

Georges Hattab

Curriculum Vitae

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Nationality: French. Born 2nd Sep. 1988

Degrees

- 2021 **Habilitation (*Doctor habil*), Computer Science,**
Department of Mathematics and Computer Science, Philipps-Universität Marburg, Marburg, Germany, (submitted 2021).
- 2018 **PhD (*Doctor rerum naturalium*), Bioimage Informatics, Bioinformatics,**
Faculty of Technology, Universität Bielefeld, Bielefeld, Germany.
- 2014 **Master of Science, Technology, Healthcare, Bioinformatics,**
Université Paris VII, Denis Diderot, Université Sorbonne Paris Cité, Paris, France.
- 2012 **Bachelor of Science, Technology, Healthcare, Bioinformatics,**
Université Paris VII, Denis Diderot, Université Sorbonne Paris Cité, Paris, France.

Education & Development

- 2019–2021 **Lecturer,** *Philipps-Universität Marburg, Department of Mathematics and Computer Science, Marburg, Germany.*
- 2019–2021 **Junior Research Group Leader, Data Analytics and Visualization Group.** *Philipps-Universität Marburg, Department of Mathematics and Computer Science, Molecular Storage for Long term Archiving (MOSLA), Marburg, Germany.*
Developing automatic workflows and visualizations for information storage systems that rely on molecular storage media
- 2019–2021 **Head of Bioinformatics Division, Data Science in Biomedicine Group.** *Philipps-Universität Marburg, Department of Mathematics and Computer Science, Marburg, Germany.*
Machine Learning and Bioinformatics for Omics data. Supervised by Prof. Dominik Heider
- 2018–2019 **Postdoctoral Researcher, National Center for Tumor Diseases (NCT), Deutsches Krebsforschungszentrum (DKFZ), University Hospital Carl Gustav Carus, Technische Universität, Dresden, Germany.**
Biomechanical analysis and computer vision for augmented reality of the kidney organ in the field of computer- and robot-assisted surgery. Advised by Prof. Stefanie Speidel

- 2014–2017 **PhD**, *Universität Bielefeld, Biodata Mining Group, Computational Methods for the Analysis of the Diversity and Dynamics of Genomes, German-Canadian DFG Int. Research Training Group*, Bielefeld, Germany.
Analyzing colony dynamics and visualizing cell diversity in spatiotemporal experiments. Supervised by Prof. Tim W. Nattkemper and Prof. Tamara Munzner
- 2016 **Visiting Graduate Student**, *Information Visualization Group, University of British Columbia (UBC)*, Vancouver, BC, Canada.
Development of an efficient algorithm and data abstractions to analyze bacterial colony growth in time-lapse image data. Supervised by Prof. Tamara Munzner
- 2016 **Visiting Graduate Student**, *Database and Data Mining Group, School of Computing Science, Simon Fraser University (SFU)*, Burnaby, BC, Canada.
Scientific exchange. Advised by Prof. Martin Ester
- 2014 **Master**, *Laboratoire Évolution, Génomes et Spéciation (LEGS), CNRS UPR 9034, Université Paris Denis Diderot*, Gif-sur-Yvette, France.
Detection and analysis of trajectory patterns of *Drosophila melanogaster* in a spatial system based on the Morris water maze. Supervised by Dr. Frederic Mery
- 2013 **Internship**, *Institut de Biologie Physico-Chimique (IBPC), CNRS UMR 7099, Université Paris Denis Diderot*, Paris, France.
Proteome and metabolome study of the bacterium strain C43(DE3) throughout membrane proliferation in *Escherichia coli*. Supervised by Prof. Bruno Miroux
- 2013 **Research Assistant**, *Necker-Enfants Malades Hospital, Necker Proteomics (PPN), Université Paris René Descartes, Inserm US 24 CNRS UMS 3633*, Paris, France.
Software deployment and data mining for label-free proteomics. Supervised by Dr. Chiara Guerrera
- 2012 **Bachelor**, *Institut de Biologie Physico-Chimique (IBPC), CNRS UMR 7099, Université Paris Denis Diderot*, Paris, France.
Establishment of a bibliographic and bioinformatics mining tool to research the over-expression of heterologous membrane proteins. Supervised by Prof. Bruno Miroux
- 2010 **Internship**, *Institut Jacques Monod (IJM), CNRS UMR 7592*, Paris, France.
Gene expression profiling and database creation to assess genetic regulations in iron homeostasis in *Saccharomyces cerevisiae*. Supervised by Dr. Denis Mestivier.

