

## Quantum Computing Overview and Global Landscape - William Hurley

Kilby (1976): Invention of the Integrated Circuit

- National Academies Summary on Integrated Circuits — free overview of how integrated circuits were invented and why they matter (history and impact).  
<https://nap.nationalacademies.org/read/25196/chapter/3>
- Wikipedia: Integrated Circuit (History) — brief, clear summary on invention and evolution of ICs.  
[https://en.wikipedia.org/wiki/Integrated\\_circuit](https://en.wikipedia.org/wiki/Integrated_circuit)
- Student-friendly history article (SweetStudy) — short explanation of Kilby and Noyce contributions.  
<https://www.sweetstudy.com/files/theinnovatorshowagroup1.pdf>

Newell & Simon (1976): Computer Science as Empirical Inquiry

- SciSpace summary — short abstract with key ideas from the paper (goal of CS, symbols and search).  
<https://scispace.com/papers/computer-science-as-empirical-inquiry-symbols-and-search-26ge2ratwk>
- Wikipedia: Heuristics (context for symbolic search) — explains core concept the authors focus on (heuristic search).  
[https://en.wikipedia.org/wiki/Heuristic\\_\(computer\\_science\)](https://en.wikipedia.org/wiki/Heuristic_(computer_science))
- Podcast commentary on paper — informal explanation (free).  
[ericnormand.me](http://ericnormand.me)  
[https://www.youtube.com/watch?v=KM0\\_MNIhIsE](https://www.youtube.com/watch?v=KM0_MNIhIsE)

Bacciagaluppi & Valentini (2009): Solvay Conference and Quantum Theory

- Encyclopedia Britannica: Solvay Conferences — clear overview of the 1927 conference and why it was important.  
<https://www.britannica.com/event/Solvay-Conferences>
- Book for general audience (“Quantum”) — history of quantum debates including Solvay.  
[Wikipediahttps://en.wikipedia.org/wiki/Quantum\\_\(book\)](https://en.wikipedia.org/wiki/Quantum_(book))

*Note:* The Bacciagaluppi & Valentini book itself is a scholarly book without free access, BUT these summaries cover the key historical context.

Shor (1997): Polynomial-Time Algorithm for Prime Factorization

- Wikipedia: Shor’s algorithm — concise explanation of the algorithm and why it matters.  
[https://en.wikipedia.org/wiki/Shor%27s\\_algorithm](https://en.wikipedia.org/wiki/Shor%27s_algorithm)
- CivilsDaily explanation — simplified overview of Shor’s algorithm and its implications for cryptography.  
<https://www.civildaily.com/story/innovations-in-sciences-it-computers-robotics-and-nanotechnology/>
- Stanford Encyclopedia (Quantum Computing) — broader context including Shor’s work.  
<https://plato.stanford.edu/entries/qt-quantcomp/>
- ArXiv intro paper (accessible) — gentle introduction to quantum computing ideas connected to Shor.  
<https://arxiv.org/abs/quant-ph/9809016>

## General Quantum Computing (Context & Student Resources)

- Quantum Computing High School Module (Open) — course module for beginners.  
<https://arxiv.org/abs/1905.00282>
- Quantum computing textbook overview (“Quantum Computing: A Gentle Introduction”) — easier than research papers.  
[https://en.wikipedia.org/wiki/Quantum\\_Computing%3A\\_A\\_Gentle\\_Introduction](https://en.wikipedia.org/wiki/Quantum_Computing%3A_A_Gentle_Introduction)

## Gender Gap in STEM

- AAUW: The STEM Gap (full report) — accessible report on gender disparities.  
<https://www.aauw.org/resources/research/the-stem-gap/>
- EETimes: More women in quantum technology article — industry context.  
<https://www.eetimes.eu/wanted-more-women-in-quantum-technologies/>
- NSF Data on Women in Physics — official stats with breakdowns.  
<https://nces.nsf.gov/archived?url=https%3A%2F%2Fwww.nsf.gov%2Fstatistics%2F2017%2Fnsf17310%2Fdigest%2Fod-women%2Fphysics.cfm>
- Statista Gender Stats for Developers — free preview charts showing global developer gender ratios.  
<https://www.statista.com/statistics/1128823/worldwide-developer-gender/>
- “Why So Few?” PDF on gender gap in STEM fields — educational summary of causes and barriers.  
<https://docslib.org/doc/2937118/why-so-few-women-in-science-technology-engineering-and-mathematics-why-so-few-women-in-science-technology-engineering-and-mathematics>
- Crash Course Computer Science & Physics (YouTube) — free video series covering microchips, computing history, quantum concepts.  
[https://www.youtube.com/playlist?list=PL8dPuuaLjXtPNZwz5\\_o\\_5uirJ8gQXnhEO](https://www.youtube.com/playlist?list=PL8dPuuaLjXtPNZwz5_o_5uirJ8gQXnhEO)

## Evolution of Quantum Computing and DiVincenzo Criteria - Prof David DiVincenzo

Popular Science (2022) — Journey to the Center of a Quantum Computer

- <https://www.popsci.com/quantum-computer-photos/>
- <https://www.ibm.com/think/topics/quantum-computing>

IBM — Quantum Computer Animation

- <https://www.youtube.com/watch?v=JhHJMJCUmQ28>
- <https://quantum.cloud.ibm.com/learning/en>

