information Sciences* **179**, 642-653 (2009), doi:10.1016/j.ins.2008.10.018
- [1] **W. Trutschnig**: A strong consistency result for fuzzy relative frequencies interpreted as estimator for the fuzzy-valued probability, *Fuzzy Sets and Systems* **159**, 259-269 (2008), doi:10.1016/j.fss.2007.05.017

PEER-REVIEWED
JOURNAL
PUBLICATIONS -
INTERDISCIPLINARY

- [13] M. Wagner, A.C. Bathke, S.C. Cary, T.G.A. Green; R.R. Junker, **W. Trutschnig**, U. Ruprecht: Myco- and photobiont associations in crustose lichens in the McMurdo Dry Valleys (Antarctica) reveal high differentiation along an elevational gradient, *Polar biology* **43**, 1967-1988 (2020), doi:10.1200/JCO.20.01442
- [12] A.S. Berghoff, M. Gansterer, A.C. Bathke, **W. Trutschnig**, P. Hungerländer, J. Berger, J. Kreminger, A. Starzer, R. Schmidt, W. Lamm, M. Raderer, A. Gottlieb, N. Mauser, M. Preusser: SARS-CoV-2 testing in 1016 consecutive cancer patients treated at a tertiary care hospital during the COVID-19 pandemic, *Journal of Clinical Oncology* **38**(30), 3547-3554 (2020), doi:10.1200/JCO.20.01442

- [11] R.R. Junker, M. Hanusch, X. He, V. Ruiz-Hernández, J.C. Otto, S. Kraushaar, K. Bauch, F. Griessenberger, L.-M. Ohler, **W. Trutschnig**: Ödenwinkel: An Alpine platform for observational and experimental research on the emergence of multidiversity and ecosystem complexity, *Web Ecology* **20**, 95-106 (2020), doi:10.5194/we-20-95-2020
- [10] R. Schuster, M.L. Schreyer, T. Kaiser, T. Berger, J.P. Klein, S. Moritz, A.R. Laireiter, **W. Trutschnig**: Effects of intense assessment on statistical power in randomized controlled trials: Simulation study on depression, *Internet Interventions* **20**, 100313 (2020), doi:10.1016/j.invent.2020.100313
- [9] W. Senker, H. Stefanits, M. Gmeiner, **W. Trutschnig**, Ch. Radl, A. Gruber: The Influence of Age on the Peri- and Postoperative Clinical Course in Patients Undergoing Minimally Invasive Transforaminal Lumbar Interbody Fusion Techniques of the Lumbar Spine, *Clinical Neurology and Neurosurgery* **182**, 25-31 (2019), doi:10.1016/j.clineuro.2019.04.025
- [8] W. Senker, H. Stefanits, M. Gmeiner, **W. Trutschnig**, Ch. Radl, A. Gruber: The Impact of Type 2 Diabetes on the Peri- and Postoperative Outcomes of Minimally Invasive Fusion Techniques in the Lumbar Spine, to appear in *Journal of Neurosurgical Sciences*, 2018 JUL 17 (2018), doi:10.23736/S0390-5616.18.04467-3
- [7] J.H. Parkinson, R. Kutil, J. Kuppler, R.R. Junker, **W. Trutschnig**, A.C. Bathke: A Fast and Robust Way to Estimate Overlap of Niches, and Draw Inference, *International Journal of Biostatistics* **14**(2) (2018), doi:10.1515/ijb-2017-0028
- [6] W. Senker, H. Stefanits, M. Gmeiner, **W. Trutschnig**, I. Weinfurter, A. Gruber: Does obesity affect peri- and postoperative morbidity and complication rates after minimal access spinal technologies (MAST) in surgery for lumbar degenerative disc disease?, *World Neurosurgery*, **111**, e374–e385 (2018), doi:10.1016/j.wneu.2017.12.075
- [5] J. Kuppler, M. Höfers, **W. Trutschnig**, A.C. Bathke, J. Eiben, C.C Daehler, R. Junker: Exotic flower visitors exploit large floral trait spaces resulting in asymmetric resource partitioning with native visitors, *Functional Ecology* **31**(12), 2244–2254 (2017), doi:10.1111/1365-2435.12932
- [4] M. Wagner, **W. Trutschnig**, A.C. Bathke, U. Ruprecht: A first approach to calculate BIOCLIM variables and climate zones for Antarctica, *Theoretical and Applied Climatology* **131**, 1397–1415 (2018) doi:10.1007/s00704-017-2053-5
- [3] S. Pittner, B. Ehrenfellner, A. Zissler, V. Racher, **W. Trutschnig**, A.C. Bathke, A.M. Sängler, W. Stoiber, P. Steinbacher, F.C. Monticelli: First application of a protein based approach for time since death estimation, *International Journal of Legal Medicine* **131**(2), 479–483 (2017), doi:10.1007/s00414-016-1459-4
- [2] R.R. Junker, J. Kuppler, A.C. Bathke, M.L. Schreyer, **W. Trutschnig**: Dynamic range boxes - A robust non-parametric approach to quantify size and overlap of n -dimensional hypervolumes, *Methods in Ecology and Evolution* **7**(12), 1503–1513 (2016), doi:10.1111/2041-210X.12611
- [1] P. Ranacher, R. Brunauer, **W. Trutschnig**, S. Van der Spek, S. Reich: Why GPS makes distances bigger than they are, *International Journal of Geographical Information Science* **30**, 316-333 (2016), doi:10.1080/13658816.2015.1086924
(open access, 9.000 reads in the period October 2015 - January 2016)

