

Summary of Ideas for Quantum Curriculum Development that the QED-C Could Support

From the November 6, 2020 WFTG Discussion Group Meeting

For those adding to this list, please list your additions under a heading that has your name as shown below. This will help us know who made the suggestion in case there are questions.

From Doug Finke

1. Create a repository of syllabi of various quantum courses taught so that new teachers who are putting together a course for the first time can see how some of the other courses have been put together.
2. Schedule regular (perhaps quarterly) Networking/Mentoring meetings with teachers who are currently teaching quantum courses and those who are looking to do so in the future. The teachers can exchange tips with one another and provide tips to one developing a new course about what works and what doesn't.
3. We should not forget about doing something for High School students to get them started early. There are a number of open resources already available, such as quantum games, and the QED-C can create a web page to provide information to these students on where to find all these resources.
4. The QED-C has already started an activity to help university students find intern opportunities with quantum companies. Perhaps this program can be extended to include high school students too.

From Ciaran Hughes – Email 1

1. Create a repository of existing materials (which target different student levels) and publicise it.
2. Use this list to create a needs analysis for what material could be created if there is a market gap (e.g., does all undergrad material require a computer; or does all the courses cost money so we need to create a open-access one). My previous email highlights some topics that may be important for future material.
3. Potentially create a small interactive project that teaches a tidbit topic in a short period of time. For example, I quite like the Manning LiveProjects (<https://liveproject.manning.com/>) instead of the MOOCs for introductions to new topics.
4. Create paid internships in industry for high-school/undergrad/masters students, particularly for start-ups to get access to young talent.
5. Hold more teachers trainings to get more teachers who are able to teach this. This could be a bottom-up approach through QED-C/NSF etc, or a top-down approach by getting Quantum approved by the city/county/state level.

From Ciaran Hughes – Email 2

1. A broad quantum course to raise general quantum awareness (self-pitch: my course does this and is appropriate for highschool + early undergrad CS/math/engineers).
2. Two types of short education (a few weeks - months) for current industry employees or current uni students:

- 2.1. Online project based resources on algs, error correction, stats and analysis, Hamiltonians, etc (something like Manning LiveProjects)
- 2.2. Lab based experience, gaining hands on experience in hardware, cryo, cavities, etc
3. Industry experience through internships highly important.
4. A one semester course in "quantum" for current undergrad/masters computer science/math/engineers students.