Further Experience

- 2021 **Workshop** 'The 11th workshop on Visual Computing for Biology and Medicine.' The Eurographics Association. Paris, France
- 2021 **Workshop** 'Evidence-Based Approaches to Improve Your Teaching – Designing Assessments.' D. Meredith, P. Soto. The Biophysical Society
- 2020 **Workshop** on DNA, polymers and big data from the Transdisciplinary Technology and Health Meetings, 'Colloque ADN, polymères et big data.' CNRS and Académie des Technologies. Paris, France
- 2019 **Workshop** 'Computational Pan-Genomics.' Center for Interdisciplinary Research. J. Stoye, A. Schönhuth. Universität Bielefeld. Bielefeld, Germany
- 2019 **Workshop** 'Perceptual Capacities and Constraints in AR/VR for the visualization of 3D biomedical image data.' Computer Assisted Radiology and Surgery (CARS). R. Eagleson, U. Eck, G. Hattab, B. Preim. Rennes, France

- 2019 **Workshop** 'Surgical Data Science.' Le Couvent des Jacobins Center. L. Maier-Hein, P. Jannin, S. Speidel. Rennes, France
- 2017 **Springer Cover design** for 'Comparative Genomics: Methods and Protocols.' Stoye et al. 2017
- 2016 **Workshop** 'Algorithms for Comparative Genomics.' C. Chauve, J. Stoye. Simon Fraser University. Burnaby, Canada
- 2016 **Workshop** 'Academic Writing in Natural Sciences.' M. Gould. Universität Bielefeld. Bielefeld, Germany
- 2015 **Workshop** 'Intense Course on Data Mining and Visualization'. M. Ester, T.W. Nattkemper, and B. Hammer. Universität Bielefeld. Bielefeld, Germany
- 2015 **Workshop** 'Intense Course on Cancer Genomics.' R. Morin, Y. Wang, A. Cherkasov, S. Volik, R Brinkman, A. Wyatt, S. Shah, and A. Bouchard. Simon Fraser University. Burnaby, Canada
- 2015 **Workshop** '13th Bioinformatics Research and Education Workshop (BREW).' University of Tartu. Tartu, Estonia
- 2015 **Workshop** 'Biodata Visualization and Subcellular localization'. W. Duddy, J. Krüger, S. Müller, and T. Wallmeyer. Universität Bielefeld. Bielefeld, Germany
- 2014 **Volunteer curator** for the United Nations Development Programme (UNDP). Lead curator and book designer for an international collaborative publication: Reversality
- 2012 **Volunteer curator** for the United Nations Children's Fund, UNICEF France. Lead curator and organizer for an international exhibition at PLÂTRE émoi. Paris, France
- 2011–2014 **Volunteer rescuer** at the French Red Cross (Croix-Rouge Française). Paris, France.

Publications

Original work (27), Reviews (2), Data (2), Theses (3)

- 2021 **Kaya, G., Ezekannagha, C., Heider, D., Hattab, G.,** *Context-Aware Phylogenetic Trees*, (in preparation).
- 2021 **Sperlea, T., Schenk, J.P., Dreßler, H., Beisser, D., Hattab, G., Boenigk, J., Heider, D.,** *The relationship between land cover and microbial community composition in European lakes*, *Science of the Total Environment*, (submitted).
- 2021 **Hattab, G., Neumann, N., Anžel, A., Heider, D.,** *CMANGOES: Carbon-based Multi-level Atomic NeiGhborhOod EncodingS*, *Computational and Structural Biotechnology*, (submitted).
- 2021 **Ezekannagha, C., Heider, D., Hattab, G.,** *DNAsmart: Multiple Attribute Ranking Tool for DNA Data Storage Systems*, *ACS Synthetic Biology*, (submitted).
- 2021 **Anžel, A., Heider, D., Hattab, G.,** *MOVIS: MOVIS: A Multi-Omics Software Solution for Multi-modal Time-Series Clustering, Embedding, and Visualizing Tasks*, *Computational and Structural Biotechnology*, (submitted).
- 2021 **Ezekannagha, C., Becker, A., Heider, D., Hattab, G.,** *Sustainable Design for long-term Archiving of information with DNA as green Storage Medium*, *Molecular Systems Biology*, (submitted).