SUBMITTED FOR
PUBLICATION -
MATHEMATICS

- [3] F. Durante, J. Fernández Sánchez, **W. Trutschnig**, M. Úbeda-Flores: On the size of subclasses of quasi-copulas and their Dedekind-MacNeille completion
- [2] F. Griessenberger, J. Fernández Sánchez, **W. Trutschnig**: Some properties of double shuffles of bivariate copulas and (extreme) copulas invariant with respect to Lüroth double shuffles
- [1] T. Mroz, S. Fuchs, **W. Trutschnig**: How simplifying and flexible is the simplifying assumption in pair-copula constructions – some analytic answers in dimension three and beyond, preprint on arXiv

- SUBMITTED FOR PUBLICATION - INTERDISCIPLINARY
- [4] E. Gfrerer, D. Laina, G. Danae, M. Gibernau, R. Fuchs, M. Happ, T. Tolasch, **W. Trutschnig**, A. Hörger, H.P. Comes, S. Dötterl: Phenotypic selection on hyperdiverse floral scents in deceptive *Arum maculatum* (Araceae) north vs. south of the Alps
 - [3] S. Pittner, A. Albers, Ch. Matzenauer, A. Zissler, **W. Trutschnig**, F. C. Monticelli: The temperature method for PMI estimation is significantly influenced by injuries
 - [2] W. Senker, H. Stefanits, M. Gmeiner, **W. Trutschnig**, Ch. Radl, A. Gruber: The Influence of Smoking on the Peri- and Postoperative Complication Rate in Minimally Invasive Fusion Technologies of the Lumbar Spine
 - [1] W. Senker, H. Stefanits, M. Gmeiner, **W. Trutschnig**, Ch. Radl, A. Gruber: MAY - The Peri- and Postoperative Morbidity Rate of Minimally Invasive Fusion Techniques of the Lumbar Spine in Older Patients
- IN PREPARATION - MATHEMATICS
- [2] J. Fernández Sánchez, **W. Trutschnig**, M. Tschimpke: Markov product invariance in classes of bivariate copulas characterized by univariate functions
 - [1] T. Mroz, **W. Trutschnig**, J. Fernández Sánchez: Distributions with fixed marginals maximizing the mass of the endograph of a function
- BOOKS AND BOOK CHAPTERS
- [8] F. Griessenberger, **W. Trutschnig**: Estimating Asymmetric Dependence via Empirical Checkerboard Copulas, in A. Pollice, N. Salvati, S. Spagnolo (Eds) *Book of Short Papers SIS 2020*, pp. 304–309 (2020), [link to pdf](#)
 - [7] **W. Trutschnig**: Complete dependence everywhere?, in M. Úbeda Flores, E. de Amo Artero, F. Durante, J. Fernández Sánchez (Eds) *Copulas and Dependence Models with Applications - Contributions in Honor of Roger B. Nelsen*, pp. 225-240, Springer (2017), doi:10.1007/978-3-319-64221-5
 - [6] F. Durante, J. Fernández Sánchez, **W. Trutschnig**: Singular copulas, Oberwolfach Reports, 2015(20), 40-43, doi:10.4171/OWR/2015/20
 - [5] **W. Trutschnig**, J. Fernández Sánchez: Some consequences of the Markov kernel perspective of copulas, in K. Glau, M. Scherer, R. Zagst (Eds) *Innovations in Quantitative Risk Management*, Springer Proceedings in Mathematics & Statistics, Volume 99, pp. 393-409, Springer Berlin/Heidelberg (2014), doi:10.1007/978-3-319-09114-3_23
 - [4] **W. Trutschnig**: Some smoothing properties of the Star Product of copulas, in: R. Kruse et al. (Eds) *Synergies of Soft Computing and Statistics for Intelligent Data Analysis*, Series: Advances in Intelligent and Soft Computing, Volume 190, Part 4, pp. 349-357, Springer Berlin/Heidelberg (2013), doi:10.1007/978-3-642-33042-1_38
 - [3] **W. Trutschnig**: Idempotent copulas with fractal support, in: S. Greco et al. (Eds) *Communications in Computer and Information Science*, Series: Advances in Computational Intelligence, Volume 298, Part 3, pp. 161-170, Springer Berlin/Heidelberg (2012), doi:10.1007/978-3-642-31715-6_18
 - [2] C. Borgelt, G. González-Rodríguez, **W. Trutschnig**, M.A. Lubiano, M.A. Gil, P. Grzegorzewski, O. Hryniewicz (Eds): *Combining Soft Computing and Statistical Methods in Data Analysis*, Series: Advances in Intelligent and Soft Computing, Vol. 77, Springer Berlin/Heidelberg (2010), doi:10.1007/978-3-642-14746-3
 - [1] M.A. Lubiano, **W. Trutschnig**: ANOVA for fuzzy random variables Using the R-package SAFD in: C. Borgelt et al. (Eds): *Combining Soft Computing and Statistical Methods in Data Analysis*, Series: Advances in Intelligent and Soft Computing, Vol. 77, pp. 449-456, Springer Berlin/Heidelberg (2010), doi:10.1007/978-3-642-14746-3_56
- SHORTLIST POSITIONS
- Full professorship §99 UG 'Statistics' at the University of Klagenfurt, 1st place (11/2019), not invited to negotiations
 - Associate professorship 'Statistics' at the University of Bozen, 2nd place (10/2017)
 - Full professorship §98 UG 'Applied Statistics' at the Technical University Graz, 3rd place (02/2017)

