Dr. Frank Gaede

Curriculum Vitae

DESY-FTX
Notkestr. 85
22607 Hamburg
+49 40 8998 4382
frank.gaede@desy.de
www.desy.de/~gaede

Personal Details

Date of Birth	July 21, 1968
Nationality	German
Marital Status	Married, two sons (born 2001 and 2006)

Current Position

since 2026 **Group Leader, FTX**, DESY, Hamburg,
- Introducing new working methods and organizational measures
- Financial and personnel planning
- Participating in planning and strategy discussions
- Advising, promoting, and supporting employees

Professional Experience

2021-2025 **Deputy Group Leader, FTX**, DESY, Hamburg,
Supporting the Group Leader in administrative tasks:
- Introducing new working methods and organizational measures
- Financial and personnel planning
- External representation on the FTX website
- Participating in planning and strategy discussions
- Advising, promoting, and supporting employees

since 2015 **Topical Group Leader FTX-SFT**
Establishment of a working group for **Machine Learning in High-Energy Physics**:
- Development of generative machine learning methods for fast detector simulation
- Application of machine learning to event reconstruction (Particle Identification, Flavor Tagging, etc.)

Coordination of international software projects for future accelerator experiments (**Key4hep**)
Supervision of multiple PhD, MSc, and BSc theses
Technical guidance for scientific staff and postdocs

2014–2015 **Research Associate**, CERN, Geneva, Switzerland
Development of core software tools for linear accelerator studies, particularly for detector geometry and material description (**DD4hep**)
Involvement in the HEP Software Foundation

2010–2014 **Scientific Staff Member**, DESY, FLC, Hamburg, Germany
Coordination of international software projects for Linear Collider Studies (ILC/CLIC)
Coordination of large-scale Monte Carlo productions on the GRID
Co-supervision of PhD and master's students

2007–2010 **Topical Group Leader IT-Physics Computing**, DESY, Hamburg, Germany
Development of algorithms for track recognition and event reconstruction
Software architect for major parts of the Linear Collider Software Packages (**iLCSoft**)
Performance studies for detector optimization for the ILC
Technical guidance for scientific staff in Grid Computing and dCache Storage

since 2002 **Scientific Staff Member**, DESY, Hamburg, Germany
Development of generic software solutions for the International Linear Accelerator Community (LCIO, Marlin, etc.)

2000–2002 **Head of Software Development**, getit GmbH, Dortmund, Germany
Managed a team of eight software developers
Project management in eCommerce projects
Development of distributed systems in Java

1998–2000 **Postdoctoral Researcher**, University of Colorado, Boulder, USA
Stationed at Stanford Linear Accelerator Center (SLAC) in the BaBar Collaboration
Responsible for the software of the EMC Source Calibration System
Development of DAQ, calibration, and reconstruction software
Co-supervision of PhD students

1995–1998 **Doctoral Researcher**, Max Planck Institute for Physics, Munich, Germany
Stationed at DESY, Hamburg, at the H1 Experiment at HERA
Optimization of filter algorithms for neural networks for the L2NN Trigger
Physics analysis: Diffractive production of vector mesons
Supervision of a diploma thesis

1992–1994 **Teaching Assistant**, Institute for Theoretical Physics, Kiel University, Kiel, Germany
Conducted tutorials in theoretical physics

Education

1998 **Ph.D. (*Dr. rer. nat.*) in Physics**, *Institute for Theoretical Physics, Kiel University*, Kiel, Germany
Thesis: *Exclusive Production of* Φ *Mesons in ep Scattering at the H1 Experiment at HERA* (Advisor: Prof. Friedrich Wagner)

1995 **Diploma in Physics**, *Institute for Theoretical Physics, Kiel University*, Kiel, Germany
Thesis: *Learning Algorithms for Pattern Recognition with Feed-Forward Networks*

1989–1995 **Undergraduate Studies in Physics**, *Kiel University*, Kiel, Germany

1992 **Internship**, *Institut Laue-Langevin (ILL)*, Grenoble, France
Simulations of neutron scattering experiments (6 weeks)

1987–1989 **Military Service**, *German Navy*, Kiel, Germany

1987 **High School Diploma (*Abitur*)**, *Apian-Gymnasium*, Ingolstadt, Germany

Project Coordination

since 2024 **Co-Coordinator**, *Scientific Computing Platform in FH*, DESY, Hamburg, Germany

since 2020 **Co-Coordinator**, *CDL1: Computational Astro- and Particle Physics*, Center for Data and Computing in Natural Sciences (CDCS), Hamburg, Germany

2021–2025 **Work Package Coordinator**, *Advanced Software*, EU Project AIDAinnova

2021–2024 **Project Coordinator**, *Helmholtz Innovation Pool Project ACCLAIM*

2018–2020 **Project Coordinator**, *Helmholtz Innovation Pool Project AMALEA*

2015–2019 **Work Package Coordinator**, *Advanced Software*, EU Project AIDA2020

2010–2015 **Work Package Coordinator**, *Advanced Software*, EU Project AIDA

2006–2010 **Task Coordinator**, *Software*, EU Project EUDET

Academic Committees and Roles

since 2026 **Deputy Spokesperson**, *ILD Collaboration*

2025 **Member**, *ERC Consolidator Grant Review Panel*

since 2025 **Co-Chair**, *Software and Computing Panel*, Committee for Particle Physics (KET)

