

Dr. Martin HÖLZER

PERSONAL DATA

Name: Dr. rer. nat. Martin Hölzer
 Gender: Male
 Place and Date of Birth: Rudolstadt, Germany | 16 March 1988
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SCIENTIFIC EDUCATION

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 an associated bioinformatics research 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

10/2019–04/2020	Visiting Researcher <i>EMBL-EBI European Bioinformatics Institute, Dr. Rob Finn, Wellcome Trust Genome Campus, Hinxton, Cambridge, United Kingdom</i> Working in the research group of Dr. Rob Finn on the analysis and classification of metagenomic samples using Nanopore long-read sequencing data and hybrid approaches.
Current	Post-Doc & team leader of an associated research group <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, metagenomics, and visualization of results. Development of novel applications for long-read sequencing data. Team leader of an associated and fresh bioinformatics group at the University of Jena.
since 06/2019	nanozoo GmbH <i>Co-founder and Co-managing director of nanozoo GmbH, Leipzig, Germany</i> Founded in mid-2019, nanozoo is a small bioinformatics company providing end-to-end services for the production and analysis of microbial data. <i>nanozoo</i> has set itself the goal of removing barriers in bioinformatic data analysis to provide up-to-date standards and analyses to a broad mass of researchers.
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

- **Next-Generation Sequencing**
Management of more than 50 Next-Generation Sequencing projects, including design of experimental set-up and definition of sequencing parameters. Calculation of project costs and communication between the wet lab partners and the sequencing facility. Organization of data handling and computational analysis.
- **Advisory board memberships**
Member of the external advisory board of the EU project “Digital Skills on Computational Biology for Health Professionals” ([BioS](#))
- **Supervision of bachelor theses**
Sandra Triebel, *A comparison of short-read, long-read, and hybrid de novo genome assembly tools for*

the reconstruction of Mycoplasma bovis strains. (completed autumn 2019)

Jannes Spangenberg, *Analysis of host-virus transcriptome data: exploring the unmapped.* (completed autumn 2019), co-supervised

Rebekka Köhl, *RNA-Seq analysis of a transfected human cell line.* (started 07/2018)

- **Supervision of practical works**

Anne Muriel Christin Ritsch, *Transcribed endogenous viral elements in Myotis lucifugus.* (completed summer 2019), co-supervised

Lasse Faber, *Transcripto – A Snakemake de novo transcriptome assembly pipeline.* (completed spring 2019)

Daria Meyer, *Endogenous Viral Elements (EVEs).* (completed winter 2018), co-supervised

- **Supervision of master theses**

Lisa-Marie Barf, *Bioinformatic and in vitro comparison among Chlamydia spp. to elucidate chlamydial host specificity and phylogeny.* (completed 06/2019), co-supervised

Lasse Faber, *Effective clustering of de novo transcriptome assemblies.* (started 04/2019)

Marie Lataretu, *Spotting fungal mitogenomes in de novo assemblies of short-read NGS data.* (completed summer 2018)

Ruman Gerst, *PCAGO: An interactive web service to analyze RNA-Seq data with principal component analysis.* (completed fall 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: Supporting 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**

Genome Biology (2019), BMC Supplements (2019), Scientific Reports (2019), Frontiers in Microbiology (2019), Virus Research (2018), Molecular Ecology Resources (2018)

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 “Add-on Fellowship for Interdisciplinary Life Science” of €12,500
the Joachim Herz Stiftung

GRANTS

		Amount
2020 – 2025	“Digitisation of the life sciences: Ways into the future” We receive €1.35 million from the <i>Thuringian Ministry of Science</i> to advance the digitization of life sciences. The project will start in 2020 and is initially scheduled for five years. I was jointly responsible for the application and significantly involved in the compilation of the contents and the writing.	–
DEC. 2018 – DEC. 2019	Program of the University of Jena to support junior researchers in obtaining third-party funding	€ 9,930

TEACHING

at the University of Jena

Teaching instructor

2018, 2019	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 two-week practical course on the topic of RNA-Seq data analysis.

Teaching assistant

2016/17, 2017/18 2018/19	Lecture: BASIC BIOINFORMATIC APPLICATIONS <i>Responsibilities:</i> Prepared and taught four 1.5-hour lectures on the topic of high-throughput data analysis and assembly (<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, 2018/19	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

- 03/2019 | 3rd annual meeting of the European Virus Bioinformatics Center (EVBC), Glasgow, Scotland
Virus- and interferon alpha-induced transcriptomes of the microbat Myotis daubentonii.
- 03/2019 | 29th Annual Meeting of the Society for Virology, Düsseldorf, Germany
Virus- and interferon alpha-induced transcriptomes of the microbat Myotis daubentonii.
- 09/2018 | German Conference on Bioinformatics, Vienna, Austria
Long reads matter: The advantages of nanopore long-read sequencing.
- 05/2017 | Bioinformatics Mittelerde 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
- 10/2018 | 16. Herbstseminar der Bioinformatik, Doubice, Czech Republic
Session chair on virus bioinformatics
- 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 –