- HONORS
- Gambrinus Fellowship of the Technical University of Dortmund (DE); collaboration partner: Prof. Dr. Karl Friedrich Siburg (06/2019)
 - Winner of the University of Salzburg's Kurt-Zopf-Förderpreis 2018 (for the paper [22])
 - Winner of the University of Salzburg's Excellence in Teaching Award (category: best lecture); for the course 'Fractals and Chance' (05/2017)
 - Winner of the Austrian Statistical Association's price for dissertations in Mathematical Statistics (2007)
 - Excellence Scholarship of the Vienna University of Technology (1996-1999, 2002)
- EDITORIAL WORK
- Associate Editor for Biometrical Journal
 - Associate Editor for Econometrics and Statistics (EcoSta)
 - Guest Co-editor for the Dependence Modeling Special Issue for the Salzburg workshop on Dependence Models & Copulas
 - Editorial Advisory Board member of Dependence Modeling (appointed for the period 2018-01-01 till 2021-12-31)
 - Editorial Board member of Fuzzy Sets and Systems
 - Editorial Board member of Austrian Journal of Statistics
- REFEREE
- Applied Mathematics Letters, Austrian Journal of Statistics, Bernoulli, Chaos, Solitons & Fractals, Communications in Statistics, Computational Statistics and Data Analysis, Computers and Mathematics with Applications, Dependence Modeling, Econometrics, Electronic Journal of Statistics, European Actuarial Journal, Extremes, Fuzzy Sets and Systems, IEEE Transactions on Fuzzy Systems, Information Sciences, International Journal of Approximate Reasoning, International Journal of Geographical Information Science, International Journal of Uncertainty, Journal of Mathematical Analysis and Applications, Journal of Multivariate Analysis, Journal of Statistical Planning and Inference, Journal of the American Statistical Association, Knowledge-Based Systems, Kybernetika, Letters in Biomathematics, Mathematical Reviews, Mechanical Systems and Signal Processing, Metrika, Risks, Soft Computing, Statistics & Probability Letters, TEST
- SCIENTIFIC COMMITTEES
- Co-Chair of the specialized team on Dependence Models and Copulas within the ERCIM Workgroup on Computational and Methodological Statistics (together with Fabrizio Durante)
 - Management committee member (rep. Austria) of the ICT COST Action IC1408 CRoNoS (Computationally-intensive methods for the robust analysis of non-standard data)
 - Local Co-Organizer of the 10th International Workshop on Simulation and Statistics, September 02-06 2019, Salzburg, Austria
 - Chair of the Austrian Stochastic Days 2017 (as satellite meeting of the ÖMG-DMV congress 2017), September 12-13, Salzburg, Austria
 - Organizer of the session *Recent advances in dependence modelling and optimization* at the Workshop on Copulas and Their Applications celebrating the 75th birthday of Roger B. Nelsen, July 03-05, 2017, Almería, Spain
 - Co-Organizer of the sessions *Dependence models and copulas I-IV* at the CMStatistics 2016, December 09-11 2016, Seville, Spain (together with Fabrizio Durante)
 - Chair of the Salzburg Workshop on Dependence Models and Copulas, September 19-22 2016, Salzburg, Austria
 - Co-Organizer of the session *Data Analysis with Dependence Models* at the SMPS 2016, September 12-14 2016, Rome, Italy (together with Fabrizio Durante)
 - Co-Organizer of the sessions *Dependence models and copulas I-III* at the CMStatistics 2015, December 12-14 2015, London, UK (together with Fabrizio Durante)

