DR. CORNELIUS FRITZ

Curriculum Vitae
Assistant Professor ◇ fritzc@tcd.ie ◇ corneliusfritz.com
Lloyd Institute ◇ Dublin 2, Ireland

WORK EXPERIENCE

Assistant Professor   2024 - today
School of Computer Science and Statistics, Trinity College Dublin

Postdoctoral Fellow   2023 - 2024
Department of Statistics, Pennsylvania State University

Interim Professor for Data Science (representation of a vacant professorship)   2022 - 2023
Department of Statistics, Ludwig Maximilian University of Munich

Research Assistant   2019 - 2022
Department of Statistics, Ludwig Maximilian University of Munich

EDUCATION

Ph.D. in Statistics (summa cum laude, with distinction)   2019 - 2022
Ludwig Maximilian University of Munich

M.Sc. in Statistics   2016 - 2018
Ludwig Maximilian University of Munich

M.Sc. in Statistics, Visiting Student   2018
Universidad Complutense de Madrid

B.S. in Statistics with a minor in Sociology   2013 - 2016
Ludwig Maximilian University of Munich

LANGUAGE SKILLS

German   Native
English   Fluent
Spanish   Intermediate

TEACHING EXPERIENCE

Courses

- Foundations of Data Science (2024, Lecturer, undergraduate level)
- Statistical Analysis 3 (2024, Lecturer, undergraduate level)
- Sampling Theory (2022, Lecturer, undergraduate level)
- Applied Statistical Projects (2022, Lecturer and Supervisor, undergraduate level)
- Statistical Inference 2 (2020 and 2021, Teaching Assistant, graduate level)
- Statistical Inference 1 (2019 and 2020, Teaching Assistant, graduate level)
- Introduction to Statistical Software (R course) (2019, Lecturer, undergraduate level)

- Generalized Regression Models (2018 and 2019, Tutor, undergraduate level)

Seminars

- Modeling under Dependence (2022, graduate level)
- Statistical Modeling of Political Networks (2022, graduate level)
- Statistical Analysis of Social Networks (2021, graduate level)
- Complex Networks (2020, graduate level)

Tutorials

- Next-level Exponential Random Graph Models for large Networks, 3-hour workshop on the R package bigergm in Edinburgh June 2024 (with Michael Schweinberger)
- A Connected World: Data Analysis for Real-World Network Data, day-long Workshop in Munich, December 2022 & July 2023 (with Göran Kauermann and Giacomo De Nicola)

Supervision

- Daniel Seussler (Master Thesis on *"Identification of Health Risk Factors in Developing Countries using Intrinsic Model Selection Approaches"*, LMU Munich, 2023)
- Marc Schalberger (Master Thesis *"Exponential Random Graph Models for Signed Networks: Implementation and Application"*, LMU Munich, 2023)

HONORS AND AWARDS

Postdoc Travel Award - Pennsylvania State University 2023

To travel to the CMStatistics conference 2023, which will be carried out in Berlin in December 2023, I was awarded a postdoc travel award of $500 by the Office of Postdoctoral Affairs.

Best Dissertation Award - Ludwig Maximilian University of Munich 2023

The Munich University Association awarded me the Best Dissertation Award (Promotionsförderpreis 2023) for my dissertation entitled "Statistical Approaches to Dynamic Networks in Society", defended on July 27, 2022, and written under the supervision of Prof. Dr. Göran Kauermann. This award is only given to two LMU graduates per year in the college of mathematics, computer science, physics, and statistics.

Munich Center for Machine Learning (MCML) Certificate 2023

The MCML certificate was awarded to me for completing the MCML Ph.D. Program. I participated in the organizing committee of three conferences (DAGSTAT 2019, COSTNET COVID-19, and COSTNET 2020) and presented at various internal events within the MCML and the German AI Centers.

