Quantum AI Foundation

Paweł Gora
Quantum AI Foundation (Founder & CEO)
QWorld (QBoard member)
QPoland (Coordinator)
University of Warsaw (Researcher)

QUANTUM AI
FOUNDATION

QWORLD

Poland

Quantum AI Foundation

Established in Nov 2019 (http://www.qaif.org):

“We are a charity organization aiming to support development and collaboration in science and new technologies, especially Artificial Intelligence and Quantum Computing, but also other fields on Mathematics and Computer Science.”

The Foundation achieves its goals by organizing meetings (e.g., Warsaw Quantum Computing Group meetup), workshops (e.g., Workshops on Quantum Computing), contests, hackathons and other events focusing on education and enhancing research and collaboration in new technologies like AI and quantum computing.

Board: Paweł Gora (Founder & CEO), Dawid Kopczyk, Michał Kutwin

Advisory Board: Lech Mankiewicz, Adam Sawicki, Michał Krasiński

Warsaw Quantum Computing Group meetups

We organize meetings of the Warsaw Quantum Computing Group (WQCG). It is a series of meetups for quantum computing enthusiasts in Warsaw, its goal is to facilitate education and collaboration of people interested in quantum computing.

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WQCG meetings are organized several times per year (approximately once per month), usually on Mondays at 6pm CET. Each meeting consists of a lecture given by a quantum computing specialist (it usually takes about 60 minutes) followed by a Q&A session. Some of the lectures are followed by an afterparty during which the participants can interact and exchange their ideas. We record most of the lectures and make them available on our YouTube channel.

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The first WQCG meeting was organized on 18.11.2018 (even before the Quantum AI Foundation was formally established) in order to commemorate the 100th anniversary of Poland regaining independence. Initially, the meetings were organized in several locations in Warsaw. From the beginning of the pandemic crisis in Poland (March 2020), WQCG meetings are remote only. We also organize joint meetings with Washington Quantum Computing Meetup.

If you want to stay in touch with our meeting, feel free to join our mailing list: https://groups.google.com/g/warsaw-quantum-computing-group.

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Warsaw Quantum Computing Group meetups

So far, we've organized 31 meetups: https://www.qaif.org/events/warsaw-quantum-computing-group

Most of them are recorded and available on our YouTube channel: https://www.youtube.com/channel/UCoQAyPU5KQEpMOMDUN0j3IQ/videos

The next one: Nov 22, 18:00 CET

"ORQVIZ: Visualizing High-Dimensional Landscapes in Variational Quantum Algorithms"

Manuel Rudolph & Michał Stęchły (Zapata Computing)

https://www.qaif.org/events/warsaw-quantum-computing-group/next-meeting

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Quantum Machine Learning conference

Website: https://www.qaif.org/events/conferences/quantum-machine-learning-conference

Recording: https://www.youtube.com/watch?v=cAsnyty3HnU

Quantum Games Hackathon

https://www.qaif.org/contests/quantum-games-hackathon

P-Tech

We organize lectures & workshops for high school students from Kraków.

Contest on popularizing quantum computing

SPONSORZY KONKURSU

QUANTUM AI
FOUNDATION

IBM

CODEC EMPOWERING BUSINESS

SNARTO

QZ
quantumz.io

Workshops on quantum programming

Collaboration with QWorld:

We organize workshops on quantum programming based on QWorld's materials:
https://qworld.net/workshop-bronze

So far, we've organized 4 workshops https://www.qaif.org/events/qpolands-workshops and handed out 191 certificates!

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KP LABS
Mission Complete

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Association

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ODDZIAŁ MAŁOPOLSKI

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ALEXANDRIA UNIVERSITY
ALEQCG
Alexandria Quantum Computing Group (AleQCG)

digitalpoland

Digital Festival

WARSZAWSKIE
DNI INFORMATYKI

Quantum AI Foundation

We invite you to join!