- 2021 **Hannah, L. F., Welzel, M., Hattab, G., Hauschild, A. C., Heider, D.,** *Fractal Construction of Constrained Code Words for DNA Storage Systems*, Nucleic Acids Research, (under revision).
- 2021 **Martin, R., Dressler, H., Hattab, G., Hackl, T., Fischer, M. G., & Heider, D.,** *MOSGA 2: Comparative Genomics and Validation Tools*, Computational and Structural Biotechnology, doi.org/10.1016/j.csbj.2021.09.024.
- 2021 **Anžel, A., Heider, D., Hattab, G.,** *The Visual Story of Data Storage: From Storage Properties to User Interfaces*, Computational and Structural Biotechnology Journal, 19, 4904, doi.org/10.1016/j.csbj.2021.08.031.
- 2021 **Arnold, M., Speidel, S., Hattab, G.,** *Towards improving edge quality using combinatorial optimization and a novel skeletonize algorithm*, BMC Medical Imaging, 21 (1), 1-9, doi.org/10.1186/s12880-021-00650-z.
- 2021 **Hattab, G., Hatzipanayioti, A., Klimova, A., Pfeiffer, M., Klausning, P., Breucha, M., . . . , & Speidel, S.,** *Investigating the utility of VR for spatial understanding in surgical planning: Evaluation of head-mounted to desktop display*, Scientific Reports, 11(1), 1-11, doi.org/10.1038/s41598-021-92536-x.
- 2021 **Spänig, S., Mohsen, S., Hattab, G., Hauschild, A. C., & Heider, D.,** *A large-scale comparative study on peptide encodings for biomedical classification*, NAR genomics and bioinformatics, 3(2), doi.org/10.1093/nargab/lqab039.
- 2021 **Sperlea, T., Kreuder, N., Beisser, D., Hattab, G., Boenigk, J., & Heider, D.,** *Quantification of the covariation of lake microbiomes and environmental variables using a machine learning-based framework*, Molecular Ecology, 30(9), 2131-2144, doi.org/10.1111/mec.15872.
- 2021 **Wagner, D., Heider, D., & Hattab, G.,** *Mushroom data creation, curation, and simulation to support classification tasks*, Scientific reports, 11(1), 1-12, doi.org/10.1038/s41598-021-87602-3.
- 2021 **Hattab, G., Rhyne, T. M., & Heider, D.,** *Correction: Ten simple rules to colorize biological data visualization*, PLoS Computational Biology, 17(4), doi.org/10.1371/journal.pcbi.1008901.
- 2021 **Hufsky, F., Lamkiewicz, K., Almeida, A., Aouacheria, A., Arighi, C., Bateman, A., . . . , Hattab, G., . . . & Marz, M.,** *Computational strategies to combat COVID-19: useful tools to accelerate SARS-CoV-2 and coronavirus research*, Briefings in bioinformatics, 22(2), 642-663., doi.org/10.1093/bib/bbaa232.
- 2020 **Martin, R., Hackl, T., Hattab, G., Fischer, M. G., & Heider, D.,** *MOSGA: Modular Open-Source Genome Annotator*, Bioinformatics, 36 (22-23), 5514-5515, doi.org/10.1093/bioinformatics/btaa1003.
- 2020 **Hattab, G., Rhyne, T. M., & Heider, D.,** *Ten simple rules to colorize biological data visualization*, PLoS Computational Biology, 16(10), doi.org/10.1371/journal.pcbi.1008259.
- 2020 **Martin, R., Löchel, H. F., Welzel, M., Hattab, G., Hauschild, A. C., & Heider, D.,** *CORDITE: the curated CORona drug INTEractions database for SARS-CoV-2*, Iscience, 23(7), 101297, doi.org/10.1016/j.isci.2020.101297.