Best Poster Award - DAGSTAT 2022

Awarded for the poster *"Modelling large and dynamically growing bipartite networks - A case study in patent data"* presented at the DAGSTAT conference by Giacomo De Nicola, March 28-Apr 1, 2022, Hamburg, Germany

Core-member - CAS Focus Group on Policies for the Prevention of Conflict 2022

Led by Paul W. Thurner and Uwe Sunde, this focus group from the Center of Advanced Studies at the LMU organizes workshops and fosters interdisciplinary research to study conflict data.

Member - LMU Mentoring Program 2022

The mentoring program supports young scientists (doctoral students and postdocs) on their way to an academic career. Funds acquired through this program allowed me to visit collaborators in the United States and participate in international conferences.

Best Master Thesis Award - Department of Statistics, LMU 2019

Awarded for my master thesis *"Dynamic Social Network Models for Time-Stamped Data"* written under the supervision of Prof. Dr. Göran Kauermann.

GRANTS

DFG (German Research Foundation): Walter Benjamin Stipend 2023, PI $86,525$ EUR (≈ 92.352 USD)

RESEARCH

Publications under Review

[25]   Schalberger, M., & Fritz, C. (2025+). Scalable Signed Exponential Random Graph Models under Local Dependence. https://doi.org/10.48550/arXiv.2507.07660

[24]   Mehrl, M., Pfander, M., Winner, T., & Fritz, C. (2025+). Guardians of the regime: When and why autocrats create secret police. https://doi.org/10.48550/arXiv.2506.10194v1

[23]   Fritz, C., Rastelli, R., Fop, M., & Alberto, C. (2025+). Scalable durational event models: Application to physical and digital interactions. https://doi.org/10.48550/arXiv.2504.00049

[22]   Fritz, C., Schweinberger, M., Bhadra, S., & Hunter, D. R. (2025+). A regression framework for studying relationships among attributes under network interference. https://doi.org/10.48550/arXiv.2410.07555

[21]   Fritz, C., Georg, C.-P., Mele, A., & Schweinberger, M. (2025+). Vulnerability webs: Systemic risk in software networks [Under Review]. https://doi.org/10.48550/arXiv.2402.13375

Publications in Print

[20]   Espinosa-Rada, A., Lerner, J., & Fritz, C. (2025+). Socio-cognitive networks between researchers: Investigating scientific dualities with the group-oriented relational hyperevent model. *Social Networks*, *in print*. https://doi.org/10.48550/arXiv.2407.21067

[19]   Hegre, H., ..., Chadefaux, T., Fritz, C., & ... (2024). The 2023/24 views prediction challenge: Predicting the number of fatalities in armed conflict, with uncertainty. *Journal of Peace Research*, *in print*. https://arxiv.org/abs/2407.11045

[18]   Kook, L., Schiele, P., Kolb, C., Dold, D., Arpogaus, M., Fritz, C., Baumann, P., Kopper, P., Pielok, T., Dorigatti, E., & Rügamer, D. (2024). Can inverse conditional flows serve as a substitute for distributional regression model in statistics? *Conference on Uncertainty in Artificial Intelligence (UAI)*. https://doi.org/10.48550/arXiv.2405.05429

[17]   Fritz, C., Mehrl, M., Thurner, P. W., & Kauermann, G. (2024). Exponential random graph models for dynamic signed networks: An application to international relations. *Political Analysis*, *in print*. https://doi.org/10.48550/arXiv.2205.13411

[16]   De Nicola, G., Fritz, C., Mehrl, M., & Kauermann, G. (2023). Dependence matters: Statistical models to identify the drivers of tie formation in economic networks. *Journal of Economic Behavior & Organization*, *215*, 351–363. https://doi.org/https://doi.org/10.1016/j.jebo.2023.09.021

[15]   Fritz, C., De Nicola, G., Kevorg, S., Harhoff, D., & Kauermann, G. (2023). Modelling the large and dynamically growing bipartite network of german patents and inventors. *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, *186*(3), 557–576. https://doi.org/10.1093/jrsssa/qnad009

