Curriculum Vitae Dr. Michael Lupberger

Personal data

Date of birth	24/06/1983
Place of birth	Freiburg im Breisgau, Germany
Marital status	Married, two children (born December 2016 and February 2020)
Nationality	German
ORCID	0000-0002-5480-3576, INSPIRE-HEP ID 1468297, Linked in

Summary

- Physicist | Field: Experimental particle/nuclear physics | Core research: Detectors & data acquisition
- Currently: Research Associate, co-section leader R&D and BMBF multi-project (co-)leader
- Previously: EU Marie Curie Fellow (2020-2022) and CERN Fellow (2016-2019)
- PhD defence 08/03/2016, University of Bonn
- Third-party funds: 175 k€ + 3.4 M€ (my projects with other PIs), Internal funds: ≈ 45 k€
- 56 publications (4 in *large* collaborations, 11 first or corresponding author, INSPIRE HEP h-index: 13)

References: Bonn K. Desch, B. Ketzer | Freiburg M. Schumacher | DRD1 E. Oliveri | LHCb H. Schindler

Professional development

Since 05/2019 Research Associate (until 2022 as Marie Curie Fellow), University of Bonn

Detector R&D and construction subgroup (${\approx}12$ members) co-leader:

- Link person AGs Ketzer/Desch (Research and Technology center for Detector Technologies)
- Project team formation by recruitment and student training, co-supervision, coaching
- \bullet Proactive empathic leadership, strategic planning, grant applications with group leaders
- \bullet Multi-project management, introduction/test of agile methods (Scrum, Kanban) in JIRA
- Coordination in our groups, institute, national consortia and international collaborations

Main project (AG Ketzer, Helmholtz-Institut für Strahlen- und Kernphysik):

• Triggerless streaming readout & high-rate GEM detectors for the CERN AMBER experiment (BMBF funded, project leader, co-supervisor and technical work with \emptyset 2-3 students)

Secondary projects (AG Desch, Physikalisches Institut):

• Neutron detectors/electronics development (BMBF funded, networking, management, project advisor/co-leader, co-supervision/coaching 1 Postdoc, 2 PhDs)

• Machine Learning on FPGA (Internal funding, global networking, supervision 1 PhD) **Past projects** (AG Ketzer and AG Desch):

• Marie Curie (2020-2022) *A general data acquisition system to enable future experiments* (Technical work with 4 master students, management/leadership, supervision)

- Internal funds (2024) Photolithography micro-structuring (co-supervision 1 master student)
- BMBF ErUM-Pro (2019-2022) Neutron detectors/electronics development (Technical work, group formation master \rightarrow PhDs, management/co-leadership, supervision)
- 2020 2021 Six months parental leave, four of which part-time
- 05/2016 CERN Fellow in the Experimental Physics Detector Technology division,
- 04/2019 European Organisation for Nuclear Research (CERN), Geneva
- 2010 2016 Research Associate (ATLAS serial powering) and PhD student, University of Bonn
- 2009 2010 Stagiaire, CEA Saclay, France in the group of Dr. Paul Colas, research for the diploma thesis
- 2005 2007 Student assistant, Fraunhofer-Institute for short-time dynamics, Freiburg, group space-

craft technology: satellite component impact tests, ESA- and EADS-ASTRIUM-projects

Academic education

- 08/03/2016Doctoral degree in natural science/physics, Dr. rer. nat, final grade: magna cum laude
PhD thesis title: The Pixel-TPC: A feasibility study (A "real breakthrough" according to the
ECFA Detector R&D Roadmap), supervisor: Prof. Dr. Klaus Desch (University of Bonn)
- **2010 2015 PhD student** in the detector development group of Prof. Dr. Klaus Desch

	Physikalisches Institut, University of Bonn
28/09/2010	Diploma in physics , final grade: sehr gut Diploma thesis title: <i>Avalanche statistics and single electron counting with a</i> <i>Timepix-InGrid detector</i> , supervisors: Dr. Paul Colas (CEA Saclay, France), Prof. Dr. Markus Schumacher (University of Freiburg)
2004 - 2010	Studies of physics at the University of Freiburg Stays abroad (each nine months): CEA Saclay, France: Research for the diploma thesis University of Aberdeen, Scotland: ERASMUS Diploma Science
2004	Correspondence course Physics/Mathematics at the TU Kaiserslautern

