

## Prof. Dr. Hauke S. Hillen

Curriculum Vitae

### Personal data

Name	Hillen
First names	Hauke Sven
Title	Dr. rer. nat. (Ph.D.)
Date of birth	May 17, 1987
Place of birth	Erlangen, Germany
Nationality	German

### Contact information

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### Academic Positions

since 2024	Professor of Protein Biochemistry (W2) Department of Cellular Biochemistry, University Medical Center Göttingen, Germany
since 2020	Independent Research Group Leader Max-Planck-Institute for Multidisciplinary Sciences, Göttingen, Germany
2020 - 2024	Assistant Professor of Protein Biochemistry (W1 tenure-track W2) Department of Cellular Biochemistry, University Medical Center Göttingen, Germany
2018 – 2020	Project leader Department of Molecular Biology, Max-Planck-Institute for Biophysical Chemistry, Göttingen, Germany

### Education

2013 – 2017	PhD in Biochemistry (Dr. rer. nat., 'summa cum laude') Ludwigs Maximilians University Munich, Germany (with Prof. Dr. Patrick Cramer)
2012	Visiting Researcher University of California at Berkeley, USA (with Prof. Dr. Jennifer Doudna)
2007 – 2013	Diploma studies in Biochemistry (Diplom Biochemiker) Eberhard Karls University Tübingen, Germany

## Awards and Fellowships

2023	EMBO Young Investigator Programme
2022	Peter und Traudl Engelhorn Research Prize 2022
2018	Bayer Healthcare PhD Prize by the German Society for Biochemistry and Molecular Biology (GBM)
2014 – 2016	Boehringer Ingelheim Fonds PhD Fellowship
2012	PROMOS Fellowship of the German Academic Exchange Service (DAAD)

## Extramural Funding

2024 – 2028	ERC Starting Grant “MitoRNA”
2024 – 2027	DFG Project (Einzelantrag Sachbeihilfe)
2022 – 2023	Stay Inspired Grant, Niedersächsisches Ministerium für Wissenschaft und Kultur
2023 – 2027	Full Project in the Collaborative Research Center SFB1565 “Molecular Mechanisms and Interplay of Gene Expression Processes”
2023 – 2026	Seed Fund Grant from the Excellence Cluster “Multiscale Bioimaging: From Molecular Machines to Networks of Excitable Cells” by the Deutsche Forschungsgemeinschaft
2023 – 2026	Full Project in the Research Alliance FOR2848 “Nanoscale Architecture and Heterogeneity of the Mitochondrial Inner Membrane” by the Deutsche Forschungsgemeinschaft
2022 – 2023	Full Project in the Collaborative Research Center SFB1190 “Compartmental Gates and Contact Sites in Cells” by the Deutsche Forschungsgemeinschaft
2020 – 2021	Startup funding from the Collaborative Research Center SFB1190 “Compartmental Gates and Contact Sites in Cells” by the Deutsche Forschungsgemeinschaft
2019	Startup-module of the Research Alliance FOR2848 “Nanoscale Architecture and Heterogeneity of the Mitochondrial Inner Membrane” by the Deutsche Forschungsgemeinschaft

## Reviewing activities

Journals: Scientific reviewer for *Nature*, *Science*, *eLife*, *Nature Communications*, *Nucleic Acids Research*, *Nature Reviews Molecular Cell Biology*, *RNA*

Funding agencies & institutions: Scientific Reviewer for European Research Council (ERC), Fondazione Human Technopole (HT), Deutsche Forschungsgemeinschaft (DFG), University of Leuven (Belgium), UK Research and Innovation (UKRI)

## Institutional Responsibilities and Miscellaneous

Since 2023	Member of the Göttingen Center for Molecular Biosciences (GZMB)
Since 2023	Faculty Member of the International Max Planck Research School (IMPRS) Genome Science, University of Göttingen, Germany

### Institutional Responsibilities and Miscellaneous (continued)

- Since 2021 Faculty Member of the International Max Planck Research School (IMPRS) Molecular Biology, University of Göttingen, Germany
- Since 2021 Associated Member of the European Neuroscience Institute (ENI), Göttingen, Germany
- Since 2020 Associated Member of the Cluster of Excellence “Multiscale Bioimaging: From Molecular Machines to Networks of Excitable Cells”, University of Göttingen, Germany