[14] Rügamer, D., Kolb, C., Fritz, C., Pfisterer, F., Bischl, B., Shen, R., Bukas, C., de Andrade e Sousa, L. B., Thalmeier, D., Baumann, P., Klein, N., & Müller, C. L. (2023). Deepregression: A flexible neural network framework for semi-structured deep distributional regression. *Journal of Statistical Software*, *105*(2), 1–31. https://doi.org/10.18637/jss.v105.i02

[13] Fritz, C., Mehrl, M., Thurner, P. W., & Kauermann, G. (2023). All that glitters is not gold: Relational events models with spurious events. *Network Science*, *11*(Special Issue 2). https://doi.org/10.1017/nws.2022.22

[12] Fritz, C., De Nicola, G., Rave, M., Weigert, M., Berger, U., Küchenhoff, H., & Kauermann, G. (2022). Statistical modelling of COVID-19 data: Putting generalised additive models to work. *Statistical Modelling*, *(OnlineFirst)*. https://doi.org/10.1177/1471082X221124628

[11] Fritz, C., Dorigatti, E., & Rügamer, D. (2022). Combining graph neural networks and spatio-temporal disease models to predict COVID-19 cases in Germany. *Scientific Reports*, *3930*(12), 1–18. https://doi.org/10.1038/s41598-022-07757-5

[10] Fritz, C., & Kauermann, G. (2022). On the interplay of regional mobility, social connectedness, and the spread of COVID-19 in Germany. *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, *185*(1), 400–424. https://doi.org/10.1111/rssa.12753

[9] Fritz, C., Mehrl, M., Thurner, P. W., & Kauermann, G. (2021). The role of governmental weapons procurements in forecasting monthly fatalities in intrastate conflicts: A semiparametric hierarchical hurdle model. *International Interactions*, *48*(4), 778–799. https://doi.org/10.1080/03050629.2022.1993210

[8] Fritz, C., Thurner, P. W., & Kauermann, G. (2021). Separable and semiparametric network-based counting processes applied to the international combat aircraft trades. *Network Science*, *9*(3), 291–311. https://doi.org/10.1017/nws.2021.9

[7] Fritz, C., Lebacher, M., & Kauermann, G. (2020). Tempus volat, hora fugit: A survey of tie-oriented dynamic network models in discrete and continuous time. *Statistica Neerlandica*, *74*(3), 275–299. https://doi.org/10.1111/stan.12198

[6] Baumann, S. A., Fritz, C., & Mueller, R. S. (2020). Food antigen-specific ige in dogs with suspected food hypersensitivity. *Tierärztliche Praxis. Ausgabe K, Kleintiere/Heimtiere*, *48*(6), 395–402. https://doi.org/10.1055/a-1274-9210

Other Publications

[5] Fritz, C., De Nicola, G., Günther, F., Rügamer, D., Rave, M., Schneble, M., Bender, A., Weigert, M., Brinks, R., Hoyer, A., Berger, U., Küchenhoff, H., & Kauermann, G. (2023). Challenges in interpreting epidemiological surveillance data - Experiences from Germany. *Journal of Computational and Graphical Statistics*, *3*. https://doi.org/10.1080/10618600.2022.2126482

[4] Schweinberger, M., & Fritz, C. (2023). Discussion of "A tale of two datasets: Representativeness and generalisability of inference for samples of networks" by Pavel N. Krivitsky, Pietro Coletti, and Niel Hens. *Journal of the American Statistical Association*, *(OnlineFirst)*, 1–5. https://doi.org/10.1080/01621459.2023.2223680

[3] Fritz, C., Dworschak, C., & Mehrl, M. (2024+). Predicting uncertainty in stages: Using a semiparametric hierarchical hurdle model for predicting distributions of conflict fatalities [VIEWS working paper]. https://viewsforecasting.org/wp-content/uploads/Fritz_VIEWSPredictionChallenge2023.pdf

[2] Kauermann, G., & Fritz, C. (2022). Analyse von Netzwerkdaten (english translation: Analysis of network data). In B. Wawrzyniak & M. Herter (Eds.), *Neue Dimensionen in Data Science* (pp. 151–161). Wichmann.