CITATION ANALYSIS

Total number of publications:	21
No. of peer rev. publications:	19
No. of submissions & preprints:	1
No. of book chapters:	1
h-index:	7
Citations:	125
Average impact factor:	4.9
ORCID	0000-0001-7090-8717
Google Scholar	goo.gl/CY4352

PUBLICATIONS

Peer-reviewed journal publications

Ψ These authors contributed equally

- 19 N. F. Mostajo^Ψ, M. Lataretu^Ψ, S. Krautwurst, F. Mock, D. Desirò, K. Lamkiewicz, M. Collatz, A. Schoen, F. Weber, M. Marz^Ψ, and **M. Hölzer^Ψ**. A comprehensive annotation and differential expression analysis of short and long non-coding RNAs in 16 bat genomes. *NAR Genomics and Bioinformatics*. 2(1):lqz006, 2019. **IF: na**
- 18 A. Viehweger, S. Krautwurst, K. Lamkiewicz, R. Madhugiri, J. Ziebuhr, **M. Hölzer**, and M. Marz. Direct RNA nanopore sequencing of full-length coronavirus genomes provides novel insights into structural variants and enables modification analysis. *Genome Research*, 2019. **IF: 10.1**
- 17 **M. Hölzer^Ψ**, A. Schoen^Ψ, J. Wulle, MA. Müller, C. Drosten, M. Marz, and F. Weber. Virus- and interferon alpha-induced transcriptomes of cells from the microbat *Myotis daubentonii*. *iScience* 1:647–661, 2019. **IF: na**
- 16 K. Laroucau, F. Vorimore, R. Aaziz, L. Solmonson, RC. Hsia, PM. Bavoil, P. Fach, **M. Hölzer**, A. Wuenschmann, and K. Sachse. *Chlamydia buteonis*, a new *Chlamydia* species isolated from a red-shouldered hawk. *Systematic and Applied Microbiology* 2019. **IF: 3.2**
- 15 R. Kallies, **M. Hölzer**, R. Brizola Toscan, U. Nunes da Rocha, J. Anders, M. Marz, and A. Chatzinotas. Evaluation of sequencing library preparation protocols for viral metagenomic analysis from pristine aquifer groundwaters. *Viruses* 11(6):484, 2019. **IF: 3.7**
- 14 S. Peter, **M. Hölzer**, K. Lamkiewicz, P. Speroni di Fenizio, HA. Hwaer, M. Marz, S. Schuster, P. Dittrich, and B. Ibrahim. Structure and hierarchy of influenza virus models revealed by reaction network analysis. *Viruses* 11(5), 2019. **IF: 3.7**
- 13 **M. Hölzer** and M. Marz. *De novo* transcriptome assembly: A comprehensive cross-species comparison of short-read RNA-Seq assemblers. *GigaScience* 8(5), 2019. **IF: 7.3**

- 12 Z. Chen, E. Amro, F. Becker, **M. Hölzer**, S. Rasa, S. Njeru, B. Han, S. Di Sanzo, Y. Chen, D. Tang, S. Tao, R. Haenold, M. Groth, V. Romanov, J. Kirkpatrick, J. Kraus, H. Kestler, M. Marz, A. Ori, F. Neri, Y. Morita, and K. L. Rudolph. Cohesin-mediated NF- κ B signaling limits hematopoietic stem cell self-renewal in aging and inflammation. *J. Exp. Med.* 216(1):152–175, 2018. IF: 10.8
- 11 D. Desirò, **M. Hölzer**, B. Ibrahim, and M. Marz. SilentMutations (SIM): a tool for analyzing long-range RNA-RNA interactions in viral genomes and structured RNAs. *Virus Res.*, 2018. IF: 2.5
- 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 J11-1961, 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. Rummeler, 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. Dose, 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 Siederdisen, M. Al-Arab, K. Tout, M. Marz, M. Middendorf, P. F. Stadler, and M. Bernt. Towards a comprehensive picture of alloacceptor tRNA remodeling in metazoan mitochondrial genomes. *Nucleic Acids Res.* 43(16):8044-8056, 2015. **IF: 11.5**

Submitted journal publications & preprints

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.

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

06/2019	<i>Managing a Bioinformatics Core Facility</i> , European Bioinformatics Institute (EMBL-EBI), Hinxton, UK
07/2018	<i>Fördermöglichkeiten für exzellente Nachwuchswissenschaftler/innen</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)

since 2019	<i>Management board member of “VTPV” registered society</i> Administrative tasks and representation of the scout activities in Thuringia.
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

2019/20	<i>Member of the Cambridge University Whisky Appreciation Society</i>
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

since 1999	<i>Piano</i>
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LANGUAGES

German	Native language
English	Written and spoken fluently

REFERENCES

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High-Throughput Analysis
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Dr. Konrad K. W. Sachse

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Dr. rer. nat. Martin Hölzer

Jena, November 3, 2019