- Organizer of the session *Copulas* at the Österreichische Statistiktage 2015, October 21-23 2015, Vienna, Austria
- Co-Organizer of the sessions *Dependence models and copulas: Theory* and *Dependence models and copulas: Applications* at the ERCIM 2014, December 6-8 2014, Pisa, Italy (together with Fabrizio Durante)
- Co-Organizer of the sessions *Mathematical Aspects of Copulas I + II*, *Dependence Models in Environmental Sciences* at the ERCIM 2013, December 14-16 2013, Senate House, University of London, London, UK (together with Fabrizio Durante)
- Organizer of the sessions *Copulas I-III* at the ERCIM 2012, December 1-3 2012, Conference Centre, Oviedo, Spain
- Co-Chair of the Fifth International Conference on Soft Methods in Probability and Statistics SMPS 2010, September 28 - October 1 2010, Oviedo/Mieres, Spain
- Organizer of the session *Statistics with fuzzy or incomplete data* at the ERCIM 2009, October 29-31 2009, Grand Resort Hotel, Limassol, Cyprus

INVITED TALKS
(SINCE 2011)

- *Quantifying And Estimating Asymmetric Dependence*, at the 10th International Workshop on Simulation and Statistics, September 02-06 2019, Salzburg, Austria
- *Quantifying asymmetric dependence with the R-package qad*, at the Symposium: Ecology — Geomorphology — Statistics, March 28-29 2019, Salzburg, Austria (*keynote speaker*)
- *The Markov product of copulas revisited*, at the CMStatistics 2018 (ERCIM 2018), December 14-16 2018, Pisa, Italy
- *On the interrelation between Kendall's τ and Spearman's ρ* , at the International Statistics Festival Ulm, September 17-18 2018, University of Ulm, Germany
- *Stochastic, dynamical and topological aspects of copulas*, at the 7th Austrian Stochastics Days, September 13-14 2018, Vienna University of Economics and Business, Austria (*keynote speaker*)
- *Complete dependence everywhere?*, at the Workshop on Copulas and Their Applications celebrating the 75th birthday of Roger B. Nelsen, July 03-05, 2017, Almería, Spain
- *Complete dependence everywhere?*, Vienna University of Technology, May 08 2017, Vienna, Austria
- *Three copula-based optimization problems and an excursion*, at the CMStatistics 2016, December 09-11 2016, Seville, Spain
- *On sharp inequalities between Kendall's τ and Spearman's ρ* , at the CMStatistics 2015, December 12 2015, London, UK
- *Some remarks on singular components of copulas*, at the ERCIM 2014, December 06 2014, Pisa, Italy
- *Viewing copulas as special Markov kernels - some consequences*, IFAS Seminar, November 06 2014, Linz, Austria
- *Copulas from the Markov kernel perspective*, at the First Joint International Meeting of the UMI (Italian Mathematical Union), the SIMAI (Italian Society for Applied and Industrial Mathematics), the RSME (Royal Spanish Mathematical Society), SCM (Catalan Mathematical Society), and the SEMA (Spanish Society for Applied Mathematics), July 2 2014, Bilbao, Spain
- *Very singular copulas*, at the ERCIM 2013, December 14 2013, Senate House, University of London, London, UK
- *Some useful and surprising consequences of the Markov kernel perspective of two-dimensional copulas*, Österreichische Statistiktage 2013, October 24 2013, Statistik Austria, Vienna, Austria
- *Some useful and surprising consequences of the Markov kernel perspective of two-dimensional copulas*, within the Workshop Copula modeling: New challenges and techniques, September 9 2013, Technical University of Munich, Munich, Germany

- *The Markov kernel perspective of two-dimensional copulas and some useful and surprising consequences*, June 13 2013, Department of Mathematics, University of Salzburg, Salzburg, Austria
- *Copulas from the Markov kernel point of view*, at the [ERCIM 2012](#), December 2 2012, Conference Centre, Oviedo, Spain
- *Some (smoothing and non-smoothing) properties of the star product of copulas*, at the 6th International Conference on Soft Methods in Probability and Statistics, [SMPS 2012](#), October 6 2012, Konstanz, Germany
- *A nonparametric dependence measure for random variables based on the one-to-one correspondence between copulas and Markov operators*, at the 58th Session of the International Statistical Institute, [ISI 2011](#), August 26 2011, Dublin, Ireland
- *The R-package SAFD for Statistical Analysis of Fuzzy Data*, at the 58th Session of the International Statistical Institute, [ISI 2011](#), August 25 2011, Dublin, Ireland
- *A nonparametric dependence measure for random variables based on the one-to-one correspondence between copulas and Markov operators*, at the 8th International Conference on Computational Management Science, [CMS 2011](#), April 29 2011, Neuchatel, Switzerland

