

Dr. Martin HÖLZER

PERSONAL DATA

Name: Dr. rer. nat. Martin Hölzer
 Gender: Male
 Place and Date of Birth: Rudolstadt, Germany | 16 March 1988
 Nationality: German
 Address: Jansonstr. 11, 07745 Jena
 Phone: +49 160 92675865
 Email: martin.hoelzer@uni-jena.de
 Web: hoelzer-lab.github.io
 Family status: Single

SCIENTIFIC EDUCATION

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|-----------------|---|
| 01/2018 | Doctorate degree, Dr. rer. nat. University of Jena Grade: summa cum laude Doctoral thesis: <i>The Dark Art of Next-Generation Sequencing: fundamental approaches for genomics, transcriptomics, and differential gene expression</i> Prof. Dr. Manja Marz, RNA Bioinformatics and High-Throughput Analysis Faculty of Mathematics and Computer Sciences |
| since 06/2017 | Leader of a small bioinformatics group at University of Jena |
| 08/2013–06/2017 | PhD student at University of Jena |
| 12/2012 | Diploma in Bioinformatics University of Jena Grade: 1.4 Diploma thesis: <i>Data management of mass spectra and fragmentation trees with BExIS</i> Prof. Dr. Sebastian Böcker, Chair of Bioinformatics Faculty of Mathematics and Computer Sciences |
| 10/2007–12/2012 | Studies of Bioinformatics at University of Jena |
| 2006–2007 | Civilian service, Diakonisches Altenhilfezentrum, Bad Blankenburg |
| 1998–2006 | University entrance qualification, Friedrich-Fröbel-Gymnasium, Bad Blankenburg, Grade 2.0 |

WORK EXPERIENCE

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| Current | Post-Doc & group leader <i>RNA Bioinformatics/High-Throughput Analysis, Prof. Dr. Manja Marz, University of Jena</i> Supervision of Next-Generation Sequencing (NGS) projects including the automatization of workflows for assembly, annotation, variant calling, differential gene expression, and visualization of results. Development of novel applications for long-read sequencing data. Head of a fresh, small bioinformatics group at the University of Jena. |
| since 03/2017 | EVBC member <i>Founding member of the "European Virus Bioinformatics Center" (EVBC), University of Jena</i> The EVBC is intended to bring together virologists and bioinformaticians across Europe and provide a platform for interdisciplinary collaborative projects. My expertise covers sequencing, design and high-throughput analysis of virus-enriched and -infected biological samples. |
| 08/2013–06/2017 | PhD student <i>RNA Bioinformatics/High-Throughput Analysis, Prof. Dr. Manja Marz, University of Jena</i> Management of various NGS projects comprising 1) experimental design, 2) selection of appropriate sequencing parameters, and 3) data analysis, visualization and interpretation. Development of pipelines for downstream bioinformatical analyses. Examination of (meta-)genomic/transcriptomic data with a special focus on <i>de novo</i> assembly, annotation, and identification of differential expressed protein- and non-coding genes. Contributions to the emerging field of virus bioinformatics. |
| 09/2009–05/2012 | Student assistant <i>Chair of Bioinformatics, Prof. Dr. Sebastian Böcker, University of Jena</i> Integration of algorithms, data management and visualization for phylogenetic analyses and clustering. |

TASKS BEYOND OWN RESEARCH

- **Supervision of practical works**
Lasse Feldhahn (started 10/2018)
Jannes Spangenberg (started 10/2018)
Daria Meyer (started 09/2018)
- **Supervision of bachelor theses**
Rebekka Köhl (started 07/2018)
- **Supervision of master theses**
Marie Lataretu (completed summer 2018)
Ruman Gerst (completed fall 2018)
Lisa-Marie Barf (started 10/2017)
- **Organization of international conferences and meetings**
23rd International Bioinformatics Workshop on Virus Evolution and Molecular Epidemiology (VEME), 2018: Supporting Organizer
Hackathon on aging-related data, *Stay Young or Die Trying*, 2017: Organizer
First Meeting of the *European Virus Bioinformatics Centre*, 2017: Supporting Organizer
Hackathon on virus infected RNA-Seq data, *Fight against Ebola – in silico*, 2014: Organizer
- **Peer-Reviews for international conferences**
Annual International Conference on Research in Comp. Molecular Biology (RECOMB 2018)
Annual International Conference on Intelligent Systems for Molecular Biology (ISMB 2017)
German Conference on Bioinformatics (GCB 2014, 2015, 2017)