[1]   Berger, U., Fritz, C., & Kauermann, G. (2022). Reihentestungen an Schulen können die Dunkelziffer von COVID-19 Infektionen unter Schülern signifikant senken (english translation: Mandatory testing in schools can significantly reduce underreporting of COVID-19 infections among students with in-class teaching compared to home schooling). *Das Gesundheitswesen*, *84*(6), 495–502. https://doi.org/10.1055/a-1813-9778

Theses

- Statistical Approaches to Dynamic Networks in Society. Dissertation, LMU Munich (2022)
- Dynamic Social Network Models for Time-Stamped Data. Master Thesis, LMU Munich (2018)
- Explorative Datenvisualisierung mit Shiny in R (in English: Explorative data visualization with Shiny in R). Bachelor Thesis, LMU Munich (2016)

Software

- `bigergm`: R package on CRAN providing a toolbox to analyze and simulate large networks based on hierarchical exponential-family random graph models (HERGMs).
- `ergm.sign`: R package on GitHub to estimate, simulate, and assess the fit of Signed Exponential Random Graph Models.
- `ergm.patent`: R package on GitHub implementing pairwise covariate effects possible for use in `ergm`.
- `intervisu`: R package on GitHub which was the main contribution of my Bachelor thesis implementing explorative data analysis by means of interactive Shiny apps.

Seminar Talks (mm-dd-yyyy)

- **10-18-2024 (Dublin, IR)**: A Regression Framework for Studying Relationships among Attributes under Network Interference. *TCD Statistics Seminar*
- **10-01-2024 (Coventry, UK)**: A Regression Framework for Studying Relationships among Attributes under Network Interference. *Seminar Series on Statistical Learning and Inference in the Department of Statistics at the University of Warwick*
- **01-30-2024 (Dublin, IR)**: Predicting uncertainty in stages: Using a semiparametric hierarchical hurdle model for predicting distributions of conflict fatalities. *Colloquium at the PaCE: Patterns of Conflict Emergence Group at Trinity College Dublin*
- **01-23-2024 (Pittsburgh, US)**: A Generalization of GLMs for Studying Relationships among Attributes under Network Interference. *Seminar at the Department of Statistics, University of Pittsburgh*
- **07-25-2023 (Zurich, CH)**: Analyzing Durational Event Data. *Colloquium at the Social Networks Lab at ETH Zurich*
- **07-13-2023 (Munich, DE)**: Challenges in modern statistical network analysis. *Colloquium at LMU Munich*
- **04-05-2023 (Seattle, US)**: Exponential Random Graph Models for Dynamic Signed Networks: An Application to International Relations. *Colloquium at the Computational Demography Working Group at the University of Washington*
- **12-12-2022 (Dublin, IR)**: Statistical Approaches to Dynamic Networks in Society. *Statistics Seminar at University College Dublin*
- **06-10-2022 (Zurich, CH)**: Statistical Approaches to Dynamic Networks: From Discrete to Continuous Observations. *Colloquium at the Social Networks Lab at ETH Zurich*

- **06-06-2022 (Lugano, CH)**: Statistical Approaches to Dynamic Networks: From Discrete to Continuous Observations. *Colloquium USI Lugano*

Conference Talks (mm-dd-yyyy)