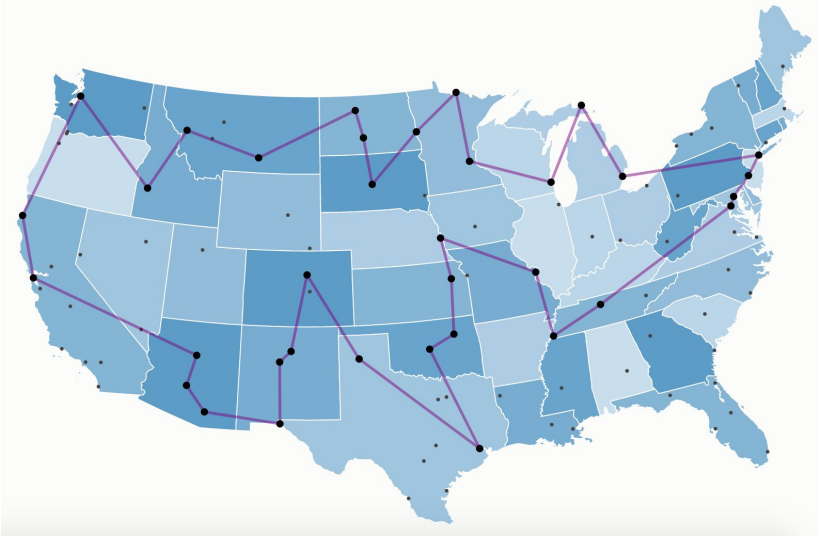
- ➔ Website: http://www.qaif.org
- ➔ Contact: warsaw.quantum@gmail.com
- ➔ Mailing list: https://groups.google.com/g/warsaw-quantum-computing-group
- ➔ Facebook group:
  https://www.facebook.com/groups/warsaw.quantum
  https://www.facebook.com/groups/qpoland
  https://www.facebook.com/groups/quantumai
- ➔ Fanpage:
  https://www.facebook.com/QPoland-110308580421373
  https://www.facebook.com/quantumaifoundation
  https://www.facebook.com/Warsaw-Quantum-Computing-Group-1936160966506139
- ➔ Twitter: QPolandCousin, https://twitter.com/qaifoundation
- ➔ Slack: https://qpoland.slack.com
- ➔ LinkedIn: https://www.linkedin.com/company/quantumaifoundation
- ➔ YouTube: https://www.youtube.com/channel/UCoQAyPU5KQEpMOMDUN0j3IQ/videos

Research

Solving Vehicle Routing Problem (and its variants) using quantum computing algorithms.

Borowski M., Gora P., Karnas K., Błajda M., Król K., Matyjasek A., Burczyk D., Szewczyk M., and Kutwin M., "New Hybrid Quantum Annealing Algorithms for Solving Vehicle Routing Problem", Computational Science - ICCS 2020, 2020, pp. 546-561.

(University of Warsaw + Snarto + QWorld)



Source: http://examples.gurobi.com/traveling-salesman-problem

Thank you for your attention!

- Questions?
  - p.gora@mimuw.edu.pl
  - warsaw.quantum@gmail.com
  - pawel.gora@qworld.net
- www: http://www.mimuw.edu.pl/~pawelg, http://www.qaif.org

"Logic can get you from A to B, imagination will take you everywhere"

A. Einstein

*"The sky is **NOT** the limit"*

Why we should build a quantum ecosystem?

Obstacles on a road toward quantum supremacy:

- ➔ We need quantum competencies (education)
- ➔ We need to develop quantum technology (research)
- ➔ We need real-world applications (business)
- ➔ We need funding (private & public sector)