- **Peer-reviews for journals**
Frontiers in Microbiology (2018), Virus Research (2018), Molecular Ecology Resources (2018), Bioinformatics (2014)
Publons: publons.com/author/1521002
- **Third-party funding applications**
Assistance in writing research grants for third-party funding (DFG, SPP, ERC)

SCHOLARSHIPS

DEC. 2018 – JAN. 2021 Scholarship for an "Add-on Fellowship for Interdisciplinary Life Science" of the Joachim Herz Stiftung (€12,500)

TEACHING

at the University of Jena

Teaching instructor

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| 2018 | Practical course: VIROINFORMATICS <i>Responsibilities:</i> Prepared, supervised, and assisted students in a two-week practical course on the topic of virus detection from meta-transcriptomic NGS data. |
| 2017, 2017/18 2018 | Lecture & Practical course: L^AT_EX BASICS FOR NATURAL SCIENTISTS <i>Responsibilities:</i> Presented lectures on the document preparation system L ^A T _E X. Supervised and assisted 30 undergraduate students in a one-week full-time course. Graded daily assignments, exercises, and exams. |
| 2017/18 | Practical course: HIGH-THROUGHPUT BIOINFORMATICS <i>Responsibilities:</i> Prepared, supervised, and assisted students in a one-week practical course on the topic of RNA-Seq data analysis. |

Teaching assistant

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| 2016/17, 2017/18 | Lecture: BASIC BIOINFORMATIC APPLICATIONS <i>Responsibilities:</i> Prepared and taught four 1.5-hour lectures on the topic of high-throughput data analysis (<i>From raw read data to differential expressed genes</i>). Prepared and supervised practical examples. Graded assignments and course exams. |
| 2014/15, 2015, 2016, 2017 | Lecture: VIRUS BIOINFORMATICS <i>Responsibilities:</i> Developed and taught hour-long lessons on viral replication, assembly, and sequencing. |
| 2014/15, 2015/16, 2016/17, 2017/18 | Lecture: HIGH-THROUGHPUT BIOINFORMATICS <i>Responsibilities:</i> Developed and taught hour-long lessons on sequencing technologies and protocols, Next-Generation Sequencing design, quality control and data processing, <i>de novo</i> and reference-based assembly, read quantification, normalization, and differential gene expression analysis. |
| 2015/16 | Practical course: HIGH-THROUGHPUT BIOINFORMATICS <i>Responsibilities:</i> Prepared, supervised, and assisted students in a one-week practical course on the topic of RNA-Seq data analysis. |

SCIENTIFIC POSTER PRESENTATIONS

- 09/2018 German Conference on Bioinformatics, Vienna, Austria
Long reads matter: The advantages of nanopore long-read sequencing.
- 05/2017 Bioinformatics Mittelerte Meeting, Leipzig, Germany
PoSeiDon: a web server for the detection of evolutionary recombination events and positive selection.
- 03/2017 27th Annual Meeting of the Society for Virology, Marburg, Germany
PoSeiDon: a web server for the detection of evolutionary recombination events and positive selection.
- 04/2016 26th Annual Meeting of the Society for Virology, Münster, Germany
A method pipeline for the detection of positively selected sites in silico – exemplarily shown for bat Mx1.

