

ANNEX B

UNIVERSITY OF MILAN

Public selection for recruiting No. 1 tenure track researcher(s) (RTT) for competition sector 02/A2 - Theoretical Physics of Fundamental Interactions, (scientific-disciplinary sector FIS/02 - Theoretical Physics, Mathematical Models and Method) at the Department of PHYSICS "ALDO PONTREMOLI", (announcement published in Official Gazette No. IV, "Serie speciale Concorsi ed Esami." of 18-06-24) - Competition code 5577

Sascha Diefenbacher

CURRICULUM VITAE

(N.B. CV MUST BE OF UP TO 30 PAGES AND INCLUDE THE DETAILS CANDIDATES CONSIDER USEFUL FOR THE ASSESSMENT.

ALL THE TITLES INSERTED BELOW ARE JUST EXAMPLES THAT CAN BE REPLACED, CHANGED OR COMPLETED)

PERSONAL DATA (DO NOT INCLUDE YOUR PERSONAL ADDRESS AND LANDLINE OR MOBILE PHONE NUMBER)

SURNAME	DIEFENBACHER
NAME	SASCHA
DATE OF BIRTH	28.12.1995

QUALIFICATIONS

DEGREE

(Specify full degree name and related score, University, date, thesis title, etc.)

MASTER OF SCIENCE (M.Sc.),
grade: 'very good, 1.2'
University of Heidelberg, Germany
September 12, 2019
Thesis: Tagging Whole LHC Events with Capsule Networks

DOCTORAL DEGREE OR EQUIVALENT QUALIFICATION EARNED IN ITALY OR ABROAD / MEDICAL SPECIALISATION DIPLOMA OR EQUIVALENT QUALIFICATION, FOR THE RELEVANT SECTORS, EARNED IN ITALY OR ABROAD

(Specify qualification full name and related score, institution, date, thesis title, etc.)

Doktor der Naturwissenschaften (Dr. rer. nat.)
summa cum laude
University of Hamburg, Germany
January 11, 2023
Thesis: Topics in Generative Modeling of Particle Physics Data

RESEARCH CONTRACTS, RESEARCH FELLOWSHIP CONTRACTS, POSTDOCTORAL SCHOLARSHIPS OR SIMILAR CONTRACTS

(Specify, for each contract, university/institution, starting and termination date, duration in years, etc.)

Oct.2019-March.2023 (3.5 years) : Scientific Assistant
Universität Hamburg, Hamburg, Germany

May.2023-current (up to 3 years total): PostDoc Physics
Lawrence Berkeley National Lab, Berkeley CA, USA

TEACHING ACTIVITIES AT ITALIAN OR FOREIGN UNIVERSITIES

(Specify academic year, university, degree course, number of hours/CFU, indicate type of activity, start and end date - day, month, year, etc.)

2021:

Teaching assistant

Universität Hamburg, Hamburg, Germany

Course: 'Machine learning and deep learning' (undergraduate lecture)

2 hours per semester week, duration: 12 weeks

2022:

Teaching assistant and substitute lecture

Universität Hamburg, Hamburg, Germany

Course: 'Machine learning and deep learning' (undergraduate lecture)

2 hours per semester week, duration: 12 weeks

ATTESTED TRAINING OR RESEARCH ACTIVITIES AT QUALIFIED ITALIAN OR FOREIGN INSTITUTIONS

(Specify academic year, institution, course, period, commitment in terms of hours, indicate type of activity, etc.)

2023: Deep Learning School "Basic Concepts", organized by RWTH Aachen, Germany

<https://indico.desy.de/event/37303/sessions/14383/#20230301>

Invited lecturer on "Convolutions, Convolutional Layers and CNNs"

2023: US ATLAS Machine Learning Training, organized by Lawrence Berkeley National Lab, USA

<https://indico.cern.ch/event/1264566/contributions/5348559/>

Invited lecturer on "Generative Models"

ATTESTED ACTIVITY IN THE CLINICAL FIELD

(Specify date, duration, role, institution where the aid activity was carried out, etc.)

IMPLEMENTATION OF PROJECTS

(Specify date, project name, indicate type of activity, any organization in favor of which the activity was carried out etc.)

ORGANISATION, SUPERVISION AND COORDINATION OF NATIONAL AND INTERNATIONAL RESEARCH GROUPS, OR PARTICIPATION IN THEM

(For each entry, specify year, role, research group, any financing institutions and amount of financing, indicate type of project, etc.)

2019-2023: ILC collaboration (collaboration for the development of the International Linear Collider project), participant

2023-current: ATLAS collaboration (collaboration for the ATLAS experiment at the LHC), participant

HOLDING PATENTS

(For each patent, specify authors' names, title, classification (national or international), patent number, etc.)