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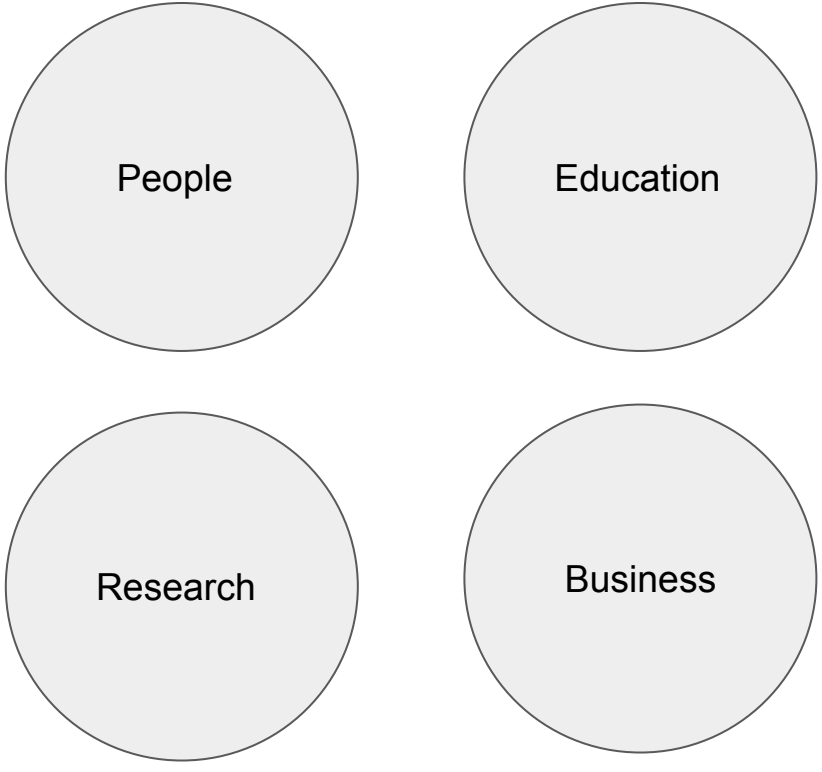
- ➔ We need real-world applications (business)
- ➔ We need funding (private & public sector)
- ➔ **We need people**

Quantum Computing Ecosystem



QWorld

➔ http://qworld.net

QWorld

➔ http://qworld.net

WELCOME TO QWORLD!

QWorld was established by five quantum cousins during QDrive project in July 2019. At the moment, QWorld has the networks of QCousins and QWomen and the departments of QEducation, QResearch, and QJunior.

Our main aim is to have an open access and public global ecosystem for quantum technologies and quantum software by the year 2025 so that each interested hardworking individual, group, institute, or region can be easily part of the ecosystem.

We are looking for enthusiastic individuals, groups, institutions, organization, and companies to take part in QWorld or to work and operate together.

Join us/Collaborate with us.

QWorkshop

➔ http://qworld.net/workshop-bronze

QBronze is *QWorld's introductory level workshop series* (15 to 20 hours) on the basics of quantum computing and quantum programming. Bronze is the name of our workshop tutorial, a collection of Jupyter notebooks using Python as the programming language and Qiskit library for writing quantum programs.

We hit our 50th workshop in February 2021 (around 1500 handed out diplomas). You can see the list at the end of this page.

- The outline of a typical QBronze
- The list of QBronze

The outline of a typical QBronze

A typical name of our workshop is "Introduction to Quantum Computing and Programming". Our tutorial Bronze can be downloaded from our QKitchen:

https://gitlab.com/qkitchen/basics-of-quantum-computing

Bronze is composed by main, auxiliary, and reference notebooks. The auxiliary notebooks are prepared to be used before the workshops. They are for testing the system, reviewing the basics of python, and explaining vectors, matrices, and basic operations on them. The main notebooks are prepared to be used during the workshops.

QHackathon

➔ http://qworld.net/hackathons

Quantum Programming Hackathon by QTurkey!

QTurkey is organizing the first quantum programming hackathon of Turkey in Ankara.

The aim of our event is to bring together people who are interested in developing quantum programming and want to meet this field through project-based learning. In this context, not only those who know quantum programming, but also who are interested in the subject and are willing to learn this subject from teammates can apply to our event.

The event will start on December 14 Saturday at 09.00, and will end on December 15 Sunday at 21.00. Participants will be able to spend the night in the event area.

The quota for the event is limited to 80 participants. We prioritize applicants who have completed the Bronze material and received their diplomas.

Location: METU CoZone, Mustafa Kemal District IT Innovation Center METU Technopolis 280 / G, 06510 Çankaya

Main Sponsors: METU Technopolis – Unitary Fund – Redeye

For more information and to submit your application please visit https://ej.uz/qturkey_hackathon

QKitchen

➔ http://qworld.net/qkitchen

Q KITCHEN

We are working on developing free and open access educational materials for the fundamental concepts and ongoing-upcoming developments in quantum technologies and quantum software.

