

CHRISTOPH **HARING**

B.Sc. Mechanical Engineering
B.Sc. Industrial Engineering



CHRISTOPH HARING

Engineer | Creative | Generalist | Ideator

CONTACT

TO

ML4SCI





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FROM

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<https://github.com/Free-WorkingSpace>

COVER LETTER

Date: April 13th, 2021

Job reference: GSOC 2021 QML for HEP at LHC

Dear Raphael,

In mid-2020, I became aware of the IBM Q summer school and qiskit. By participating, I gained my first practical experience in the field of quantum computing and quantum mechanics. We were given a short introduction to the basics of QM (Dirac notation, entanglement etc.) before some famous QC algorithms like Shor's or Grover's were presented and implemented with Qiskit. In addition, VQE and quantum chemistry applications were briefly touched upon. Since then I am very interested in the visionary field of QC and the connection with ML/DL.

Although I studied mechanical and industrial engineering (specialized in racing car technology), I wrote a master thesis on real-time object recognition of alphanumeric characters for unmanned aerial vehicles (https://drive.google.com/file/d/1IFw8x4Ym4qhthueTBpjnzc3qOwqh8_12/view?usp=sharing), because with my last university project I wanted to learn programming with Python, the use of Linux, Edge and Cloud Computing and especially ML/pattern recognition for computer vision. After a long research I specialized in the YOLOv4 architecture. Nevertheless I try to stay up to date with the latest architectures in CNN's, RNN's, Transformer networks, GAN's and now GNN by reading scientific papers and medium articles every day.

Since submitting my master thesis (end of Feb 2021) I am deeply involved in QM, QC and QML. I want to do research in this area in the future and am currently looking for a PhD position in QML. Because Google plans to develop a QC with over one million qubits by 2030, I see a lot of research potential in this field. Also right now with "only" NISQ devices. Moreover, with TFQ/Cirq, QiskitML, PennyLane or SF there are now several frameworks to implement new QML applications in a more user-friendly way.

Through working on the evaluation worksheet I realized the great potential in GNNs and QGNNs. I am very curious about how to implement rich information of a graph and its relations into a learnable QGNN and would like to specialize in this research area in the future.

Last I would like to thank you very much for the opportunity to participate here. I would be really happy if I could work on one of the three announced topics in the context of QML HEP at GSOC 2021.

Best regards

Christoph Haring

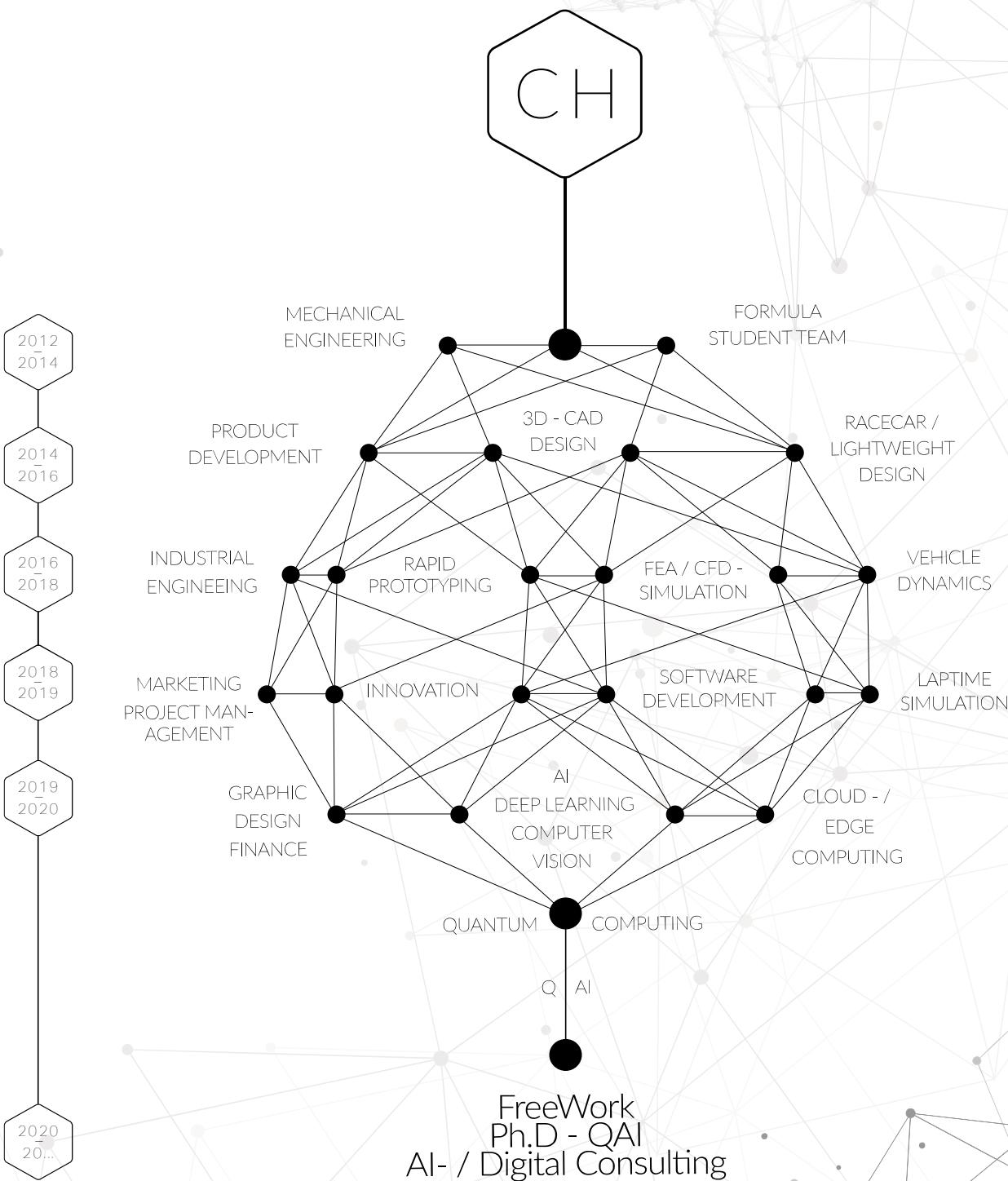
B.Sc B.Sc



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TRANSDISCIPLINARY KNOWLEDGE NETWORK