Research funding

applied	BMBF ErUM-Data project funding Empowering Data Efficiency In Embedded Processors with Artificial Intelligence (ErUM-Data, 515 k€ as PI)
co-applied	BMBF ErUM-Pro project funding <i>Boron-based Neutron Detector platform (BoND)</i> (ErUM Matter, 910 k€, with Dr. Kaminski as PI)
2024	BMBF ErUM-Pro project funding <i>AMBER: Experimente zur QCD am M2-Strahl des CERN SPS</i> (ErUM Particles, 1.4 M€, with Prof. Ketzer as PI)
2022	BMBF ErUM-Pro project funding <i>Instrumentation for Next GEneration Neutron Science</i> (ErUM Matter, 849 k€, with Dr. Kaminski as PI)
2019	BMBF ErUM-Pro project funding <i>Next Generation Readout Infrastructure for Neutron Detectors</i> (ErUM Matter, 857 k€, with Dr. Kaminski as PI)
2019	Marie Curie Fellowship from the European Union (175 k€ as PI)
2015	EU AIDA-2020 WP13: Innovative Gas Detectors (300 k€, with Prof. Desch as PI)
Unsuccessful	as PL to FrIIM-Data DEG Research Unit Emmy-Noether FRC Starting Grant NRW Rückkehr

successful as PI to ErUM-Data, DFG Research Unit, Emmy-Noether, ERC Starting Grant, NRW Rückkehr

Internal funding/Awards/Grants

2022	ERC-STG application Seed Funding , Transdis. Research Area Matter, University of Bonn (20 k€)
2022	Funding to prepare a grant application with CEA Saclay, University of Bonn (20 k \in)
2021	Funding for one student assistant to mitigate pandemic effects, University of Bonn (2 k€)
2019	International cooperation grant with ETH Zurich, University of Bonn (1 k€)
2015	Conference Trainee Grant and Valentin T. Jordanov Radiation Instrumentation Travel Grant for the IEEE NSS conference in San Diego, USA
2013	Georges Charpak Young Scientist Award granted during the MPGD2013 conference in Zaragoza, Spain for my contributions to the field of modern gas detector technologies, CERN Courier Vol. 53 No. 9 33-34 (2013)
2009	Stipends by DAAD and the Freiburg University Club for stay abroad in Saclay, France

Scientific supervision of students

Helmholtz-Institut für Strahlen- und Kernphysik: 2 student assistants, 1 PhD co-supervised Currently Physikalisches Institut: 1 PhD + 1 PhD co-supervised + 1 bachelor student co-supervised Past 1 PhD, 1 visiting CERN PhD 1 Diploma, 11 Master, 4 Bachelor 4 Student assistants, 1 ERASMUS internship, 3 CERN summer students, 1 CERN internship

Further support to early career researchers

2020	Recruitment and integration of a PostDoc from Turkey to Germany and the research group
2019	Recruitment and integration of a PhD student from India to Germany and the research group
Since 2019	Collection of Conferences and Summer schools, promotion of participation to students
2011 - 2016	Pro-Buddy programme at the University of Bonn (foreign PhD student assistance)

Teaching: Training and experience

2017	Training course Communication: Science or Art? (1 day) CFRN
2017	Sominar Tagehing Communication (2 days) University of Bonn
2015	Seminar <i>Teaching Competencies</i> (2 days), Oniversity of Bohn
2012	Workshop Educational Teaching in Particle Physics (3 days), Netzwerks Teilchenwelt
2024	Seminar Detector Physics, tutor , 3 SWS
2023/24	Bachelor seminar Presentation Techniques, tutor, 3 SWS
2023	Graduate School Detector Seminar, tutor , 3 SWS
2023	Physics II for Natural Scientists, assistant lecturer, with Prof. Brock, 6 hours
2022/23	Physics of Particle Detectors, lecturer , shared (\approx 1/3) with Prof. Ketzer, 4 SWS
2022	Bachelor seminar Presentation Techniques, tutor, 3 SWS
2021/22	Hands-on Master seminar: Detector Construction, lecturer, 3 SWS
2021	Advanced Gaseous Detectors - Theory and Practice (Master), lecturer , 4 SWS (cancelled) Pentecost break lecture on Special Relativity, Physics II, lecturer , 4 hours
2020/21	Physics I for Natural Scientists, head tutor , 4 SWS
2020	Master seminar Presentation Techniques, tutor/co-organiser, 3 SWS
2019/20	Particle Astrophysics (Master), head tutor , 4 SWS + lecturer substitute (2 hours)
2014	RD51 Electronics School, CERN, lecture on FPGA programming, 4 hours
2010 - 2016	Tutorships Physikalisches Institut, University of Bonn
2008 - 2009	Tutorships Physikalisches Institut, University of Freiburg