### Teaching

- Since 2022 Methods Course „Characterization and quantification of biomolecular interactions by fluorescence polarization“ for PhD students, University of Göttingen, Germany
- Since 2021 Examiner „Erster Abschnitt der Ärztlichen Prüfung“, University of Göttingen, Germany
- Since 2021 Undergraduate teaching for medical students (seminar “Einführung in die Klinische Medizin IV“, lecture „Biochemie für Mediziner, Zahnmediziner und Molekularmediziner“, seminar „Biochemie“) University of Göttingen, Germany
- Since 2021 Lecture “DNA Structure”, IMPRS Molecular Biology Program, University of Göttingen, Germany
- 2018 Organizer and lecturer, methods course „Crystallization and X-ray structure determination of biological macromolecules“, IMPRS Molecular Biology Program, University of Göttingen, Germany

### Peer-reviewed publications

\* shared first authorship # corresponding author

1. Bhatta A, Kuhle B, Yu RD, Spanaus L, Ditter K, Bohnsack KE, Hillen HS<sup>#</sup>. Molecular basis of human nuclear and mitochondrial tRNA 3' processing. ***Nature Structural & Molecular Biology*** 2025 Jan 2.
2. Vučković A, Freyer C, Wredenber A, Hillen HS<sup>#</sup>. The molecular machinery for maturation of primary mtDNA transcripts. ***Hum Mol Genet.*** 2024 May 22;33(R1):R19-R25
3. do Prado PFV, Ahrens F, Liebers M, Ditz N, Braun HP, Pfannschmidt T, Hillen HS<sup>#</sup> (2024) Structure of the multi-subunit chloroplast RNA polymerase. ***Molecular Cell*** Mar 7;84(5):910-925.e5.
4. Poerschke S, Oeljeklaus S, Cruz-Zaragoza LD, Schenzielorz A, Dahal D, Hillen HS, Das H, Kremer LS, Valpadashi A, Breuer M, Sattmann J, Richter-Dennerlein R, Warscheid B, Dennerlein S, Rehling P. (2024) Identification of TMEM126A as OXA1L-interacting protein reveals cotranslational quality control in mitochondria. ***Molecular Cell.*** 84(2):345-358.e5.
5. Hillen HS. (2023) Cryo-EM for Structure Determination of Mitochondrial Ribosome Samples. ***Methods in molecular biology*** (Clifton, N.J.), 2661, 89–100.