TEACHING
EXPERIENCE

University of Salzburg, Salzburg, Austria

Associate/Assistant Professor

since 10/2013

- (Mathematical) Statistics (Lecture and Exercise for Bachelor Students in Mathematics, 2+1h, 5th Semester), 6 times
- Fractals and Chance (Lecture for Bachelor/Master Students of Mathematics, 2h), 3 times
- Applied (mathematical) Statistics (Lecture and exercise for Bachelor Students in Mathematics, 2h, 6th semester), 3 times
- PhD Seminar Statistics (for PhD Students in Mathematics, 1h), together with [Arne Bathke](#), 12 times
- (Elementary) Regression Methods & Computational Statistics (Lecture for Master Students in Data Science, 2h), 3 times
- Dependence Modelling (Lecture and Exercise for Master and PhD Students in Mathematics, 3h)
- Markov Processes in discrete time (Lecture for Master Students in Mathematics, 2h)
- Statistics, Visualization and More Using R (Seminar/Computer Lab for Master- and PhD Students in Psychology and Master Students in Data Science, 2h), 4 times
- Introductory statistics for earth scientists (Lecture and exercise for Bachelor Students in Geology, 2h), 2 times
- Interpreting and Presenting Statistical Analyses (Seminar for Master Students in Data Science, 2h), together with [Arne Bathke](#), 2 times
- Case Studies (Seminar for Master Students in Data Science, 2h), together with [Nikolaus Augsten](#), [Arne Bathke](#) and [Roland Kwitt](#), 2 times
- R Introduction via Applied Statistics (Seminar/Computer Lab for PhD Students in Psychology, 2h), together with [Walter Gruber](#), 3 times
- Scientific Computing with Matlab and R (Lecture/Exercise for Bachelor Students in Mathematics, 3h), together with [Lothar Banz](#)
- R for advanced users (Seminar/Computer Lab for PhD Students in Psychology, 2h), together with [Walter Gruber](#), 2 times
- Mathematical Software R/Matlab/Mathematica (Lecture for Bachelor Students in Mathematics, 3h), together with [Lothar Banz](#) and [Andreas Schröder](#), 2 times
- Automatic reporting with knitR (training and further education for employees of University Salzburg, 1h)
- (Basic) Mathematics for Neuroscientists (for PhD students of the DK Imaging the Mind, 1h)
- Refresher course Applied Statistics (training and further education for employees of University Salzburg, 1h)
- Stochastic modeling (Exercise for Students of Mathematics, 4th Semester, 2h), 2 times
- Mathematics I and Mathematics II (Exercise for Students of Material Sciences, 2h)

European Centre for Soft Computing, Mieres, Spain

Lecturer

2010 - 2012

- Introduction to R (Seminar/Lecture)
- R Computer Lab

Vienna University of Technology, Vienna, Austria

Teaching assistant

1999 - 2008

- Measure and Probability Theory (Exercise), 3 times
- Applied Statistics for Mathematicians (Exercise), 3 times
- Introduction to Probability Theory and Statistics (Exercise), 3 times
- Mathematics 1-3 for Electrical Engineers (Exercise), 3 times
- Introduction to Probability Theory and Statistics for Computer Scientists (Exercise), 3 times

SUPERVISION
(PHD)

University of Salzburg, Salzburg, Austria

- Thimo Kasper (PhD student in Mathematics), since 05/2019
- Florian Griessenberger (PhD student in Mathematics), since 11/2018
- Julian von Schleinitz (PhD student in Data Science), together with [Andreas Schröder](#), since 10/2018
- Thomas Mroz (part-time PhD student in Mathematics), since 10/2015
- Noppadon Kamnitui: *Special Classes of Copulas and their Properties*, finished 10/2019
- Manuela Schreyer: *Some new results in copula theory*, finished 10/2018

SUPERVISION
(MASTER)