Organisation of scientific meetings, convenerships

Since 2024	Convener DRD1 Electronics Working Group, CERN
Since 2022	Organiser of the Detector Physics Seminar, University of Bonn
Since 2021	Chair of the AG Ketzer hardware group meetings, University of Bonn
Since 2021	Session Chair on DPG Spring Conferences
2022 - 2024	Organiser of two Hands-on workshops Machine Learning, University of Bonn
2019 - 2022	Co-chair of the AG Desch hardware group meetings, University of Bonn
2017 - 2021	Convener PICOSEC analysis group, CERN
2016 - 2018	Convener, work package leader BrightnESS (Horizon2020), CERN
2011 - 2016	Convener LCTPC-pixel working group, University of Bonn
2012	Organiser workshop on GridPix detectors, University of Bonn

Declined nomination requests from search committees: AMBER Spokesperson, DRD1 Management Board

Institutional responsibilities

2021 - 2025	Steering Committee member Transdisciplinary Research Area Matter, University of Bonn
2021-2023	Member of a committee for a family-friendly work environment , University of Bonn
2021 -2022	Member of a professor appointment committee , University of Bonn
2007	Member of the student council at the University of Freiburg
2005 - 2010	Member of the physics student association , Freiburg: Participation in academic self- administration, professor appointment committees, bachelor and master degrees planning

National/International committees

Since 2022	(Deputy) Ex-Officio Member of the Committee for Particle Physics (KET), Germany
2022 - 2024	Member of the DRD1 preparation committee (extended RD51 management board)
Since 2022	Member of the DPG particle physics section Program Advisory Board
Since 2021	Management Board Member of the young High Energy Physics Association, Germany

Reviewer in scientific journals

Since 2023	Editorial Board member Frontiers in Detector Science and Technolog
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Since 2017 More than ten manuscript reviews for Nuclear Inst. and Methods in Physics Research A, Journal of Instrumentation and IEEE Transactions on Nuclear Science

Major collaborations

Since 2024	DRD1 Collaboration, R&D on Gaseous Detectors
Since 2021	AMBER Collaboration, fundamental Hadron Physics
Since 2019	MAGIX Collaboration, fundamental Hadron and High Energy Physics
Since 2015	ATLAS Collaboration, fundamental High Energy Physics
Since 2009	LCTPC, future Linear Collider Time Projection Chamber R&D
2009 - 2023	RD51 Collaboration, R&D on Micro-Pattern Gaseous Detectors

Memberships of scientific societies

Since 2020	Transdisciplinary Research Area Matter, University of Bonn
2015 - 2017	IEEE
Since 2010	DAAD Alumni
Since 2003	German Physics Society

Continuing education (selection)

2021	Compatibility of work and family, University of Bonn
2020	An eye on risks? - Export control, foreign trade law & dual-use, University of Bonn
2020	Leading for Tomorrow, German Physics Society
2018	CERN training: IQ versus EQ
2017	CERN trainings: Leading for Success; Being a Skilled Facilitator
2014 - 2015	Mentoring Programme, German Physics Society
2014	46 th School for High Energy Physics, Maria Laach
2012	Hadron Collider Physics Summer School, FermiLab, USA

Outreach and science communication

2020	Supervisor in a Jugend Forscht project
2019	Mediator at Highlights der Physik , Bonn
2019	Supervisor in a Netzwerk Teilchenwelt project at CERN
Since 2017	CERN Guide, regular tours until 2019
2015	Press article InGrids on the rise, B. Warmbein, Linear Collider Newsline
2014 - 2017	Netzwerk Teilchenwelt school classroom lecturer

Skills (small selection)

Languages	German(native), English(fluent), French (proficient)
Technical	FPGA & software programming, CAD design, clean room work, detectors & electronics layout
	FLUKA simulation
Soft	Leadership, project management, chairmanship, communication, grant writing, data management
	export control, univesity/CERN work environment and laws

Publications (statistics and ten most relevant with contribution statement)

- 56 peer-reviewed or book publications
 - 52 with direct involvement, thereof 11 as first or corresponding author
 - 4 by collaboration, involved at least in review
- h-index: 13 (INSPIRE-HEP), 15 (google scholar)

Ben Bruers, ..., **M. Lupberger**, ... et al., *Resource-aware Research on Universe and Matter: Call-to-Action in Digital Transformation*

The European Physical Journal Special Topics (2024): 1-17. Contribution: ErUM-Data Hub workshop summary paper and input to German Ministry. Organisation Committee member, paper writing, internal review

P. Bechtle, ..., **M. Lupberger**, ... et al., A Proposal for the Lohengrin Experiment to Search for Dark Sector Particles at the ELSA Accelerator

arXiv pre-print submitted to European Physical Journal C (2024). Contribution: Proposal of a new experiment. The unique advantage is my idea of single electron life-tracking at high rates using my AI-based online tracking on AMD Versal, technical work by my PhD student co-funded by my grants, internal review