SCIENTIFIC ORAL PRESENTATIONS

- 11/2018 BioGeo-Colloquium, Jena, Germany
The advantages of nanopore sequencing: because long reads matter
- 11/2018 Institut für Mikrobiologie der Bundeswehr, Munich, Germany
A short and a long sequencing story about Ebola and Coronaviruses
- 07/2018 11th International Conference on Virology/Microbiology, Vancouver, Canada
An Interface between Bioinformatics and Virology (KEYNOTE SPEAKER)
- 06/2018 CRC AquaDiva On Site Retreat, Vitaleum UG Hütten, Germany
Viral diversity, viral de novo assembly, and viral decay in groundwater
- 02/2018 33. Winterseminar der Bioinformatik, Bled, Slovenia
PCAGO: An interactive web service to analyze RNA-Seq data with principal component analysis
- 08/2017 CRC AquaDiva Recruitment Symposium, Jena, Germany
Next-Generation Sequencing meets viruses
- 02/2017 32. Winterseminar der Bioinformatik, Bled, Slovenia
PoSeiDon: A web server for the detection of evolutionary recombination events and positive selection
- 10/2016 14. Herbstseminar der Bioinformatik, Doubice, Czech Republic
Fun with PCA: Insights into RNA-Seq based principal component analysis
- 02/2016 31. Winterseminar der Bioinformatik, Bled, Slovenia
Evolutionary analyses of positively selected sites in the interferon-induced innate immunity factor Mx1 of bats
- 03/2015 25th Annual Meeting of the Society for Virology, Bochum, Germany
Differential transcriptional responses to Ebola and Marburg virus infection in cells from bats and humans
- 02/2015 30. Winterseminar der Bioinformatik, Bled, Slovenia
Fight against Ebola – in silico –
- 10/2014 12. Herbstseminar der Bioinformatik, Doubice, Czech Republic
Bats and viruses: friend or foe?
- 02/2014 29. Winterseminar der Bioinformatik, Bled, Slovenia
Assembly and annotation of Mycobacterium avium subsp. paratuberculosis Typ-III
- 10/2013 11. Herbstseminar der Bioinformatik, Doubice, Czech Republic
Assembler comparison and cluster assembly

CITATION ANALYSIS

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| Total number of publications: | 15 |
| No. of peer rev. publications: | 11 |
| No. of submissions & preprints: | 4 |
| No. of book chapters: | 1 |
| h-index: | 6 |
| Citations: | 67 |
| Average impact factor: | 4.2 |
| ORCID | 0000-0001-7090-8717 |
| Google Scholar | goo.gl/CY4352 |

PUBLICATIONS

Peer-reviewed journal publications

Ψ These authors contributed equally

- 10 D. Steinbach, **M. Hölzer**, M. Marz, M. Gajda, F. C. Von Rundstedt, and M. O. Grimm. Analysis of molecular mechanism of progression of non-muscle-invasive bladder cancer (NMIBC) by genome-wide exome and UTR mutation analysis. *Eur Urol Suppl.* 17(2), e1523, 2018. **IF: 3.5**
- 9 P. Möbius, G. Nordsiek, **M. Hölzer**, M. Jarek, M. Marz, and H. Köhler. Complete Genome Sequence of JII-1961, a Bovine *Mycobacterium avium* subsp. *paratuberculosis* Field Isolate from Germany. *Genome Announc.* 5(34), 2017. **IF: 1.2**
- 8 J. Fuchs, **M. Hölzer**, M. Schilling, C. Patzina, A. Schoen, T. Hoenen, G. Zimmer, M. Marz, F. Weber, M. A. Müller, and G. Kochs. Evolution and Antiviral Specificities of Interferon-Induced Mx Proteins of Bats against Ebola, Influenza, and Other RNA Viruses. *J Virol.* 12; 91(15), 2017. **IF: 4.7**
- 7 P. Möbius, E. Liebler-Tenorio, **M. Hölzer**, and H. Koehler. Evaluation of associations between genotypes of *Mycobacterium avium* subsp. *paratuberculosis* and presence of intestinal lesions characteristic of paratuberculosis. *Veterinary microbiology.* 201, 188-194, 2017. **IF: 2.6**
- 6 K. Riege^Ψ, **M. Hölzer**^Ψ, T. Klassert, E. Barth, J. Bräuer, M. Collatz, F. Hufsky, N. Mostajo, M. Stock, B. Vogel, H. Slevogt, and M. Marz. Massive Effect on LncRNAs in Human Monocytes During Fungal and Bacterial Infections and in Response to Vitamins A and D. *Sci Rep.* 7:40598, 2017. **IF: 4.8**
- 5 T. E. Klassert, J. Bräuer, **M. Hölzer**, M. Stock, K. Riege, C. Zubiría-Barrera, M. M. Müller, S. Rummler, C. Skerka, M. Marz, and H. Slevogt. Differential Effects of Vitamins A and D on the Transcriptional Landscape of Human Monocytes during Infection. *Sci Rep.* 7:40599, 2017. **IF: 4.8**