2020–2024 **Member**, *Executive Board*, Center for Data and Computing in Natural Sciences (CDCS), Hamburg

2021–2022 **Chair**, *IDT-WG3 Software and Computing Working Group*

since 2017 **Member**, *Software and Computing Panel*, Committee for Elementary Particle Physics (KET)

2016 **Member**, *Belle II Computing Review*

2015-2026 **Software Coordinator**, *ILD Collaboration*

2015–2020 **Chair**, *LCC Software and Computing Working Group*

2013–2021 **Representative of Germany**, *LHC Computing Resource Scrutiny Group (CRSG)*

2006–2007 **Member**, *Geant4 Review Committee*

Research Interests

All aspects of software development in high-energy physics, particularly:

- Algorithms for track recognition and event reconstruction

- Pattern recognition, Machine Learning, and Artificial Intelligence

- Detector optimization for future particle physics experiments, especially at Higgs Factories

Higgs boson physics

Selected Publications

[1] J. de Blas, M. Dunford, E. Bagnaschi, A. Freitas, P. P. Giardino, C. Grefe, M. Selvaggi, A. Taliercio, F. Bartels and A. Dainese, *et al.* "Physics Briefing Book: Input for the 2026 update of the European Strategy for Particle Physics," doi:10.17181/CERN.35CH.2O2P [arXiv:2511.03883 [hep-ex]].

[2] J. Birk, **F. Gaede**, A. Hallin, G. Kasieczka, M. Mozzanica and H. Rose, "OmniJet-α_C: learning point cloud calorimeter simulations using generative transformers," JINST **20** (2025) no.07, P07007 doi:10.1088/1748-0221/20/07/P07007 [arXiv:2501.05534 [hep-ph]].'

[3] B. Dudar, U. Einhaus, J. List, K. Helms and **F. Gaede**, "Development of the time-of-flight particle identification for future Higgs factories," PoS **EPS-HEP2023** (2024), 548 doi:10.22323/1.449.0548 [arXiv:2311.04720 [hep-ex]].

[4] E. Buhmann, **F. Gaede**, G. Kasieczka, A. Korol, W. Korcari, K. Krüger and P. McKeown, "CaloClouds II: ultra-fast geometry-independent highly-granular calorimeter simulation," JINST **19** (2024) no.04, P04020 doi:10.1088/1748-0221/19/04/P04020 [arXiv:2309.05704 [physics.ins-det]].

[5] E. Buhmann, S. Diefenbacher, E. Eren, **F. Gaede**, G. Kasieczka, A. Korol, W. Korcari, K. Krüger and P. McKeown, "CaloClouds: fast geometry-independent highly-granular calorimeter simulation," JINST **18** (2023) no.11, P11025 doi:10.1088/1748-0221/18/11/P11025 [arXiv:2305.04847 [physics.ins-det]].

[6] S. Diefenbacher, E. Eren, **F. Gaede**, G. Kasieczka, A. Korol, K. Krüger, P. McKeown and L. Rustige, "New angles on fast calorimeter shower simulation," Mach. Learn. Sci. Tech. **4** (2023) no.3, 035044 doi:10.1088/2632-2153/acefa9 [arXiv:2303.18150 [physics.ins-det]].

[7] S. Bieringer, A. Butter, S. Diefenbacher, E. Eren, **F. Gaede**, D. Hundhausen, G. Kasieczka, B. Nachman, T. Plehn and M. Trabs, "Calomplification — the power of generative calorimeter models," JINST **17** (2022) no.09, P09028 doi:10.1088/1748-0221/17/09/P09028 [arXiv:2202.07352 [hep-ph]].

[8] E. Buhmann, S. Diefenbacher, D. Hundhausen, G. Kasieczka, W. Korcari, E. Eren, **F. Gaede**, K. Krüger, P. McKeown and L. Rustige, "Hadrons, better, faster, stronger," Mach. Learn. Sci. Tech. **3** (2022) no.2, 025014 doi:10.1088/2632-2153/ac7848 [arXiv:2112.09709 [physics.ins-det]].

[9] E. Buhmann, S. Diefenbacher, E. Eren, **F. Gaede**, G. Kasieczka, A. Korol and K. Krüger, "Decoding Photons: Physics in the Latent Space of a BIB-AE Generative Network," EPJ Web Conf. **251** (2021), 03003 doi:10.1051/epjconf/202125103003 [arXiv:2102.12491 [physics.ins-det]].

[10] E. Buhmann, S. Diefenbacher, E. Eren, **F. Gaede**, G. Kasieczka, A. Korol and K. Krüger, "Getting High: High Fidelity Simulation of High Granularity Calorimeters with High Speed," Comput. Softw. Big Sci. **5** (2021) no.1, 13 doi:10.1007/s41781-021-00056-0 [arXiv:2005.05334 [physics.ins-det]].

- 177 publications (18220 citations, h-index 65)

Language Skills

German	Native
English	Fluent (written and spoken)
French	Very Good