

# Daniel

Habermann

## CONTACT INFORMATION

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**Github** 🐙 <https://github.com/daniel-habermann>

## EDUCATION

**Dr. rer. nat at the Faculty of Biology** **2018-2022**  
*University of Duisburg-Essen | Essen, Germany*

- Graduated with *magna cum laude*
- Thesis topic: "Computational methods to detect HLA-associated mutations"

**M.Sc. Medical Biology** **2015-2017**  
*University of Duisburg-Essen | Essen, Germany*

- Grade: 1.2
- Thesis topic: "Dynamics of CTL-escape mutations and viral loads in HIV-1"

**B.Sc. Medical Biology** **2012-2015**  
*University of Duisburg-Essen | Essen, Germany*

- Grade: 1.5
- Thesis topic: "Computational analysis of viral sequences and protein structures"

## WORK EXPERIENCE

**Statistician and Co-founder** **2021-today**  
*Athenata GmbH | Wuppertal*

- Management and implementation of data science projects
- Acquisition of third-party funding (EXIST start-up grant, 140.000 €)

**Research Associate at the University of Duisburg-Essen** **2018-2021**  
*Department of Bioinformatics and Computational Biophysics*

- Development and application of methods for the analysis of virological and immunological data
- Teaching

## SOFTWARE AND LANGUAGES

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- Julia
- R
- Python
- $\LaTeX$
- Stan
- Linux
- Ansible
- Git
- SQL
- German (mother tongue)
- English (business fluent)

## TECHNICAL SKILLS

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- Hierarchical modeling
- Gaussian processes
- Imputation of missing data
- Average predictive comparisons
- Pareto-smoothed importance sampling
- Time series analysis
- Modelling sparsity
- Prior elicitation
- Bayesian workflow
- Bayesian regression models (ordinal, logistic, robust)

## PROJECTS

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### Identification of marker genes

One problem often encountered in gene expression analyses is how to make sense of the potentially large number of differentially expressed genes between a treatment and a control group.

In this project with the Abalos Therapeutics GmbH, Athenata developed a statistical model based on a projection predictive variable selection approach that identifies a minimal subset of genes based on the condition that this subset characterizes the difference between the treatment and control group, as well as a reference model with all genes.

*Testimonial: Athenata's customized quantitative data analysis was instrumental in mapping the complex biological relationships of an anti-tumour effect of our optimized viruses to statistical models in a pilot project. This enabled us to obtain new insights that could be important for the further development of our product candidate and that we would not have obtained using standard procedures. - Dr. Marcus Kostka*

### Recommendation system for the retail sector

To realize the idea of the "digital supermarket", Athenata has developed a recommendation system for a customer in the retail sector that utilizes autoencoders to generate product recommendations based on shopping lists.

### Forecasting air traffic passenger volumes

For efficient route network planning, it is important to accurately estimate future passenger volumes between countries of origin and destination. For a customer in the aviation industry, Athenata developed a statistical model as a proof-of-principle that takes advantage of macro-economical predictors like GDP and tourism earnings, and links these with historical passenger volumes to generate air traffic forecasts.

The focus in this project was on the precise quantification of model uncertainty to enable cost-benefit analyses.

**Habermann et al.: HAMdetector: a Bayesian regression model that integrates information to detect HLA-associated mutations**

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Daniel Habermann, Hadi Kharimzadeh, Andreas Walker, Yang Li, Rongge Yang, Rolf Kaiser, Zabrina L Brumme, Jörg Timm, Michael Roggendorf, and Daniel Hoffmann. "HAMdetector: a Bayesian regression model that integrates information to detect HLA-associated mutations". In: *Bioinformatics* 38.9 (Mar. 2022). Ed. by Janet Kelso, pp. 2428-2436. doi: 10.1093/bioinformatics/btac134.