- 4 **M. Hölzer**^Ψ, V. Krähling^Ψ, F. Amman, E. Barth, S. H. Bernhart, V. A. O. Carmelo, M. Collatz, G. Doose, F. Eggenhofer, J. Ewald, J. Fallmann, L. M. Feldhahn, M. Fricke, J. Gebauer, A. J. Gruber, F. Hufsky, H. Indrischek, S. Kanton, J. Linde, N. M. Berrospi, R. Ochsenreiter, K. Rieger, L. Rivarola-Duarte, A. H. Sahyoun, S. J. Saunders, S. E. Seemann, A. Tanzer, B. Vogel, S. Wehner, M. T. Wolfinger, R. Backofen, J. Gorodkin, I. Grosse, I. Hofacker, S. Hoffmann, C. Kaleta, P. F. Stadler, S. Becker, and M. Marz. Differential transcriptional responses to Ebola and Marburg virus infection in bat and human cells. *Sci Rep.* 6:34589, 2016. **IF: 4.8**
- 3 **M. Hölzer**, K. Laroucau, H. H. Creasy, S. Ott, F. Vorimore, P. M. Bavoil, M. Marz, and K. Sachse. Whole-genome sequence of *Chlamydia gallinacea* type strain 08-1274/3. *Genome Announc.* 4(4):e00708–16, 2016. **IF: 1.2**
- 2 P. Möbius^Ψ, **M. Hölzer**^Ψ, M. Felder, G. Nordsiek, M. Groth, H. Köhler, K. Reichwald, M. Platzer, and M. Marz. Comprehensive insights in the *Mycobacterium avium* subsp. *paratuberculosis* genome using new WGS data of sheep strain JIII-386 from Germany. *Genome Biol Evol.* 7(9):2585–2601, 2015. **IF: 3.9**
- 1 A. H. Sahyoun, **M. Hölzer**, F. Jühling, C. Höner Zu Siederdissen, M. Al-Arab, K. Tout, M. Marz, M. Middendorf, P. F. Stadler, and M. Bernt. Towards a comprehensive picture of alloacceptor tRNA remolding in metazoan mitochondrial genomes. *Nucleic Acids Res.* 43(16):8044–8056, 2015. **IF: 10.2**

Submitted journal publications & preprints

A. Viehweger, S. Krautwurst, K. Lamkiewicz, R. Madhugiri, J. Ziebuhr, **M. Hölzer** and M. Marz. Nanopore direct-RNA sequencing reveals modification in full-length coronavirus genomes. *bioRxiv.* doi.org/10.1101/483693, 2018.

R. Gerst and **M. Hölzer**. PCAGO: An interactive web service to analyze RNA-Seq data with principal component analysis. *bioRxiv.* doi.org/10.1101/433078, 2018.

D. Desirò, **M. Hölzer**, B. Ibrahim and M. Marz. SilentMutations (SIM): a tool for analyzing long-range RNA-RNA interactions in viral genomes and structural RNAs. *bioRxiv.* doi.org/10.1101/424002, 2018. Accepted for publication in *Virus Research*.

M. Hölzer and M. Marz. *De novo* transcriptome assembly: A comprehensive cross-species comparison of short-read RNA-Seq assemblers. *In revision.* 2018.

Z. Chen, Y. Morita, F. Becker, B. Han, E. Amro, Y. Chen, D. Tang, S. Tao, S. Di Sanzo, **M. Hölzer**, R. Hänold, M. Groth, J. Kirkpatrick, H. Bierhoff, V. Romanov, M. Marz, A. Ori, and K. L. Rudolph. Rad21-mediated NF- κ B signaling limits hematopoietic stem cell self-renewal in aging and inflammation. Accepted for publication in the *Journal of Experimental Medicine*. 2018.