### Peer-reviewed publications (continued)

6. Wohlfarter Y, Eidelpes R, Yu RD, Sailer S, Koch J, Karall D, Scholl-Bürgi S, Amberger A, Hillen HS, Zschocke J, Keller MA. (2022) Lost in promiscuity? An evolutionary and biochemical evaluation of HSD10 function in cardiolipin metabolism. ***Cellular and Molecular Life Sciences*** 79, 562
7. Bögershausen N, Krawczyk HE, Jamra RA, Lin SJ, Yigit G, Hüning I, Polo AM, Vona B, Huang K, Schmidt J, Altmüller J, Luppe J, Platzer K, Dörgeloh BB, Busche A, Biskup S, Mendes MI, Smith DEC, Salomons GS, Zibat A, Bültmann E, Nürnberg P, Spielmann M, Lemke JR, Li Y, Zenker M, Varshney GK, Hillen HS, Kratz CP, Wollnik B. (2022) WARS1 and SARS1: Two tRNA synthetases implicated in autosomal recessive microcephaly. ***Human Mutation*** 43(10):1454-1471
8. Bhatta A, Hillen HS<sup>#</sup> (2022) Structural and mechanistic basis of RNA processing by protein-only ribonuclease P enzymes. ***Trends Biochem Sci.*** 2022 Jun 18:S0968-0004(22)00139-6
9. Bhatta A, Dienemann C, Cramer P, Hillen HS<sup>#</sup> (2021) Structural basis of RNA processing by human mitochondrial Rnase P. ***Nature Structural & Molecular Biology*** 28, 713-723.
10. Lavdovskaia E, Hillen HS<sup>#</sup> & Richter-Dennerlein R<sup>#</sup> (2021). Hierarchical folding of the catalytic core during mitochondrial ribosome biogenesis. ***Trends in Cell Biology***
11. Kabinger F, Stiller C, Schmitzová J, Dienemann C, Hillen HS, Höbartner C, Cramer P (2021) Mechanism of molnupiravir-induced SARS-CoV-2 mutagenesis. ***Nature Structural & Molecular Biology*** 28, 740-746.
12. Jochheim FA, Tegunov D, Hillen HS, Schmitzová J, Kokic G, Dienemann C, Cramer P (2021) The structure of a dimeric form of SARS-CoV-2 polymerase. ***Communications Biology*** 4, 999
13. Hillen HS<sup>#</sup>, Lavdovskaia E, Nadler F, Hanitsch E, Linden A, Bohnsack KE, Urlaub H, Richter-Dennerlein R<sup>#</sup> (2021) Structural basis of GTPase-mediated mitochondrial ribosome biogenesis and recycling. ***Nature Communications*** 12, 3672
14. Hillen HS (2021) Structure and function of SARS-CoV-2 polymerase (2021) ***Current Opinion in Virology*** 48, 82-90
15. Hillen HS<sup>\*</sup>, Markov DA<sup>\*</sup>, Wojtas ID, Hofmann KB, Lidschreiber M, Cowan AT, Jones JL, Temiakov D, Cramer P, Anikin M (2021) The pentatricopeptide repeat protein Rmd9 recognizes the dodecameric element in the 3'-UTRs of yeast mitochondrial mRNAs. ***Proceedings of the National Academy of Sciences USA*** 118 (15)
16. Kokic, G<sup>\*</sup>, Hillen HS<sup>\*</sup>, Tegunov D<sup>\*</sup>, Dienemann C<sup>\*</sup>, Seitz F<sup>\*</sup>, Schmitzová J, Farnung L, Siewert A, Höbartner C, Cramer P (2021) Mechanism of SARS-CoV-2 polymerase stalling by remdesivir. ***Nature Communications*** 12, 279
17. Bonekamp NA, Peter B, Hillen HS, Felser A, Bergbrede T, Choidas A, Horn M, Unger A, Di Lucrezia R, Atanassov I, Li X, Koch U, Menninger S, Boros J, Habenberger P, Gialvalisco P, Cramer P, Denzel MS, Nussbaumer P, Klebl B, Falkenberg M, Gustafsson CM, Larsson N-G (2020) Small-molecule inhibitors of human mitochondrial DNA transcription. ***Nature*** 588, 712-716
18. Hillen HS<sup>\*</sup>, Kokic G<sup>\*</sup>, Farnung L<sup>\*</sup>, Dienemann C<sup>\*</sup>, Tegunov D<sup>\*</sup>, Cramer P (2020) Structure of replicating SARS-CoV-2 polymerase. ***Nature*** 584, 154–156
19. Hillen HS<sup>\*</sup>, Bartuli J<sup>\*</sup>, Grimm C, Dienemann C, Bedenk K, Szalay AA, Fischer U, Cramer P (2019) Structural Basis of Poxvirus Transcription: Transcribing and Capping Vaccinia Complexes. ***Cell*** 179, 1525-1536.e12

### Peer-reviewed publications (continued)

20. Grimm C\*, Hillen HS\*, Bedenk K, Bartuli J, Neyer S, Zhang Q, Hüttenhofer A, Erlacher M, Dienemann C, Schlosser A, Urlaub H, Böttcher B, Szalay AA, Cramer P, Fischer U (2019) Structural Basis of Poxvirus Transcription: Vaccinia RNA Polymerase Complexes. **Cell** 179, 1537-1550.e19
21. Hillen HS#, Temiakov D, Cramer P# (2018) Structural basis of mitochondrial transcription. **Nature Structural & Molecular Biology** 25, 754–765
22. Hillen HS, Parshin AV, Agaronyan K, Morozov YI, Graber JJ, Chernev A, Schwinghammer K, Urlaub H, Anikin M, Cramer P, Temiakov D (2017) Mechanism of Transcription Anti-termination in Human Mitochondria. **Cell** 171, 1082-1093.e13
23. Hillen HS, Morozov YI, Sarfallah A, Temiakov D, Cramer P (2017) Structural Basis of Mitochondrial Transcription Initiation. **Cell** 171, 1072-1081.e10

### Preprints and non-peer-reviewed publications

# corresponding author

24. Sala F, Ditter K, Dybkov O, Urlaub H, Hillen HS (2024) Structural basis of Nipah virus replication. **bioRxiv**
25. Bhatta A, Kuhle B, Yu RD, Spanaus L, Ditter K, Bohnsack KE, Hillen HS (2024) Molecular basis of human nuclear and mitochondrial tRNA 3' processing. **bioRxiv**
26. Bhatta A & Hillen HS# (2022). Mitochondrien: wie die Gene im Kraftwerk der Zelle aktiviert werden. **BIOspektrum**, 28 (1), 18–20.
27. Cramer P#, Kokic G, Dienemann C, Höbartner C, Hillen HS# (2021) Coronavirus-Replikation: Mechanismus und Inhibition durch Remdesivir. **BIOspektrum** 27 (1), 49-53