Quantum Kitchen (QKitchen) is our public repository for developing and sharing our educational projects, our code, and similar materials. It is open to individuals and groups.

https://gitlab.com/qkitchen

QWomen

➔ http://qworld.net/qwomen

We promote equality, diversity, and inclusion.

QJunior

➔ http://qworld.net/qjunior

QJUNIOR

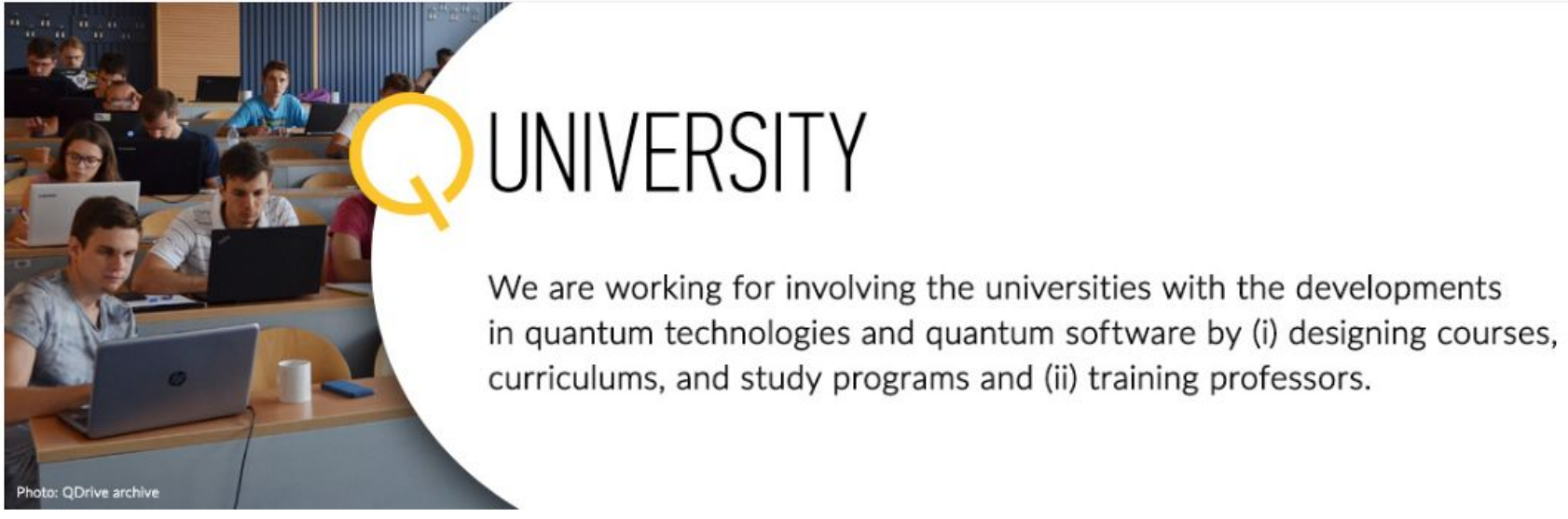
We are inviting the juniors to grow together
with quantum technologies and quantum software.

Quantum juniors for quantum future.

QJunior is in its initialization phase. Our target groups are basically teenagers called **QJuniors** and (high or elementary) school teachers called **QTeachers**.

QUniversity

➔ http://qworld.net/quniversity



QUniversity is in its initialization phase. We plan to prepare many undergraduate and graduate level courses and also to train the professors. We have a road map for three years to develop and implement our projects step by step.

QMentor Training

➔ http://qworld.net/qmentor-training

QMENTOR TRAINING

We are sharing our work and experience with the individuals and groups who are interested in taking part in QWorld as QMentor or QEducator.

The more we share the more we have. *(Leonard Nimoy)*

We have been training new people to take part in our events or to organize our events. At the moment, Workshop/Bronze is our main event.

QIntern

QIntern 2020 was successfully completed!

We are happy to announce that we organized our first QIntern program during July-August 2020! This pilot program of QWorld ran for seven weeks, during which the participants, including students, worked with more experienced researchers and quantum technology enthusiasts.

