



QuantX, the *École Polytechnique* alumni association dedicated to Quantum Computing technologies

We are witnessing the emergence of a new industry : the so-called "*second quantum revolution*" industry, which embodies phenomena that marvelled us while we were at the *École Polytechnique*: superposition, entanglement, Bose-Einstein condensation, superconductivity, Hall effect and many more.

For decades, these technologies were theoretically possible but practically infeasible outside the environment of a laboratory. The astonishing capacities of quantum computing gave it the role of the Holy Grail for generations of scientists. A tremendous amount of research effort and energy was spent to create the very first qubits, assemble them and create the proofs of concept that we all know. Today, we witness quantum computing entering in an engineering phase and the expectations of generations of researchers are finally getting realized. The first quantum computers are available and the first applications are currently being developed. Seemingly, a fully-operational quantum computer is still a faraway objective and we will probably need a few decades for the technologies to fulfill all its promises, but one thing is already clear: there is a new era of computer science growing before our eyes.

This era will be a challenge not only on a scientific ground but also organisationally as it will require the transfer of technologies acquired in the universities across the previous decades to the industry and also the training of new talents and engineers on which companies will rely on. This goes without mentioning issues of national sovereignty in a globalised world where international collaboration is less manifest and where dual technologies such as quantum computers might not be available to countries that do not have providers on their territory. France has well understood these challenges, since the Government has released a national strategy aiming for the country to be a leader in the field in terms of research, industries and jobs.

The *École Polytechnique* alumni community has the chance to count a diversity of profiles and skills in the quantum industry. We are a group of alumni of the *École polytechnique* who are pioneers in the field. We are researchers, start-up founders, executive members of some of the largest companies in the country, investors, and we know that the *École polytechnique* is not only an extraordinary university but also one of the most efficient and solid professional network gathering the best of the academic and industrial worlds. We are convinced that the extent of our alumni network will have a large impact on the fields of quantum computing, sensing and communication and all associated sectors (finance, medicine, energy, navigation. . .)

By gathering the quantum community, we aim to contribute to the acceleration of progress and of the transfer of knowledge, to the discovery of new applications, to the training of the future experts and future quantum engineers, and to the motivation of the forthcoming generations to contribute to the world of quantum computing. To reach our ambitions, we have created a dedicated alumni society: QuantX. In the continuity of the core values of the *École polytechnique*, QuantX carries the vision that the success of a French ambition in the field of quantum technologies should rely on scientific excellence as well as on a support to entrepreneurship and more broadly to the transverse and original initiatives.

Actions

So as to attain our goals, we propose to guide our actions according to the following directions:

1. Guidance of university students: a career in the quantum industry

- **Organizing seminars and workshops at the École polytechnique.**

The best way to inspire future generations of researchers and experts in quantum computing, communication and sensing is to connect them to the present experts considered as thought-leaders, who envision paramount perspectives for this new industry on a global level. In this regard, we plan to propose to the dean of the École Polytechnique a series of conferences and seminars with invited speakers as well as hackathons dedicated to quantum computing. More than just appealing to the students engaging a career in the quantum sector, we believe that these events will become an important tool to disseminate the knowledge and the progress of the industry, to foster technical discussions, prospective visions and ethics questions related to this new industry. Quite naturally, we aim to bridge the gap between the students and the industry and to offer them a catalog of possible internships and job offers available to them.

- **Participation in the École polytechnique career fair.**

Every year, the École polytechnique career fair, X-Forum, gathers hundreds of companies trying to hire potential candidates. The Forum is well suited to present the activities of major and established industries and there exists a risk that quantum technologies might be under-represented since the field is relatively new. QuantX aims to solve this difficulty by representing the possible career in quantum computing across various industries, by federating start-ups that do not have their proper representation at the Forum.

- **Creation of a professional network.**

So as to connect the students of the École Polytechnique looking for internships, Ph.D thesis and other professional opportunities, QuantX will provide a virtual network for both professionals having job openings and students, alumni from the École Polytechnique.

2. Alumni networking

More and more École Polytechnique alumni work in the technologies of the so-called "*second quantum revolution*" in France or abroad, in the academic world, in the industry or in finance, but also as public servants by their position in governmental agencies. One of our ambition is to gather the École Polytechnique community to be able to exchange through various networking activities. Besides, there is a real need and demand to educate and popularize the knowledge so as to better understand the promises, the risks, the time scales of this growing industry: this is something we propose to achieve for the École Polytechnique community.

3. Think-tank and advocacy actions

QuantX aims to be an environment to share propositions, thoughts and analysis so that the French ecosystem stays at the front-line of quantum technologies. Although many challenges remain open in the field of quantum technologies, we are urged to keep some fundamental and exploratory research: this relies heavily on talented, gifted students and ambitious projects. The support towards this research is paramount since this is where the pool of experts will thrive: undergraduate, graduate and post-doctoral students. These future experts will play a major role in pursuing national research efforts, in federating research facilities and also in reinforcing existing teams in start-up companies or already settled major industries.

This capacity to accelerate and guide research or entrepreneurial efforts should necessarily come in hands with adequate finance support whose cost are expected to be large for the development of such technologies. QuantX wishes that public and private policies be written in conjunction with the researchers

and the entrepreneurs that are active in the field, hence QuantX will carry the voice of the École Polytechnique alumni community for that purpose. To that aim, we will organize events gathering policy makers, researchers, start-up members and industrial actors to discuss aspects of quantum technologies.

Collaborations

To conduct our actions and multiply the communication channels and efforts, we collaborate with already existing initiatives while defending the specific message of the École polytechnique community. Let us mention *Le Lab Quantique*¹, which is an organization dedicated to foster bottom-up initiatives in the global quantum ecosystem. Some of the founding members of QuantX are already involved in that effort. We will also approach other alumni societies such as the one of the École Normale Supérieure. For specific themes and events, we will consider organising joint events with other societies of the École polytechnique alumni network such as X-AI on the subject of *Quantum Machine Learning*.

¹<https://lelabquantique.com>