Book chapter

M. Hölzer and M. Marz. Chapter Nine – Software Dedicated to Virus Sequence Analysis “Bioinformatics Goes Viral”. *Adv Virus Res.* (ed. M. Beer), 99:233-257, Academic Press, 2017.

Theses

M. Hölzer. The Dark Art of Next-Generation Sequencing: fundamental approaches for genomics, transcriptomics, and differential gene expression. *PhD thesis*, University of Jena, 2018.

M. Hölzer. Data management of mass spectra and fragmentation trees with BEXIS. *Diploma thesis*, in German, University of Jena, 2012.

SOFT SKILLS

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| 07/2018 | <i>Fördermöglichkeiten für exzellente Nachwuchswissenschaftler/jinnen</i> , Dr. Mareile Knees, Jena |
| 05/2018 | <i>Workshop “Drittmittel einwerben”</i> , Jana Dümmler, Graduate Academy, Jena |
| 02/2018 | <i>Patente als Chance für meine Forschung</i> , Dr. Christian Liutik, Patentinformationszentrum FSU, Jena |
| 02/2018 | <i>Pursuing an Academic Career in Germany: Pros and Cons</i> , Dr. Hanna Kauhaus, Graduate Academy, Jena |
| 02/2018 | <i>Proposal Writing Workshop</i> , Frank Lauterbach, iRTG AquaDiva, Jena |
| 03/2014 | <i>Mitteldeutscher Fundraisingtag</i> , Crowdfunding: Chancen und Grenzen, FundraisingForum e.V., Jena |
| 04/2013 | <i>Jugendgruppenleiter Card (JuLeiCa)</i> , nationwide uniform identity card for voluntary people in youth work, VTPV e.V., Bad Blankenburg |
| 03/2012 | <i>Mitteldeutscher Fundraisingtag</i> , Fundraising und Freiwillige: wie passt das zusammen? FundraisingForum e.V., Jena |
| 09/2010 | <i>Web 2.0 – für Vereine, Initiativen & Parteien</i> , Thomas Mergen, Friedrich-Naumann-Stiftung für die Freiheit, Erfurt |
| since 2002 | Various workshops, seminars, and advanced trainings about time and group management, group dynamics, self-motivation, project planning, association and employment law, speech, presentation, administration, and building management. |

LEADERSHIP EXPERIENCES & NON-SCIENTIFIC ACTIVITIES

Scout association “Bund der Pfadfinderinnen und Pfadfinder” (BdP)

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| since 2012 | <i>Management board member of “Scoutactive” registered society</i> Administrative tasks and writing of proposals for staff funding. |
| since 2008 | <i>Assistant manager of BdP scouting center of Thuringia</i> Administrative tasks, coordination of staff and volunteers, realization of adventure activities for kids and youths, technical support, web site and hardware supervision. |
| since 2007 | <i>Assistant leader of BdP “Landesverband Thüringen e.V.”</i> Organization of scout activities in Thuringia and across national borders. Organized events, trainings, and elections. |
| 2005–2015 | <i>Group leader of BdP scout tribe “Falken vom Greifenstein”</i> Administration of the association. Active participation and mainly responsible for the management and organization of various scout camps, international cooperations, and regular meetings. Managed team conflict and morale, represented the association at national and international events. |
| since 1998 | <i>Member of BdP</i> |

Water of Life

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| since 2017 | <i>Co-Founder and organizer of the Bad Blankenburger “Kessel-Treffen”</i> Coordination of Scottish events and whisky tastings, www.kessel-treffen.de . |
| since 2014 | <i>Whisky tastings</i> Preparation and execution of whisky tastings for beginner and advanced |

Music

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| since 1999 | <i>Piano</i> |
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LANGUAGES

| | |
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| German | Native language |
| English | Written and spoken fluently |

REFERENCES

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High-Throughput Analysis
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Prof. Dr. Friedemann Weber

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Dr. Konrad K. W. Sachse

1992–2015
Head of Department
Friedrich Loeffler Institute
Institute of Molecular Pathogenesis
(Chlamydia and Mycoplasma)
Germany, Jena, Thuringia
since 2016
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High-Throughput Analysis
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