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SKILLS

> Professional

- Motivation
- Inquisitiveness
- Problem Solving
- Creativity
- Emotional Intell.
- Independ. Learning

> Technical:

- Crash (CFRP)
- Vehicle dynamics
- Structural mech.
- Software Dev.
- AI / ML / DL
- Product Dev.
- Graphic Design

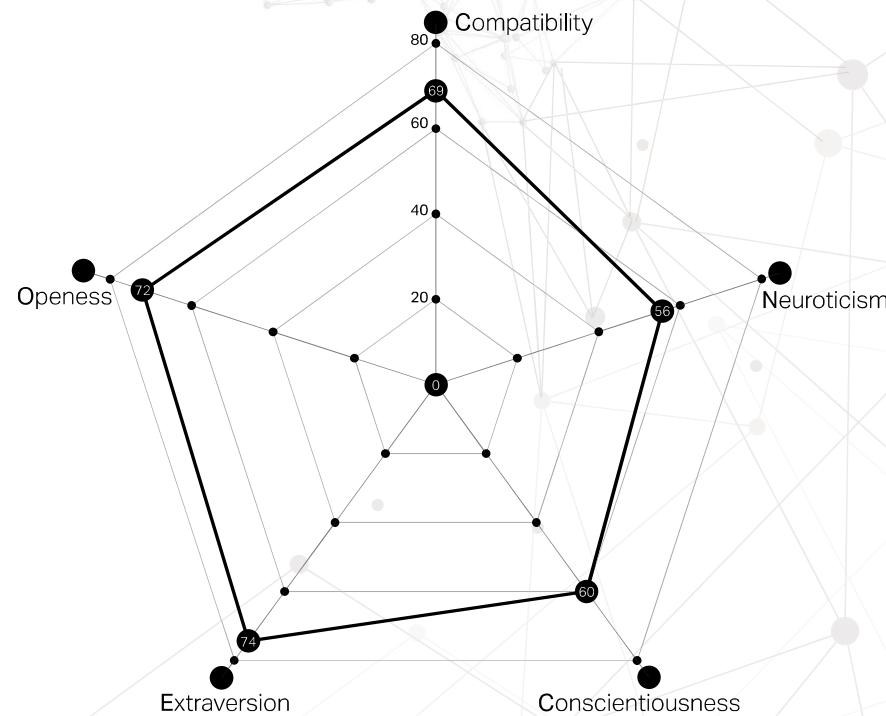
> Software

- Creo 5
- Altair Hyperworks
- Matlab/Simulink
- Python
- Ansys
- Adobe CC
- Blender CGI
- MS Office

> Language

- German
- English
- Spanish

PERSONALITY TRAITS (NEO-PI-R)



EDUCATION

Primary school
Selingenporten
1997 - 2011

Abitur
Willibald - Gluck-Gymnasium
Neumarkt i.d.OPf.
2002 - 2011

University Udayana
Denpasar, Indonesia
2014/15

Bachelor thesis: Fundamentals and procedure in modeling vehicle technology

M.Sc. | M.Sc.

Friedrich - Alexander University
Erlangen - Nuremberg

M.Sc. Mechanical Engineering (ex: 1.4)
Product Design and Development
Artificial Intelligence, Deep Learning, Cloud

M.Sc. Industrial Engineering (ex: 1.5)
Innovation/ Entrepreneurship
Marketing, Finance

Project thesis: Derivation and implementation of a two - track model for the investigation of vehicle lateral dynamics

Master thesis: Development and Evaluation of a cloud-based machine learning approach for alphanumeric label reading in favor of autonomous aerial vehicle managed stocktaking systems using transfer learning techniques and data augmentation for object detection.

University Las Palmas de Gran Canaria
Las Palmas, Spain
2016/17

2011 - 2017



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EXPERIENCE

FREEWORK.Earth

Inventor

Design, Product development, Software development

SIEMENS AG - Digital Industries

Working Student

DevOps, Software development

Schaeffler Technologies AG & Co. KG

Marketing Intern Australia

Marketing, Project Management, Graphic Design

Working Student Advancend Materials

FEA of CFRP - hybrid materials

Working Student Motorsports Formula E

Vehicle Dynamics Modelling

Start-Up Smart City Systems GmbH

Student employee/Volunteer

CAD, Supply Chain, Procurement

Fraunhofer IISB Institute for Integrated Systems and Device Technology

Student employee

Power Electronics Hardware Development (DC/DC converter)

Student employee

CFD - Simulation

High - Octane Motorsports e.V. (Formula Student)

FSAE Driverless Team Member

Object detection implementation

Vehicle Dynamics Team Member

Vehicle Dynamics Modelling

Crashnosecone Teamlead

Design and Development FSAE Crashnosecone

Chassis Team Member

Crashbox, CFRP- Monocoque

Earth

Fuerth, Germany

Sydney, Australia

Herzogenaurach, Germany

Herzogenaurach, Germany

Nuremberg, Germany

Erlangen, Germany

Erlangen, Germany

Erlangen, Germany

Erlangen, Germany