University of Salzburg, Salzburg, Austria

- Alexander Roßmann (Master student in Mathematics), since 03/2020
- Nina Marie Schmitzberger (Master student in Mathematics, in collaboration with BMW group), since 02/2020
- Marco Tschimpke (Master student in Mathematics): Markov product invariance in classes of bivariate copulas characterized by univariate functions since, finished 12/2020
- Lukas Klaffenböck (Master student in Mathematics): The consistency of the CART-Algorithm and a special case of random forests, finished 12/2020
- Iris Rammelmüller (Master student in Mathematics, in collaboration with Noemi Castelletti from HelmholtzZentrum münchen): *Biological-Based Models of Carcinogenesis in the Lung from Radiation in the Eldorado cohort*, finished 09/2020
- Klemens Kurtz (Master student in Data Science, in collaboration with KTM Innovation GmbH): *Sensor failure prediction on MotoGP motorcycles*, finished 09/2020
- Simone Müller (Master student in Data Science): *Nightclub detection with image classification using convolutional neural networks*, finished 09/2019
- Marcel Steger (Master student in Data Science, in collaboration with Porsche Informatik): *Methods for Feature Selection*, finished 08/2019
- Florian Griessenberger (Master student in Mathematics): *Measure-theoretic properties of copulas & Quantification of dependence*, finished 10/2018
- Guido Friesacher (Master student in Mathematics): *Analyzing log-returns using Copulas*, finished 10/2016
- Eva Andrea Eder (student teacher in Mathematics/Biology): *Fraktale - Von der Natur inspiriert und durch die Mathematik in die heutige Zeit integriert*, finished 05/2016

European Centre for Soft Computing, Mieres, Spain

- Julia Lastra: *Teoría de Cópulas - Cópulas con soporte fractal*, within the Master in Advanced Mathematics (University of Almería), finished 09/2013, together with [Enrique de Amo Artero](#)
- Héctor Fernández Martínez: *Product demand prediction*, within the Master in Soft Computing and Intelligent Data Analysis, finished 07/2010, together with [Ana Colubi](#)

SUPERVISION
(BACHELOR)

University of Salzburg, Salzburg, Austria

- Martin Geroldinger, *Zeitreihenanalysen und Prognosen: Theorie und Anwendung*, finished 09/2020
- Wanda Lauth, *Gemischte Lineare Modelle: Theorie und Anwendung zur Beschreibung der Arbeitsmoral*, finished 01/2020
- Selina Miller, *Regression: eine Anwendung zu 'Time Since Death Estimation' und mathematische Resultate zur Kernel-Regression*, finished 09/2019
- Florian Günther, *Spieltheorie und Nash-Gleichgewicht*, finished 08/2019
- Nina Marie Schmitzberger: *Visualisieren von Daten in R mit ggplot2, lineare und nicht-parametrische Regression und deren Anwendung in der 'Carotisstudie'*: finished 08/2018
- Jakob Schmollgruber: *Markov Ketten und Random Walk*, finished 01/2017
- Philipp Schwartenbeck: *Frequentist and Bayesian parameter estimation*, finished 12/2016
- Gianna Liehr: *Julia Mengen*, finished 11/2016
- Victoria Racher: *Eine Anwendung multipler linearer Regression und Grundzüge der Bayes Statistik auf 'Time Since Death Estimation'*, finished 09/2016
- Lukas Helminger: *Maximierung der Masse des Graphen/Endographen einer nicht fallenden Transformation innerhalb der Klasse der Copulae*, finished 08/2016
- Florian Griessenberger: *Parametrische und nichtparametrische Regression und ihre Anwendung*, finished 07/2016
- Sebastian Heintze: *Periodische Punkte und chaotische Eigenschaften von Funktionen*, finished 06/2016

SERVICE TO THE
UNIVERSITY

- Member of the working group on quality development in teaching (AG QE Studium und Lehre), University of Salzburg, since 10/2018
- Member of the Curricularkommission for Mathematics, University of Salzburg, 2016 - 2019
- Member of the Curricularkommission for Data Science, University of Salzburg, since 2016
- Deputy-chairman of the appointment committee for the §99 full professorship (Stiftungsprofessur) for Data Science at the University Salzburg, 2017/2018
- Jury member for the University of Salzburg's Excellence in Teaching Award (2018)
- Referee for the Marie Andessner Preise für Diplom- und Masterarbeiten 2017
- Coaching for female students (Bachelor Mathematics), together with Bettina Sereinig
- Active member of the Math2School-Team
- Core faculty member of the Data Science Salzburg initiative

SOFTWARE

R-packages:

- **qad**: A copula-based measure for quantifying asymmetry in dependence and associations (together with Florian Griessenberger and Robert R. Junker)
- **Chaos game**: Plot fractal words in dimension two and three (together with Manuela Schreyer)
- **dynRB**: Calculate niche size and overlap using dynamic range boxes (together with Manuela Schreyer, Robert R. Junker, Jonas Kuppler, Arne Bathke)

THIRD-PARTY
FUNDING

Chaos Game (Talente: Praktika für Schülerinnen und Schüler 2020), University of Salzburg, Salzburg, Austria

Supervisor

2020 -

- Improving the R-package ChaosGame
- Funded by Österreichische Forschungsförderungsgesellschaft mbH