At the end of the event, the interns from over thirteen projects had the opportunity to present their works. The projects focused on various fields of quantum computer science, including quantum machine learning and quantum optimization. The interns did research on quantum computing with implementation on real devices, developed new educational materials, designed and implemented new software, and did educational research on quantum programming.

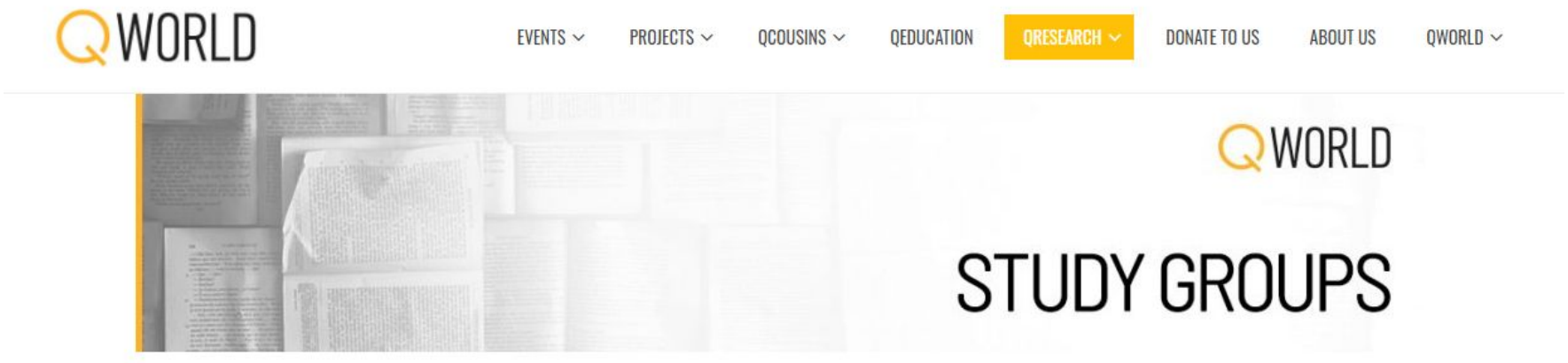
At the end of **QIntern 2020**, the jury evaluated projects as well as presentations of the results and awarded prizes in two categories.

For the best project:
- the first place goes to the projects *QFA Implementation* and *Quantum Byzantine Agreement*,
- the second place goes to the projects *QML and Edge AI* and *QML Notebooks*,
- the third place goes to the projects *Assessing the Effectiveness of Bronze* and *Solid State QCircuit*.

For the best presentation:
- the first place goes to the projects *QML and Edge AI and QML Notebooks*,
- the second place goes to the projects *QFA Implementation* and *Quantum Byzantine Agreement*,

QWorld Study Groups

➔ https://qworld.net/study-groups



An excellent way of studying a larger piece of material is to meet in a small group and simply go through it together. This is the purpose of study groups: A bunch of people take the same material, split the content among themselves, and share their thoughts.

The study group consists of participants who are reading and presenting information from the material, the group leader who is taking care of the smooth flow of the study group, and possibly mentors who are taking care of the quality of the information presented. A mentor has to be a person with an adequate experience in the related topic. The group leader can be either a participant or a mentor.

Each research project team has to follow the rules of study groups.
If you are interested in creating a study group or joining an existing one, please contact us!

Coordinator: Adam Glos (QPoland), Zoltán Zimborás (QHungary)
Contact: qresearch [at] qworld.lu.lv

QCousins

At the moment, we are eleven QCousins: QLatvia, QTurkey, QHungary, QBalkan, QPoland, QRussia, QSlovakia, QPakistan, QCzech, QTunisia, and QMexico.

QPoland

QPoland is a QCousin organized by quantum computing researchers and educators from Poland. We organized the first workshops in May 2019 (in Kraków and Warsaw) in collaboration with QLatvia and officially entered the initialization phase on 11.11.2019 (the 101st anniversary of regaining independence by Poland). Among QPoland members are representatives of, i.a., Warsaw Quantum Computing Group, Institute of Theoretical and Applied Informatics of the Polish Academy of Sciences, Center for Theoretical Physics of the Polish Academy of Sciences, Faculty of Mathematics, Informatics and Mechanics of the University of Warsaw, Warsaw School of Economics.

