

HELMUT G. KATZGRABER

P +1 979 229 0444 | E helmut@katzgraber.org | W katzgraber.org | IN [linkedin.com/in/katzgraber](https://www.linkedin.com/in/katzgraber) | C US, AT & PE Citizenship

EXPERTISE

Seasoned research and business manager with experience in leading a diverse international team of researchers and developers with a focus on emergent technologies and scalable solutions to industry's hardest problems. 20+ year experience in solving optimization problems, algorithm development, quantum technologies, and experimenting with novel computing paradigms. Due diligence advisor for venture capital funds. Comfortable with negotiating C-Suite-level contracts. Multicultural background and fluent in 3 languages (English, German, Spanish).

PROFESSIONAL EXPERIENCE

AMAZON WEB SERVICES | Global Practice Lead – Advanced Solutions | Seattle WA Aug. 2020 – present

Research and business manager leading an interdisciplinary international professional services team that focuses on quantum and hybrid solutions, assessing the viability of quantum technologies for industry applications across verticals. The team delivers impact by building solutions that combine quantum computing, operations research, high-performance computing, and machine learning. The Advanced Solutions Lab is the only customer-facing organization in the broader AWS quantum computing effort, engaging typically with Fortune 500 customers. Experience with C-Suite negotiations. Selected public references:

- BMW Group: Optimization of robot path planning resulting in an 8 – 10% reduction of robot run time per vehicle.
- Chugai Pharmaceutical: Development of an efficient constraint-programming approach to peptide folding.
- Amgen: Optimization of clinical trial enrollment (reduction of simulation time from hours to seconds).
- Australian Red Cross: Optimization of nurse schedules resulting in a 47% reduction in cost per blood donation.
- Amazon.com: Development of an algorithm that saves Amazon EU approx. \$39MM per annum in delivery costs.
- Delivery Hero: Development of a routing solution that saves Delivery Hero approx. \$1.7MM globally per annum.
- JPMorgan Chase: Development of a compilation toolchain for Rydberg atom optimizers for problems with thousands of variables.
- Fidelity: Development of a pruning algorithm that maintains expressivity and reduces the memory footprint of gen-AI models.
- Goldman Sachs: Resource estimation of quantum algorithms for financial applications.
- Co-inventor of 12 patents (pending).

MICROSOFT CORP. | Principal Research Manager | Redmond WA Aug 2018 – Aug 2020

Led an interdisciplinary team of developers and scientists focusing on the development of optimization algorithms and a fully-managed service. Led a professional services team seeking quantum applications.

- Designed and led the development of quantum-inspired solvers on CPUs and FPGAs vastly outperforming quantum optimizers.
- Led the team that built the first prototype of Azure Quantum, the first fully-managed cloud-based quantum service.
- Led a professional services team solving complex problems for customers such as, e.g., Case Western Reserve (3x speedup for MRI scans) and Willis Towers Watson (accelerated stratified sampling for risk modeling).
- Co-inventor of 8 patents (all granted).

CONSULTANT

Guided research efforts and the development of algorithms that led to the launch of the 1Qcloud optimization service at 1Qbit, Azure Quantum at Microsoft Corp., and the development of patented space-exploration radiation shielding technology for Atlantis Industries.

- Head of Research | 1QBit | Vancouver BC Feb 2017 – Aug 2018
- Consultant | Microsoft Corp. | Redmond WA Jun 2017 – Aug 2018
- Consultant | Atlantis Industries, Inc. | Baton Rouge LA Jan 2018 – Jan 2022
- Co-inventor of 2 patents (all granted).

COURTESY APPOINTMENTS

Board memberships and academic courtesy appointments at universities and research institutions

- Affiliate Professor | University of Washington | Seattle WA Feb 2019 – present
- Visiting Professor | Coventry University | Coventry UK Jul 2015 – Jul 2016
- External Faculty Member | Santa Fe Institute | Santa Fe NM Jul 2014 – Jul 2020
- Board Member | British Columbia Quantum Algorithms Institute | Vancouver BC Jan 2021 – May 2022

PROFESSOR

Full-time faculty positions at academic institutions

- Professor | Department of Physics & Astronomy, Texas A&M University | College Station TX Sep 2015 – Jan 2021
- Associate Professor | Department of Physics & Astronomy, Texas A&M University | College Station TX Sep 2012 – Aug 2015
- Assistant Professor | Department of Physics & Astronomy, Texas A&M University | College Station TX Jan 2009 – Aug 2012
- Assistant Professor | Theoretical Physics Institute, ETH Zurich | Zurich Switzerland Mar 2007 – Mar 2013

RESEARCH SCIENTIST

Postdoctoral appointments, graduate and undergraduate research positions

- Postdoctoral Researcher | ETH Zurich | Zurich Switzerland Oct 2002 – Mar 2007
- Postdoctoral Researcher | University of California at Davis | Davis CA Oct 2002 – Mar 2007
- Graduate Research Assistant | University of California at Santa Cruz | Santa Cruz CA Oct 1997 – Oct 2001
- Undergraduate Research Assistant | ETH Zurich | Zurich Switzerland Apr 1994 – Sep 1997

EDUCATION

EXECUTIVE EDUCATION Focus on economics and leadership Stanford Graduate Business School LEAD Program	2020 – 2021
PHD Computational Physics University of California at Santa Cruz	1998 – 2001
MASTER'S DEGREE Computational Physics University of California at Santa Cruz	1997 – 1998
DIPLOMA Theoretical Physics (diploma with distinction) Swiss Federal Institute of Technology (ETH Zurich)	1992 – 1997
MILITARY SERVICE Österreichisches Bundesheer (medal for outstanding service) Vienna Austria	1992 – 1992

SCIENTIFIC ACHIEVEMENTS & TECHNICAL SKILLS

SCIENCE | (Co)Author of 175 publications (Google Scholar) | (Co)inventor of 22 patents | Speaker at over 280 international venues
VENTURE CAPITAL | Experience in due diligence (Advisor for Cambium Capital since 2020)
CERTIFICATIONS | AWS Cloud Practitioner certified and AWS AI Practitioner certified

AWARDS

FELLOW American Physical Society	2021
OUTSTANDING REFEREE American Physical Society	2016
TEACHING AWARD Texas A&M University	2016
CAREER AWARD National Science Foundation	2012
SNF PROFESSORSHIP Swiss National Science Foundation Faculty Fellowship	2007
POLYA PRIZE ETH Zurich (best diploma thesis in mathematics and theoretical physics)	1997

INTERESTS

American Physical Society member (since 1996) | PADI Divemaster & Underwater Photography (since 2003) | Karate (1st Dan, black belt)