- 2020 **Hattab, G., Ahlfeld, T., Klimova, A., Koepp, A., Schuerer, M., & Speidel, S.,** *Uniaxial compression testing and Cauchy stress modeling to design anatomical silicone replicas*, Scientific Reports, 10(1), 1-7, doi.org/10.1038/s41598-020-68886-3.
- 2020 **Hattab, G., Ahlfeld, T., Klimova, A., Koepp, A., Schuerer, M., & Speidel, S.,** *Data from Uniaxial Compression testing and validation scripts for Cauchy stress modeling to design anatomical silicone replicas*, 10.24435/materialscloud:2020.0019/v2.
- 2020 **Hattab, G., Riediger, C., Weitz, J., & Speidel, S.,** *A case study: impact of target surface mesh size and mesh quality on volume-to-surface registration performance in hepatic soft tissue navigation*, International journal of computer assisted radiology and surgery, 15(8), 1235-1245, doi.org/10.1007/s11548-020-02123-0.
- 2020 **Hattab, G., Arnold, M., Strenger, L., Allan, M., Arsentjeva, D., Gold, O., ... & Speidel, S.,** *Kidney edge detection in laparoscopic image data for computer-assisted surgery*, International journal of computer assisted radiology and surgery, 15(3), 379-387, doi.org/10.1007/s11548-019-02102-0.
- 2020 **Hattab, G., Meyer, F., Albrecht, R. D., & Speidel, S.,** *MODELAR: A MODular and EvaLuative framework to improve surgical Augmented Reality visualization*, The Eurographics Association, Eurographics & Eurovis 2020, 10.2312/evs.20201066.
- 2019 **Hattab, G., & Nattkemper, T. W.,** *SeeVis-3D space-time cube rendering for visualization of microfluidics image data*, Bioinformatics, 35(10), 1802-1804, doi.org/10.1093/bioinformatics/bty889.
- 2018 **Hattab, G.,** *Analyzing colony dynamics and visualizing cell diversity in spatiotemporal experiments*, Universität Bielefeld, (PhD, Doctor rerum naturalium).
- 2018 **Hattab, G., Wiesmann, V., Becker, A., Munzner, T., & Nattkemper, T. W.,** *A novel Methodology for characterizing cell subpopulations in automated Time-lapse Microscopy*, Frontiers in bioengineering and biotechnology, 6, 17, doi.org/10.3389/fbioe.2018.00017.
- 2017 **Hattab, G., Schlüter, J. P., Becker, A., & Nattkemper, T. W. ,** *ViCAR: an adaptive and landmark-free registration of time lapse image data from microfluidics experiments*, Frontiers in genetics, 8, 69, doi.org/10.3389/fgene.2017.00069.
- 2016 **Hattab, G., Brink, B. G., & Nattkemper, T. W.,** *A mnemonic card game for your amino acids*, Emily Carr University of Art+Design, 1, 48, Information+Conference.
- 2015 **Hattab, G., Warschawski, D. E., Moncoq, K., & Miroux, B.,** *Escherichia coli as host for membrane protein structure determination: a global analysis*, Scientific reports, 5(1), 1-10, doi.org/10.1038/srep12097.
- 2015 **Schlueter, J. P., McIntosh, M., Hattab, G., Nattkemper, T. W., & Becker, A.,** *Phase Contrast and Fluorescence Bacterial Time-Lapse Microscopy Image Data*, Universität Bielefeld, doi.org/10.4119/unibi/2777409.
- 2014 **Hattab, G., Moncoq, K., Warschawski, D., & Miroux, B.,** *Escherichia coli as host for membrane protein structure determination: A global analysis.*, Biophysical Journal, 106(2), 46a, doi.org/10.1016/j.bpj.2013.11.335.

- 2014 **Hattab, G.**, *Pattern recognition in a heat maze based spatial system adapted to Drosophila melanogaster*, Université Paris-Saclay. Université Paris Denis Diderot, (Master of Science).
- 2012 **Hattab, G.**, *Establishment of a bibliographic and bioinformatics mining tool to research the over-expression of heterologous membrane proteins*, Institute of Biological Physical Chemistry. Université Paris Denis Diderot, (Bachelor of Science).