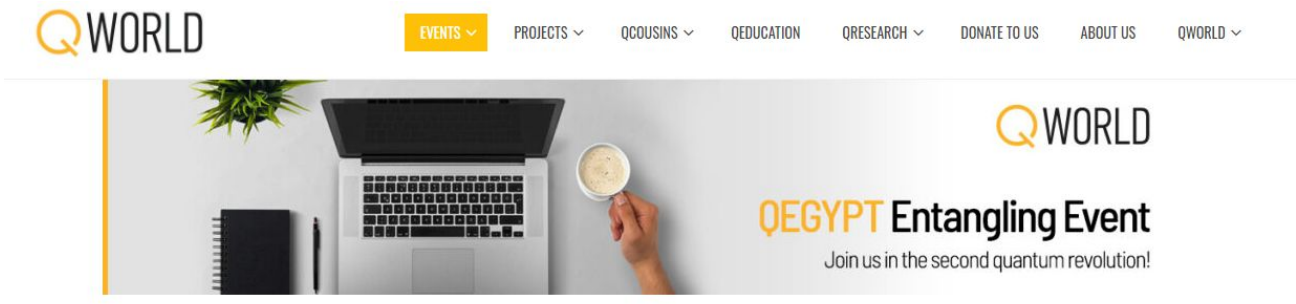
Members:

- Anna Dawid
- Piotr Gawron
- Adam Glos
- Paweł Gora *(Coordinator)*
- Kamil Hendzel
- Jacek Karwowski
- Dawid Kopczyk
- Marcin Kostrzewa
- Michał Kutwin
- Aleksandra Lipińska
- Filip Maciejewski
- Piotr Migdał
- Jarosław Miszczak
- Jakub Nowak
- Adam Sawicki
- Oskar Słowik
- Kamila Szafrańska
- Jerzy Szuniewicz
- Katarzyna Wojtkowiak
- Sebastian Zając

QPoland

QEgypt

https://qworld.net/qbronze57-qegypt



QBronze57 | Quantum Computing and Programming | April 2-3 & 9-10, 2021

We are happy to announce the first QBronze workshop in Egypt! The entangling workshop for QEgypt will take place on two consecutive weekends in April. Join us and our Egyptian host Alexandria Quantum Computing Group (AleQCG) for the introductory workshop "Quantum Computing and Programming" and learn the basics of quantum computing and how to write simple quantum programs.

We are inviting high school students, university and graduate students, researchers, professors, and industrial people from Egypt. During the workshop, we will use the introductory tutorial Bronze-Qiskit by QWorld. We will use Slack to communicate with each other and conduct the workshop by Zoom meetings. Jupyter notebooks and Zoom lectures will be in English.

The participants completing the workshop successfully will receive a diploma!

Participants will be watching the lecture videos and completing the tasks on their own. Mentor support will be provided for participants to ask their questions and share their progress with mentors. The workshop will be held over 4 days on two consecutive weekends, with a total of 20 hours of training.

First Weekend | 2-3.04.2021
Friday: 17:00 - 22:00 (GMT+2)
Saturday: 17:00 - 22:00 (GMT+2)