- **12-15-2024(London, UK)**: Regression Framework for Studying Relationships among Attributes under Network Interference. **(Invited Talk)**. *CMStatistics 2024*
- **08-15-2024 (Bochum, DE)**: Socio-cognitive Networks between Researchers **(Invited Talk)**. *Bernoulli-IMS 11th World Congress in Probability and Statistics*
- **06-30-2024 (Seattle, US)**: A Strategic Model of Software Dependency Networks. *WEAI's Annual Conference 2024*
- **12-16-2023 (Berlin, DE)**: A Scalable Statistical Platform for Learning from Discrete and Dependent Attribute and Network Data Generalizing GLMs **(Invited Talk)**. *CMStatistics 2023*
- **08-08-2023 (Toronto, CA)**: Analyzing Durational Event Data. *JSM 2023*
- **09-27-2022 (London, UK)**: All that Glitters is not Gold: Relational Events Models with Spurious Events **(Invited Talk)**. *CMStatistics 2022*
- **09-27-2022 (Leipzig, DE)**: Statistical Approaches to Dynamic Networks: From Discrete to Continuous Observations **(Invited Talk)**. *Workshop Statistical Methods on Networks*
- **09-21-2022 (Münster, DE)**: Exponential Random Graph Models for Dynamic Signed Networks/ An Application to International Relations. *Statistische Woche*
- **09-19-2022 (Münster, DE)**: All that Glitters is not Gold: Relational Events Models with Spurious Events. *DStatG Nachwuchsworkshop*
- **09-15-2022 (London, UK)**: Exponential Random Graph Models for Dynamic Signed Networks: An Application to International Relations. *EUSN2022*
- **03-29-2022 (Hamburg, DE)**: All that Glitters is not Gold: Relational Events Models with Spurious Events. *DAGSTAT 2022*
- **11-26-2021 (Online)**: Networks $\neq$ Networks **(Invited Talk)**. *Center for Advanced Studies LMU: AI and Uncertainty*
- **10-08-2020 (Online)**: The Role of Governmental Weapons Procurements in Forecasting Monthly Fatalities in Intrastate Conflicts: A Semiparametric Hierarchical Hurdle Model. *ViEWS Workshop*
- **09-24-2020 (Online)**: Tempus Volat, Hora Fugit - A Survey of Tie-Oriented Dynamic Network Models in Discrete and Continuous Time. *COSTNET 2020*
- **6-10-2020 (Online)**: Regional Mobility, Social Connectedness,and the Spread of COVID-19 in Germany. *COSTNET COVID-19 Conference*
- **09-14-2020 (Online)**: A Counting Processes-based Model for the Analysis of the International Arms Trade Network from 1950 to 2017. *Sunbelt Virtual Conference*
- **10-10-2019 (Bilbao, ES)**: A Counting Processes-based Model for the Analysis of the International Arms Trade Network from 1950 to 2017. *COSTNET19 Conference*
- **09-11-2019 (Zurich, CH)**: A Counting Processes-based Model for the Analysis of the International Arms Trade Network from 1950 to 2017. *EUSN2019 - Europen Conference on Social Networks*
- **9-8-2019 (Zurich, CH)**: Tempus Volat, Hora Fugit - A Survey of Tie-Oriented Dynamic Network Models in Discrete and Continuous Time. *Satellite meeting on Relational Event Model: EUSN2019*

Reviewer of research papers (in alphabetical order)

Annals of Applied Statistics, AStA Advances in Statistical Analysis, Bayesian Analysis, Computational Statistics & Data Analysis, Econometrics and Statistics, European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD), IEEE Transactions on Network Science and Engineering, Journal of Biomedical Informatics, Journal of Open Source Software, Journal of Computational and Graphical Statistics, Journal of the Royal Statistical Society (Series A, B, C), Journal of Statistical Software, Nature Human Behavior, Network Science, Science Advances, Social Network Analysis and Mining, PLOS ONE, Political Analysis

Professional memberships

Member of the German Statistical Society (Deutsche Statistische Gesellschaft) and American Statistical Association.

Last updated: July 11, 2025