Patents

Books

- 2021 **Marey, E. J.**, *The Graphic Method, La Méthode Graphique*, Information Graphic Visionaries, Translated and edited by Hattab, G. Co-edited by Andrews, R. J., (in production).
- 2015 **Hattab, G., Bahram, B., Nazar Pastor, K.**, *Reversality*, Lulu, Photobook archive. Center for Contemporary Art, Tehran, Iran. The International Center of Photography, New York, NY, USA.
- 2014 **Hattab, G., Suisse, A. Y., Iliaia, O., Casiraghi, M., Dezi, M., Warnet, X. L. ... & Miroux, B.**, *Membrane protein production in Escherichia coli: overview and protocols. Membrane Proteins Production for Structural Analysis*, Springer, 87-106, doi.org/10.1007/978-1-4939-0662-8_4 .

Selected Conferences

- 2021 IEEE Visualization Conference (VIS). New Orleans, Louisiana, USA. (attendee)
- 2021 The 29th German Conference on Bioinformatics (GCB). Virtual (co-author one paper in proceedings)
- 2020 IEEE Visualization Conference (VIS). Salt Lake City, Utah, USA. (attendee)
- 2020 The 28th German Conference on Bioinformatics (GCB). Frankfurt, Germany (co-author two papers in proceedings)
- 2020 Eurographics & Eurovis (EGEV) 2020. Norrköpping, SE (paper in proceedings)
- 2019 The 33rd International Conference on Computer Assisted Radiology and Surgery (CARS). Rennes, FR (workshop talk and co-organizer)
- 2018 The 9th International Conference on Information Processing in Computer-Assisted Interventions (IPCAI). Berlin, DE (event assistant)
- 2016 IEEE Visualization Conference (VIS). Baltimore, MD, USA (attendee)
- 2016 Information+ conference. Emily Carr University. Vancouver, BC, CA (highlight talk and exhibition)
- 2015 The 7th Gender summit (GS7): Mastering gender in research performance, contexts, and outcomes. Berlin, DE (attendee)
- 2015 Membrane Protein Structures 2015 Meeting (MPS): Advance Photon Source. Argonne National Laboratory. Lemont, IL, USA (abstract in proceedings)
- 2014 The 22nd German Conference on Bioinformatics (GCB). Bielefeld, DE (attendee)

- 2014 DYNAMO Labex Symposium: Evolution, biogenesis and dynamics of energy transducing membranes. Oceanographic Institute. Paris, FR (poster)
- 2014 Biophysical Society: The 58th Annual Meeting. Biophys J 106 (2, Suppl 1): 46a. San Francisco, CA, USA. (poster and abstract in proceedings)
- 2013 Bioenergetics: Gordon Research Conferences. Proctor Academy. Andover, NH, USA (highlight talk).

Invited Communications

Verbal

- 2021 **Colloquium** 'Hidden Data Facets in Bioinformatics.' Colloquium for Bioinformatics and Systems Biology. (KoBiS) Kolloquium für Bioinformatik und Systembiologie Mittelhessen. University of Applied Sciences Middle Hesse. Giessen, Germany
- 2019 **Lecture** 'Visual Computing.' Institute of Simulation and Graphics (ISG), Otto-von-Guericke-Universität Magdeburg. H. Theisel, B. Preim. Magdeburg, Germany
- 2019 **Workshop** 'The 9th Summer on School Surgical Robotics.' Laboratory of Computer Science, Robotics and Microelectronics Laboratory of Computer Science, Robotics and Microelectronics (LIRMM), CNRS. P. Poignet, N. Zemiti. Montpellier, France
- 2019 **Workshop** 'Perceptual Capacities and Constraints in AR/VR for the visualization of 3D biomedical image data.' The 33rd International Conference on Computer Assisted Radiology and Surgery (CARS). R. Eagleson, G. Hattab, B. Preim, U. Eck. Rennes, France
- 2015 **Lecture** 'Interdisciplinary vue d'ensemble.' At the Interface of Science and Art, Art 101. Department of Art, University of Oregon. F. Bahram. Eugene, OR, USA.

Collaborative

- 2020 **Article** 'A Snapshot View of IEEE Visualization (VIS) 2020.' ACM SIGGRAPH, the international Association for Computing Machinery's Special Interest Group on Computer Graphics and Interactive Techniques. T. M. Rhyne. blog.siggraph.org

Teaching

Philipps-Universität Marburg. Marburg, Germany

- 2020-2021 **Lecture** Data Visualization. Bilingual (EN/DE). Four consecutive semesters (4 SEM)
- 2020-2021 **Seminar** Biological Data Visualization. 3 SEM
- 2021 **Seminar** Information Theory Tools for Visual Computing. 2 SEM

Universität Bielefeld. Bielefeld, Germany

- 2015–2016 **Seminar** 'Visualization approaches for biological data (BioVITAL).' 2 SEM.