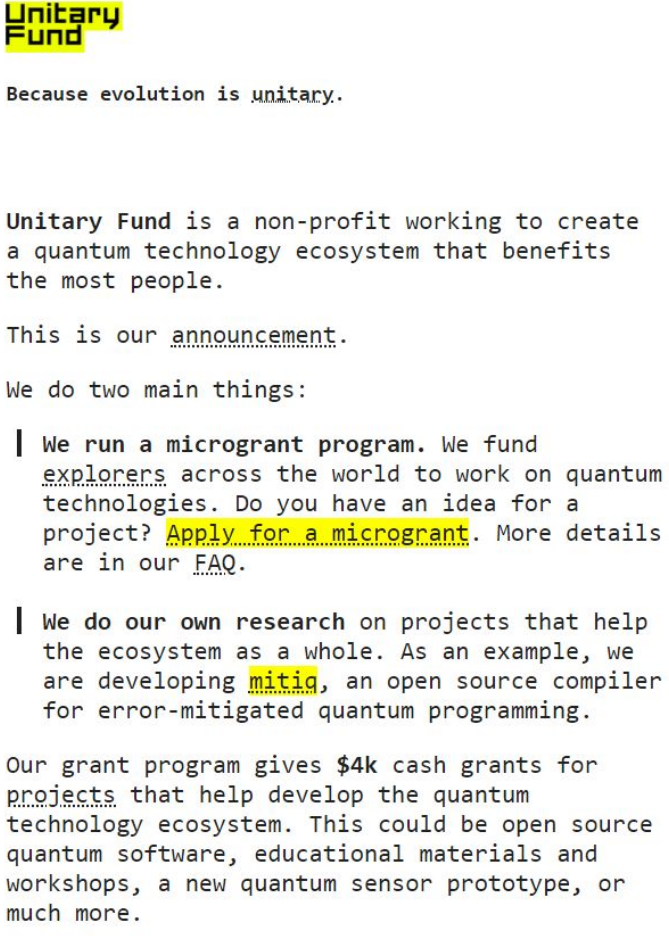
Second Weekend | 9-10.04.2021
Friday: 17:00 - 22:00 (GMT+2)
Saturday: 17:00 - 22:00 (GMT+2)

QWorld

We invite you to join!

- ➔ Website: http://qworld.net
- ➔ Email: info@qworld.net
- ➔ QCousins program: qcousins@qworld.net
- ➔ Facebook page: https://www.facebook.com/qworld19
- ➔ Twitter profile: https://twitter.com/QWorld19
- ➔ Internal mailing list
- ➔ Community Slack: https://qworldworkspace.slack.com
- ➔ Sponsor: Unitary Fund https://unitary.fund

Business / Funds



Unitary Fund

Because evolution is unitary.

- **Unitary Fund** is a non-profit working to create a quantum technology ecosystem that benefits the most people.

  This is our announcement.

  We do two main things:

  > **We run a microgrant program.** We fund explorers across the world to work on quantum technologies. Do you have an idea for a project? Apply for a microgrant. More details are in our FAQ.

  > **We do our own research** on projects that help the ecosystem as a whole. As an example, we are developing mitiq, an open source compiler for error-mitigated quantum programming.

  Our grant program gives **$4k** cash grants for projects that help develop the quantum technology ecosystem. This could be open source quantum software, educational materials and workshops, a new quantum sensor prototype, or much more.

Source: http://unitary.fund

Business / Funds

Many companies:

- ➔ IBM
- ➔ Microsoft
- ➔ Google
- ➔ Amazon
- ➔ Xanadu
- ➔ D-Wave
- ➔ Zapata Computing
- ➔ IonQ
- ➔ Rigetti
- ➔ Beit.tech
- ➔ Bohr Technology
- ➔ ...

Where to learn more?

- ➔ QWorld webinars (and other QWorld sources): http://qworld.net
- ➔ edX course https://www.edx.org/course/quantum-machine-learning
- ➔ Videos on YouTube: lectures of Peter Wittek (UoT), Warsaw Quantum Computing Group
- ➔ “Quantum Computing Now” Facebook group: https://www.facebook.com/groups/328231110942652
- ➔ “Quantum AI” Facebook group: https://www.facebook.com/groups/quantumai (> 3500 members)
- ➔ “Quantum Information and Quantum Computer Scientists of the World Unite” Facebook group: https://www.facebook.com/groups/qinfo.scientists.unite
- ➔ Warsaw Quantum Computing Group: https://www.facebook.com/groups/warsaw.quantum
- ➔ Quantum Computing Report - weekly newsletter: https://quantumcomputingreport.com
- ➔ Online tutorials of QISKIT, pyQuil, PennyLane etc
- ➔ Swiss Quantum Hub: https://www.swissquantumhub.com
- ➔ ...

Where to learn more?

QURECA
quantum resources & careers

Home Services Resources Blog About Contact Sign In / Sign Up

Resources

All resources you need to be part of the quantum revolution!

If you cannot find what you are looking for, contact us!

Education

Media

Source: https://www.qureca.com/resources-2