D. Pfeiffer, ..., **M. Lupberger**, ... et al., *Demonstration of Gd-GEM detector design for neutron macromolecular crystallography applications*

JINST 18 (2023) P04023. Contribution: Summary document on our group's work during my CERN fellowship. Technical DAQ system development, beam tests, EU subproject leader, writing and internal review

F. Jaekel, ..., **M. Lupberger**, ... et al., *An automated testing system for the RD51 VMM hybrid and yield measurement of the first production batches*

Nucl.Instr.Meth.A 1049 (2023) 168132. Contribution: My master students project. Corresponding author, project idea and supervision, technical work with student, main writing and internal review

D. Pfeiffer, ..., **M. Lupberger**, ... et al., *Rate-capability of the VMM3a front-end in the RD51 Scalable Readout System*

Nucl.Instrum.Meth.A 1031 (2022) 165576.Contribution: Joint paper between my new Bonn subgroup and my former CERN group, summery of my master student's work. Project idea and minor parts of technical work, parts of writing and internal review.

M. Lupberger et al., Implementation of the VMM ASIC in the Scalable Readout System

Nucl. Inst. Meth. A903 (2018) 91-98. Contribution: New RD51/DRD1 general readout system key paper. Technical work primarily myself or my team, supervision, strategic concept and writing, internal review.

J. Bortfeldt, ..., **M. Lupberger**, ... et al., *PICOSEC: Charged particle timing at sub-25 picosecond precision with a Micromegas based detector*

Nucl. Instr. Meth. A903 (2018) 317-325.Contribution: Fast timing PICOSEC concept key paper with first analysis results. Technical work on DAQ synchronisation and detector efficiency analysis, analysis group convener, writing and internal review.

M. Lupberger et al., *Toward the Pixel-TPC: Construction and operation of a large area GridPix detector* IEEE Transactions on Nuclear Science 64.5 (2017) 1159-1167. Contribution: Summary of the technical parts of my PhD project. All technical work and writing, internal review. Key paper for the Pixel-TPC concept now e.g. proposed as baseline technology for a CEPC detector central tracker, breakthrough according to the ECFA Detector R&D roadmap.

C. Krieger, J. Kaminski, **M. Lupberger** and K. Desch, *A GridPix-based X-ray detector for the CAST experiment* Nucl. Inst. Meth. A867 (2017)⁻¹101-107. Contribution: CAST detector using my readout system. All technical work for readout system, involved in writing and internal review.

M. Lupberger, K. Desch and J. Kaminski, *Implementation of the Timepix ASIC in the Scalable Readout System* Nucl. Inst. Meth. A830 (2016) 75-81. Contribution: Summary of parts of the technical work of my PhD project. All technical work and writing, internal review.

Talks (statistics and selection)

- 15 invited talks
- 51 talks at international conferences
- 4 posters at international conferences
- 11 talks at national conferences
- **2025, invited Extra AMBER Collaboration Board: Strategy review**, CERN, Switzerland/online *AMBER GEM Readout*
- **2025, invited** German strategy workshop in preparation of the ESPP update, Bad Honnef, Germany Early Career Researchers' Input and draft section for ESPP input document
- **2024, invited** Workshop on Realtime Machine Learning, Giessen, Germany GNN live tracking and triggering on the Versal platform for Dark Matter searches

2024, invited	DPG Spring Conference, Karlsruhe, Germany
	Introduction to particle physics detectors (preparation session)
2024	DRD1 Topical Workshop on Electronics for Gaseous Detectors, CERN, Switzerland
	Summary, wrap-up and close out (as Workshop organiser)
2024	DRD1 Scientific Coordination Board, CERN, Switzerland/online
	Working group 5 (Electronics): Implementation, status update, plans and future strategy
2023, invited	DPG Spring Conference, Dresden, Germany
	Recent advancements in Micro-Pattern Gaseous Detectors: Exciting research ahead towards
	future experiments (regular conference program)
2022, invited	Rencontre du DEDIP, CEA Saclay, France
	Triggerless readout for AMBER GEMs and novel neutron detectors
2022	15th Pisa Meeting on Advanced Detectors, La Biodola, Isola d'Elba, Italy
	Particle Physics Readout Electronics and Novel Detector Technologies for Neutron Science
2021	Topical Workshop on Electronics for Particle Physics 2021, Online
	The Scalable Readout System as a common initiative - a personal review

Michael Lupberger

Bonn, 25.02.2025