**Karimzadeh et al.: Computational Tools for Discovery of CD8 T cell Epitopes and CTL Immune Escape in Viruses Causing Persistent Infections**

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Hadi Karimzadeh, **Daniel Habermann**, Daniel Hoffmann, and Michael Roggendorf. "Computational Tools for Discovery of CD8 T cell Epitopes and CTL Immune Escape in Viruses Causing Persistent Infections". In: *Virus Bioinformatics*. Chapman and Hall/CRC, June 2021, pp. 141-156. doi: 10.1201/9781003097679-8.

**Magvan et al.: Sequence diversity of Hepatitis D Virus in Mongolia**

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Battur Magvan, Alina Kloeble, Johannes Ptok, Daniel Hoffmann, **Daniel Habermann**, Anuujiin Gantumur, Martha Paluschinski, Gerelmaa Enebish, Vera Balz, Johannes Fischer, Battogtokh Chimeddorj, Andreas Walker, and Jörg Timm. "Sequence diversity of Hepatitis D Virus in Mongolia". In: *Frontiers in Medicine* 10 (2023). issn: 2296-858X. doi: 10.3389/fmed.2023.1108543. url: <https://www.frontiersin.org/articles/10.3389/fmed.2023.1108543>.

**Spassova et al.: Clinical and molecular characteristics associated with response to therapeutic PD-1/PD-L1 inhibition in advanced Merkel cell carcinoma**

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Ivelina Spassova, Selma Ugurel, Linda Kubat, Lisa Zimmer, Patrick Terheyden, Annalena Mohr, Hannah Björn Andtback, Lisa Villabona, Ulrike Leiter, Thomas Eigentler, Carmen Loquai, Jessica C Hassel, Thilo Gambichler, Sebastian Haferkamp, Peter Mohr, Claudia Pfoehler, Lucie Heinzerling, Ralf Gutzmer, Jochen S Utikal, Kai Horny, Hans-Ulrich Schildhaus, **Daniel Habermann**, Daniel Hoffmann, Dirk Schadendorf, and Jürgen Christian Becker. "Clinical and molecular characteristics associated with response to therapeutic PD-1/PD-L1 inhibition in advanced Merkel cell carcinoma". In: *Journal for ImmunoTherapy of Cancer* 10.1 (Jan. 2022), e003198. doi: 10.1136/jitc-2021-003198.

**Spassova et al.: Predominance of Central Memory T Cells with High T-Cell Receptor Repertoire Diversity is Associated with Response to PD-1/PD-L1 Inhibition in Merkel Cell Carcinoma**

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Ivelina Spassova, Selma Ugurel, Patrick Terheyden, Antje Sucker, Jessica C. Hassel, Cathrin Ritter, Linda Kubat, **Daniel Habermann**, Farnoush Farahpour, Mohammadkarim Saeedghalati, Lukas Peiffer, Rajiv Kumar, David Schrama, Daniel Hoffmann, Dirk Schadendorf, and Jürgen C. Becker. "Predominance of Central Memory T Cells with High T-Cell Receptor Repertoire Diversity is Associated with Response to PD-1/PD-L1 Inhibition in Merkel Cell Carcinoma". In: *Clinical Cancer Research* 26.9 (May 2020), pp. 2257-2267. doi: 10.1158/1078-0432.ccr-19-2244.

**Streeck et al.: Dissecting drivers of immune activation in chronic HIV-1 infection**

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Hendrik Streeck, Alvino Maestri, **Daniel Habermann**, Trevor A. Crowell, Allahna L. Esber, Gowoon Son, Leigh Anne Eller, Michael A. Eller, Ajay P. Parikh, Peter A. Horn, Lucas Maganga, Emmanuel Bahemana, Yakubu Adamu, Francis Kiweewa, Jonah Maswai, John Owuoth, Merlin L. Robb, Nelson L. Michael, Christina S. Polyak, Daniel Hoffmann, and Julie A. Ake. "Dissecting drivers of immune activation in chronic HIV-1 infection". In: *eBioMedicine* 83 (Sept. 2022), p. 104182. doi: 10.1016/j.ebiom.2022.104182.