### Invited talks and public appearances (selected)

*“Molecular basis of RNA biogenesis in human mitochondria”*, EMBO/FEBS Lecture Course *Mitochondria in Life, Death & Disease* 2024, Landshut, Germany (September 2024)

*“Molecular basis of organellar RNA biogenesis”*, GRC Mitochondria & Chloroplasts 2024, Barcelona, Spain (July 2024)

*“Molecular basis of RNA biogenesis in human mitochondria”*, Horizons in Molecular Biology 2023, Göttingen, Germany (September 2023)

*“From Genes to Power Machines: Molecular basis of gene expression in human mitochondria”*, Tampé Lab (Goethe University Frankfurt) Summer School, Kleinwalsertal, Austria (August 2023)

*“Mechanisms of mitochondrial RNA biogenesis in health and disease”*, Invited talk, Euromit 2023, Bologna, Italy (June 2023)

*“Molecular basis of human mitochondrial gene expression”*, University of Geneva, Geneva, Switzerland (February 2023)

*“Molecular basis of human mitochondrial gene expression”*, University of Bern, Bern, Switzerland (February 2023)

*“Molecular basis of human mitochondrial gene expression”*, MitoClub, SFB1218, Cologne, Germany (August 2022)

### **Invited talks and public appearances (continued)**

*“Molecular basis of transcription and RNA processing in human mitochondria”*, EMBO Workshop Mitochondrial Gene Expression, Bro, Sweden (May 2022)

*“Transcription and RNA processing in human mitochondria”*, Joint Symposium of SFB1190, MBExC and iMol Institute Warsaw, Göttingen, Germany (May 2022)

*“Molecular basis of transcription and RNA processing in human mitochondria”*, MolMet Webinar, Karolinska Institutet, Stockholm, Sweden (November 2021)

*“Molecular basis of transcription and RNA processing in human mitochondria”*, Club Mitochondrie, I2BC, Paris, France (October 2021)

*“From pathogens to symbionts: Cryo-EM of viral and mitochondrial gene expression machineries”*, MBExC Symposium Göttingen (October 2021)

*“From SARS-CoV-2 to mitochondria: Mechanisms of viral and organellar gene expression”*, Thomas Jefferson University, Philadelphia, USA (April 2021)

*“Watching coronavirus multiply: Structure, function and inhibition of SARS-CoV-2 RNA polymerase”*, Buchmann Institute for Molecular Life Sciences Frankfurt (March 2021)

*“The genes that power us: Molecular basis of human mitochondrial gene expression”*, GBM Lunch Seminar (January 2021)

*“Structural basis of poxvirus transcription”*, Department of Biochemistry and Molecular Biophysics, Columbia University, NY, USA (August 2019)

*“Structural basis of transcription by a viral multisubunit RNA polymerase”*, GRC: Mechanisms of Microbial Transcription, Lewiston, ME, USA (July 2019)

*“Structural and mechanistic basis of mitochondrial transcription”*, Division of Molecular Metabolism, Karolinska Institutet, Stockholm, Sweden (May 2019)

*“Structural basis of mitochondrial transcription”*, Department of Biochemistry and Molecular Biophysics, Columbia University, NY, USA (October 2018)

*“How mitochondrial genes are activated – or: Molecular machines in 3-D”*, Max-Planck-Day 2018, Göttingen, Germany (September 2018)

*“Structural basis of human mitochondrial transcription”*, 31<sup>st</sup> European Crystallographic Meeting (ECM31), Oviedo, Spain (August 2018)

*“Structural basis of human mitochondrial transcription”*, CryoNet seminar in structural biology, SciLifeLab Stockholm, Sweden (June 2018)

*“Structural basis of human mitochondrial transcription initiation”*, EMBO Workshop Molecular Biology of Mitochondrial Gene Expression, Svartsjö, Sweden, (May 2018)

*“Structural basis of human mitochondrial transcription”*, Bayer Healthcare PhD Prize Award Lecture, 69<sup>th</sup> Mosbacher Kolloquium of the GBM, Mosbach, Germany (March 2018)

*“Integrated structural biology of non-nuclear transcription systems”*, Symposium “Structural Biology meets Cell Biology”, Göttingen, Germany (December 2017)

*“Structural basis of mitochondrial transcription initiation and elongation”*, Department of Cell Biology, Rowan University of Osteopathic Medicine, Stratford, NJ, USA (August 2017)

*“Structural basis of mitochondrial transcription initiation”*, FASEB SRC “Mechanisms and Regulation of Prokaryotic Transcription”, Saxton Rivers, VT, USA (June 2017)