IDA Lab Salzburg (Lab for Intelligent Data Analytics), University of Salzburg, Salzburg, Austria

Director

2020 -

- Establishment of a research center with 4 research teams (lead by 4 postdocs, for 5 years)
- Funded by Land Salzburg (within the WISS 2025)
- Applied research in statistics and machine learning

Sensor failure prediction on MotoGP motorcycles, University of Salzburg, Salzburg, Austria

Project leader 2019 -

- Predictive Maintenance MotoGP sensors
- Funded by [KTM Innovation GmbH](#)

Wohnbaudatenbank (Analyse und GUI), University of Salzburg, Salzburg, Austria

Project leader (together with Arne Bathke) 2019 -

- Data analytics Wohnbaudaten
- Funded by the province of Salzburg (im Rahmen der Wohnbauforschungsmittel)

KFZ, University of Salzburg, Salzburg, Austria

Project leader (together with Roland Kwitt) 2019 -

- Basic research in statistics and machine learning
- Supervision of 2 fulltime PhD students in Data Science (for 3 years)
- Funded by [Porsche Informatik](#) and [Land Salzburg](#) (within the [WISS 2025](#))

Successional Generation of Functional Multidiversity, University of Salzburg, Salzburg, Austria

Cooperation partner of START price winner Robert R. Junker 2018 -

- Responsible for the development of statistical methods for the quantification of asymmetric dependence and the supervision of 1 PhD student (for 3 years)
- [Der Standard](#) article on the project (in German)

Data Analytics in Industrial Environments, University of Salzburg, Salzburg, Austria

Project leader (together with Roland Kwitt) 2018

- Data Science: Production of the Future, Smart Sales and Customer Analytics
- For [Siemens Austria](#), Vienna, Austria

Forecasting material requirements, University of Salzburg, Salzburg, Austria

Project leader 2018

- Forecasting techniques, merging of different data sources
- For [HAI - Hammerer Aluminium Industries](#), Ranshofen, Austria

Data Science Endowed Professorship, University of Salzburg, Salzburg, Austria

Co-applicant (together with Arne Bathke) 2018 - 2023

- Data Science Endowed Professorship (5 years) at the University of Salzburg, funded by the province of Salzburg, the City of Salzburg and the Federation of Austrian Industries

NIRS Analysis, University of Salzburg, Salzburg, Austria

Project leader 2017

- Analysis Near Infrared Spectroscopy (NIRS) data
- For [Universitätsklinik für Anästhesiologie, perioperative Medizin und allgemeine Intensivmedizin](#), Salzburg, Austria

Analysis questionnaire data Diacerein for EBS, University of Salzburg, Salzburg, Austria

Project leader 2016

- Statistical testing for positive treatment effects
- For [Prof. Dr. Johann Bauer/EB-Haus Austria](#)

Prozessdatenanalyse Walzenproduktion, University of Salzburg, Salzburg, Austria

Assistant project leader 2015

- Detection of possible factors relevant for product quality
- Development of an R-shiny app to simplify data analysis for experts
- For [Eisenwerk Sulzau-Werfen](#)

- SIMOP II project**, European Centre for Soft Computing, Mieres, Spain
Project leader 2012 - 2013
- In collaboration with Alimerka and Nortia (local Spanish companies)
 - Analysis/quantification of the effect of product offers to sales numbers of related products
- SIMOP I project**, European Centre for Soft Computing, Mieres, Spain
Project leader 2011 - 2012
- In collaboration with Alimerka and Nortia (local Spanish companies)
 - Optimization of the delivery system of an Asturian supermarket chain based on the forecasting of daily sales numbers of products during offer and non-offer periods
- Cajacash-project**, European Centre for Soft Computing, Mieres, Spain
Operating project member 2010
- In collaboration with cajastur (Asturian savings bank)
 - Forecasting daily withdrawn amounts at cash machines (ATMs) to improve the cash delivery system
- MICINN-project**, European Centre for Soft Computing, Mieres, Spain
Project leader (since 2011) 2010 - 2012
- Project of the Spanish ministry for research and innovation
 - Basic research on flexible (linear) regression models for imprecise data
- CORRELATE.AT
PROJECTS
(INCOMPLETE LIST)
- IPTV pattern detection**
For A1 2019
- Pattern detection in and classification of IPTV data
 - Graphical illustration of the main results
- HR-Analytics**
For ÖBB 2018
- Statistical data analysis concerning ten predefined hypotheses
 - Graphical illustration of the main results
- Statistical Data Analysis in Medicine**
For Landeskrankenhaus Amstetten 2016 - 2017
- Statistical data analysis concerning MAST in obese patients
- Confirmed by customer**
For T-Mobile Austria 2015
- Hexagonal binning and aggregation of speed measurements by customers
 - Illustration of the results
- Breitbandanalyse Bundesland Salzburg (together with SBR-net Consulting AG)**
For the province of Salzburg, Austria 2015
- Analysis of the status quo
 - Collection, cleaning and aggregation of all relevant data sources on a 100 × 100 meter grid
- Analysis CTU Data**
For Specure (as subcontractor in their project with Czech Telecommunication Office) 2015
- Plausibility checking, heavy user filtering, data aggregation and visualization
 - Implementation in R and SQL
- Opening Hours Illustration**
For Stadtgemeinde Baden, Austria 2015
- Analysis of the collected data and summarization of the most important findings in pretty and easy to interpret graphics
 - Publication of the results in the Baden Passion magazine