SPEAKING AT NATIONAL AND INTERNATIONAL CONFERENCES AND CONVENTIONS

(Specify conference/convention title, date, duration in days/hours, organizing institution, etc.)

- Artificial Intelligence and the Uncertainty challenge in Fundamental Physics, Paris(France), November 27 - December 1 2023,
Talk on Metrics for Uncertainty-Aware ML Methods
- ML4jets 2023, Hamburg (Germany), 5.-10. November 2023
Talk on OnlineFlow: Refining Fast Calorimeter Simulations with a Schrödinger Bridge
- ML4jets 2022, Rutgers (USA), 1.-4. November 2022
Talk on Generative Models for Fast Simulation of Electromagnetic and Hadronic Showers in Highly Granular Calorimeters
- 21st International Workshop on Advanced Computing and Analysis Techniques in Physics Research, Bari, (Italy), 23.-28. October. 2022
Plenary Talk on Generative Models for Fast (Calorimeter) Simulation
- 5th Inter-experiment Machine Learning Workshop, Geneva (Switzerland), 9.-13. May 2022
Talk on Ephemeral Learning - Augmenting Triggers with Online-Trained Normalizing Flows
- Learning To Discover, Paris (France), 19.-29. April 2022
Invited talk Generator Models for 4-momenta Events
- Machine Learning and the Physical Sciences at Neurips 2021, online (due to Covid), 13. December 2020
Video and Poster on Generative models for hadron shower simulation
- 20th International Workshop on Advanced Computing and Analysis Techniques in Physics Research, Online (due to Covid), 28. November - 3. December 2021
Talk on Fast and Accurate Electromagnetic and Hadronic Showers from Generative Models
- ML4jets 2021, Heidelberg (Germany), 5.-8. July 2021
Talk on OnlineFlow: Trigger Free Analysis Using Online Learned Generative Models
- 25th International Conference on Computing in High-Energy and Nuclear Physics, Online (due to Covid), 17.-21. May 2021
Talk on Fast and Accurate Electromagnetic and Hadronic Showers from Generative Models
- Deep Learning for Simulation at ICLR 2021, Online (due to Covid), 7. May 2021,
Poster on Amplifying Statistics with Ensembles of Generative Models
- Machine Learning and the Physical Sciences at Neurips 2020, Online (due to Covid), 11. December 2020
Poster on Amplifying Statistics using Generative Models
- 4th Inter-experiment Machine Learning Workshop, Online (due to Covid), 19.-23. October 2020
Talk on GANplifying Event Samples
- ML4jets 2020, New York (USA), 15.-17. Januray 2020,
Talk on CapsNets Continuing the Convolutional Quest

NATIONAL AND INTERNATIONAL AWARDS AND ACCOLADES FOR RESEARCH ACTIVITY

(Specify award and motivation for the award, date, issuing organisation, etc.)

Best Paper Award of the Excellence Cluster Quantum Universe (QU) for PhD students for “GANplifying Event Samples”, Universität Hamburg

HOLDING A EUROPEAN SPECIALISATION DIPLOMA RECOGNISED BY INTERNATIONAL BOARDS

(For those competition sectors for which it is requested)

(Specify diploma and indicate the area, date, institution that awarded the diploma, etc.)

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QUALIFICATIONS UNDER ART.24, PARAGRAPH 3.a AND 3.b, OF LAW No.240/2010 OF 30 DECEMBER 2010

(Specify whether it is a type A or type B contract, University, contract effective date and end date, etc.)

Oct.2019-March.2023 (3.5 years) : Scientific Assistant
Universität Hamburg, Hamburg, Germany

May.2023-current (up to 3 years total): PostDoc Physics
Lawrence Berkeley National Lab, Berkeley CA, USA

Ph.D. Degree listed above

SCIENTIFIC PRODUCTION

SCIENTIFIC PUBLICATIONS

(For each publication, specify the following: authors' names, full title, publisher, date and place of publication, ISBN/ISSN/DOI or equivalent code)