Advising & Supervision

Philipps-Universität Marburg. Marburg, Germany

- Aleksandar Anžel, Ph.D. Computer Science (CS), 12.2023 (tentative)
- Chisom Ezekannagha, Ph.D. CS, 10.2023 (tentative)
- Roman Martin, Ph.D. CS, 12.2021 (A, tentative)

Fabio Rougier, M.Sc. CS. 5.2022 (tentative)
 Liu Chang, M.Sc. Business Informatics (BI), 4.2022 (tentative)
 Yin Lanhan, M.Sc. BI, 3.2022 (tentative)
 Gizem Kaya, B.Sc. BI, 10.2021
 Theodor Sperlea, Ph.D. Natural Science, 9.2021 (Advisor, A)
 Sandra Clemens, CS Projektarbeit, 6.2021
 Nils Neumann, M.Sc. CS, 11.2020
 Johannes Tauscher, B.Sc. CS, 10.2020
 Dennis Wagner, B.Sc. CS, 9.2020
 University Hospital Carl G. Carus, Technische Universität. Dresden, Germany
 Ljupka Titizova, CS Projektarbeit, 11.2019
 Oliver Gold, B.Sc. Computer Science, 9.2019
 Alexander Koepp, Medical Projektarbeit, 10.2018

Departmental Work

Committees

2021 **Habilitation committee**, M. C. Thrun, Department of Mathematics and Computer Science. Philipps-Universität Marburg. Marburg, Germany

Administration

2015–2016 **Student Representative**, Graduate school 'Computational Methods for the Analysis of the Diversity and Dynamics of Genomes', Universität Bielefeld. Bielefeld, Germany.

Refereeing Services and Scientific Committees

Reviewer

2014–2021 *Oxford Bioinformatics, BMC Bioinformatics, BMC Biodata Mining, PLOS Computational Biology, Springer Science Information China, Elsevier Journal of Computational Science, Springer International Journal of Computer Assisted Radiology and Surgery.*

Board Member

2021 **Scientific**, Center for Synthetic Microbiology, *Zentrum für Synthetische Mikrobiologie (SYNMIKRO)*, Philipps-Universität Marburg

2019–2021 **Editorial**, *Nightingale*, The Journal of the Data Visualization Society.

Funding

2020-2021 **Center for Interdisciplinary Research**, *Zentrum für interdisziplinäre Forschung (ZiF)*, the 1th International Conference on Data Storage in Molecular Media (DSMM), Bielefeld, Germany, (funding awarded to organize the conference).

2019 **Intuitive Surgical Inc.**, *CARS Conference*, Rennes, France, (sponsorship awarded for the AR/VR 3D biomedical image data visualization workshop).

Awards

- 2017–2018 **Jump-start position**, *Bielefeld University, DFG GRK 1906*, Bielefeld, Germany, Funded position awarded to transition from a PhD to a Postdoctoral position.
- 2014 **Ryoichi Sasakawa Young Leaders Fellowship Fund (Sylff)**, *Bahram, F., Hattab, G., Nazar Pastor, K.*, Award granted by the Tokyo Foundation.

Skills & Competences

Programming & Scripting Python, Perl, C, C++, Mathematica, PL/PGSQL, PostgreSQL, xHTML, PHP, Javascript, R, \LaTeX , ConTeXt

Other Bioinformatics, Data Science, Image Processing, Machine Learning, Visualization.

Languages

French	native speaker	–
English	near native	CEFR (C2)
German	very good command	CEFR (B2)

References

Prof. Dr. Dominik Heider	dominik.heider@uni-marburg.de
Theresa-Marie Rhyne	theresamarierhyne@gmail.com
Prof. Dr. Ing. Tim W. Nattkemper	tim.nattkemper@uni-bielefeld.de
Prof. Dr. Tamara Munzner	tmm@cs.ubc.ca
Dr. Roland Wittler	roland.wittler@uni-bielefeld.de
Prof. Dr. Bruno Miroux	bruno.miroux@ibpc.fr