CONSULTING & FREELANCE EXPERIENCE (INCOMPLETE LIST)	<p>A1 Telekom Austria, Vienna, Austria 2008 - 2012</p> <ul style="list-style-type: none"> • Assistance and support in the development of automated reports for ticket flows • Data mining radius data • Simulation and Backtesting Voice/mobile broadband with selectable geographical parameters, Implementation in R • Development of a Q-Voice sampling plan for Austria based on the geographical distribution of the population, Implementation in R • Data mining Scanner-data • Assistance and support in the development of automated mag backbone reports via Sweave • Assistance and support in the development of automated TEMS reports for all mag countries <p>Allianz Insurance Austria, Vienna, Austria 2006 - 2010</p> <ul style="list-style-type: none"> • Development of a forecasting model for losses caused by hail based on POH grid-data from ZAMG Austria, Implementation in R • Geographical (meteorological) risk-zoning of Austria concerning natural hazards, Implementation in R • Development of a stochastic model for flood damages given right-censored historical data, Implementation in SAS and R • Analysis of the interrelation of empirical flood damages and the Austrian HORA project (HOchwasser Risikozonierung Austria)
EDUCATION	<p>University of Salzburg & Vienna University of Technology</p> <p>PD, Habilitation in Mathematics, May 2018</p> <ul style="list-style-type: none"> • Thesis title: <i>New perspectives and recent results in dependence modeling and copulas</i> <p>PhD, Mathematics, April 2006 (with distinction)</p> <ul style="list-style-type: none"> • Thesis title: <i>Fuzzy Probability Distributions</i> • Adviser: Prof. Dr. R. Viertl <p>MSc, Mathematics, September 2001 (summa cum laude)</p> <ul style="list-style-type: none"> • Thesis title: <i>Iterated Function Systems and Chaos Game</i> • Adviser: Prof. Dr. M. Blümlinger
APPOINTMENTS	<p>University of Salzburg, Salzburg, Austria</p> <p><i>Associate Professor</i> since 07/2018</p> <ul style="list-style-type: none"> • Department of Mathematics • Basic research, applied projects and teaching in the field of probability theory and statistics <p><i>Assistant Professor (with qualification agreement)</i> 10/2014 - 06/2018</p> <ul style="list-style-type: none"> • Department of Mathematics • Basic research, applied projects and teaching in the field of probability theory and statistics <p><i>Univ.Ass. Postdoc</i> 10/2013 - 09/2014</p> <ul style="list-style-type: none"> • Department of Mathematics • Basic research and teaching in the field of probability theory and statistics

European Centre for Soft Computing, Mieres, Spain

Associate Researcher 01/2011 - 07/2013

- Research Unit for Intelligent Data Analysis
- Basic research in the field of probability theory and statistics: copulas, dependence measures and statistics with imprecise data
- Applied research in statistics/data mining: applied projects with local companies, with emphasis on forecasting problems

Postdoc Researcher 07/2008 - 12/2010

- Research Unit for Intelligent Data Analysis
- Basic research in the field of probability theory and statistics: copulas, dependence measures and statistics with imprecise data
- Applied research in statistics/data mining: applied projects with local companies, with emphasis on forecasting problems

Vienna University of Technology, Vienna, Austria

Postdoc Research Assistant 01/2006 - 06/2008

- Institute for Statistics and Probability Theory
- Research project: Decision-making based on imprecise information, supported by the National Bank of Austria

National Bank of Austria, Vienna, Austria

Employee (part-time, 28 hours/week) 02/2004 - 12/2005

- Balance of Payments Division, Department of Statistics
- Financial Statistics Quality Control

Hutchison H3G 'Drei', Vienna, Austria

Employee (part-time, 20 hours/week) 09/2003 - 01/2004

- Department for Regulatory Affairs
- Invoicing and Reporting

University of Vienna, Vienna, Austria

Research Assistant (partially part-time) 11/2001 - 08/2003

- Institute for Mathematics
- Research in Ergodic Theory

LANGUAGE SKILLS Fluent in German and English
Intermediate in Spanish
School level in Latin