- *Dark Matter in Anomaly-Free Gauge Extensions*
Martin Bauer, **Sascha Diefenbacher**, Tilman Plehn, Michael Russell, Daniel A. Camargo,
Published in: SciPost Phys. 5, 036 (2018), 19 October 2018
DOI: <https://doi.org/10.21468/SciPostPhys.5.4.036>
- *CapsNets Continuing the Convolutional Quest*
Sascha Diefenbacher, Hermann Frost, Gregor Kasieczka, Tilman Plehn, Jennifer M. Thompson
Published in: SciPost Phys. 8, 023 (2020), 7 February 2020
DOI: <https://doi.org/10.21468/SciPostPhys.8.2.023>
- *Getting High: High Fidelity Simulation of High Granularity Calorimeters with High Speed*
Erik Buhmann, **Sascha Diefenbacher**, Engin Eren, Frank Gaede, Gregor Kasieczka, Anatolii Korol, Katja Krüger
Published in: Computing and Software for Big Science 5, 13 (2021), 26 May 2021
DOI: <https://doi.org/10.1007/s41781-021-00056-0>
- *GANplifying Event Samples*
Anja Butter, **Sascha Diefenbacher**, Gregor Kasieczka, Benjamin Nachman, Tilman Plehn
Published in: SciPost Phys. 10, 139 (2021), 10 June 2021
DOI: <https://doi.org/10.21468/SciPostPhys.10.6.139>
- *DCTRGAN: Improving the Precision of Generative Models with Reweighting*
Sascha Diefenbacher, Engin Eren, Gregor Kasieczka, Anatolii Korol, Benjamin Nachman, David Shih
Published in: Journal of Instrumentation, Volume 15, November 2020, 2 November 2020
DOI: [10.1088/1748-0221/15/11/P11004](https://doi.org/10.1088/1748-0221/15/11/P11004)
- *Decoding Photons: Physics in the Latent Space of a BIB-AE Generative Network*
Erik Buhmann, **Sascha Diefenbacher**, Engin Eren, Frank Gaede, Gregor Kasieczka, Anatolii Korol, Katja Krüger
Published in: EPJ Web of Conferences 251, 03003 (2021), 23 August 2021
DOI: <https://doi.org/10.1051/epjconf/202125103003>

- *Hadrons, Better, Faster, Stronger*

Erik Buhmann, **Sascha Diefenbacher**, Engin Eren, Frank Gaede, Daniel Hundhausen, Gregor Kasieczka, William Korcari, Katja Krüger, Peter McKeown, Lennart Rustige
Published in: Machine Learning: Science and Technology, Volume 3, Number 2, 1 July 2022
DOI: 10.1088/2632-2153/ac7848

- *Calomplification -- The Power of Generative Calorimeter Models*

Sebastian Bieringer, Anja Butter, **Sascha Diefenbacher**, Engin Eren, Frank Gaede, Daniel Hundhausen, Gregor Kasieczka, Benjamin Nachman, Tilman Plehn, Mathias Trabs
Published in: Journal of Instrumentation, Volume 17, September 2022, 22 September 2022
DOI: 10.1088/1748-0221/17/09/P09028

- *Ephemeral Learning -- Augmenting Triggers with Online-Trained Normalizing Flows*

Anja Butter, **Sascha Diefenbacher**, Gregor Kasieczka, Benjamin Nachman, Tilman Plehn, David Shih, Ramon Winterhalder
Published in: SciPost Phys. 13, 087 (2022), 7 October 2022
DOI: 10.21468/SciPostPhys.13.4.087

- *L2LFlows: Generating High-Fidelity 3D Calorimeter Images*

Sascha Diefenbacher, Engin Eren, Frank Gaede, Gregor Kasieczka, Claudius Krause, Imahn Shekhzadeh, David Shih
Published in: Journal of Instrumentation, Volume 18, October 2023, 18 October 2023
DOI: 10.1088/1748-0221/18/10/P10017

- *New Angles on Fast Calorimeter Shower Simulation*

Sascha Diefenbacher, Engin Eren, Frank Gaede, Gregor Kasieczka, Anatolii Korol, Katja Krüger, Peter McKeown, Lennart Rustige
Published in: Machine Learning: Science and Technology, Volume 4, Number 3, 7 September 2023
DOI: 10.1088/2632-2153/acefa9

- *Topics in Generative Modeling of Particle Physics Data (Ph.D. Thesis)*

Sascha Diefenbacher,
Published in: Staats- und Universitätsbibliothek Hamburg, 2023
URN: urn:nbn:de:gbv:18-ediss-106191

- *CaloClouds: fast geometry-independent highly-granular calorimeter simulation*

Erik Buhmann, **Sascha Diefenbacher**, Engin Eren, Frank Gaede, Gregor Kasieczka, Anatolii Korol, William Korcari, Katja Krüger, Peter McKeown
Published in: Journal of Instrumentation, Volume 18, November 2023, 29 November 2023
DOI: 10.1088/1748-0221/18/11/P11025

- *Improving Generative Model-based Unfolding with Schrödinger Bridges*

Sascha Diefenbacher, Guan-Horng Liu, Vinicius Mikuni, Benjamin Nachman, Weili Nie
Published in: Phys. Rev. D 109, 076011, 11 April 2024
DOI: 10.1103/PhysRevD.109.076011

Date

17.07.2024

Place

Berkeley, USA