DiVincenzo (2009) — Fault-tolerant superconducting qubits

- <https://milvus.io/ai-quick-reference/what-is-quantum-error-correction-and-why-is-it-important-for-quantum-computing>
- <https://arxiv.org/abs/0906.2187>
- <https://algassert.com/post/1715>

IBM Quantum Development Roadmap

- <https://research.ibm.com/blog/quantum-development-roadmap>
- <https://www.ibm.com/quantum/roadmap>

Timeline — Quantum Computers (1960 → 2016)

- [https://en.wikipedia.org/wiki/Timeline\\_of\\_quantum\\_computing\\_and\\_communication](https://en.wikipedia.org/wiki/Timeline_of_quantum_computing_and_communication)

Feynman (1982) — Simulating physics with computers

- <https://plato.stanford.edu/archives/fall2004/entries/qm/>
- <https://arxiv.org/abs/quant-ph/0207088>
- <https://www.youtube.com/watch?v=Q1YqgPAzho>

Landauer (1960) — Heat & computation

- <https://plato.stanford.edu/entries/information-entropy/>
- <https://arxiv.org/abs/1410.4480>
- <https://www.quantamagazine.org/tag/quantum-computing/>

Holevo (1975) — Limits on quantum communication

- <https://quantum.country/qcvc> (section on communication)
- [https://en.wikipedia.org/wiki/Holevo%27s\\_theorem](https://en.wikipedia.org/wiki/Holevo%27s_theorem)

Manin (1980) — Computable & uncomputable

- <https://plato.stanford.edu/entries/computation-physicalsystems/>
- <https://www.quantamagazine.org/what-is-the-true-promise-of-quantum-computing-20250403/>

ISI Institute (1994–2006 pictures)

- <https://www.quantamagazine.org/what-is-the-true-promise-of-quantum-computing-20250403/>
- [https://www.livescience.com/technology/computing/history-of-quantum-computing-key-moments-that-shaped-the-future-of-computing?utm\\_source=chatgpt.com](https://www.livescience.com/technology/computing/history-of-quantum-computing-key-moments-that-shaped-the-future-of-computing?utm_source=chatgpt.com)

DiVincenzo (1995) — Universal two-qubit gates

- <https://quantum.country/qcvc> (gates section)
- [https://en.wikipedia.org/wiki/Universal\\_quantum\\_gate](https://en.wikipedia.org/wiki/Universal_quantum_gate)
- <https://journals.aps.org/pr/abstract/10.1103/PhysRevA.51.1015>

Di Vincenzo's Criteria

- [https://en.wikipedia.org/wiki/DiVincenzo%27s\\_criteria](https://en.wikipedia.org/wiki/DiVincenzo%27s_criteria)

Mermin (2007) — Quantum Computer Science

- [https://dn790009.ca.archive.org/0/items/QuantumInformation/quantum\\_%20computer\\_%20science.pdf](https://dn790009.ca.archive.org/0/items/QuantumInformation/quantum_%20computer_%20science.pdf)
- Overview: [https://en.wikipedia.org/wiki/Quantum\\_Computer\\_Science](https://en.wikipedia.org/wiki/Quantum_Computer_Science)

Bennett (2003) — Reversible computation

- Free paper: <https://arxiv.org/abs/physics/0210005>

Margolus (2020) — Limits on classical computation

- <https://www.youtube.com/watch?v=iYEfGwXI8AM>
- Concept explainer: <https://www.quantamagazine.org/how-can-ai-researchers-save-energy-by-going-backward-20250530/>

## Quantum Computing for Power & Energy Systems - Sayonsom Chanda

Charles Babbage

- [https://en.wikipedia.org/wiki/Analytical\\_engine](https://en.wikipedia.org/wiki/Analytical_engine)
- [computinghistory.org.uk](https://computinghistory.org.uk)
- <https://www.computinghistory.org.uk/det/11409/Charles-Babbage-publishes-a-paper-describing-the-Analytical-Engine/>

Project Gutenberg

- <https://www.gutenberg.org/ebooks/71292>

Richard P. Feynman — Simulating Physics with Computers (1982)

- [https://chem.libretexts.org/Bookshelves/Physical\\_and\\_Theoretical\\_Chemistry\\_Textbook\\_Maps/Quantum\\_Tutorials\\_%28Roux%29/08%3A\\_Quantum\\_Teleportation/8.42%3A\\_A\\_Summary\\_of\\_Feynman%27s\\_Simulating\\_Physics\\_with\\_Computers](https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Quantum_Tutorials_%28Roux%29/08%3A_Quantum_Teleportation/8.42%3A_A_Summary_of_Feynman%27s_Simulating_Physics_with_Computers)
- ArXiv Paper Archive (free download)  
[https://archive.org/details/richard\\_feynman\\_simulating\\_physics\\_with\\_computers](https://archive.org/details/richard_feynman_simulating_physics_with_computers)

Society of Environmental Journalists (SEJ) coverage

- <https://www.sej.org/headlines/summer-blackouts-wheezing-power-grid-leaves-states-risk>

Axios summary (free news)

- <https://www.axios.com/2022/06/03/blackouts-energy-climate>

NREL Docs

- <https://docs.nrel.gov/docs/fy24osti/87308.pdf>

## Quantum for Electric Grids - Aditi Lal, Varun teja Puram, Mackenson Polché

Smart Grids & Sustainable Cities

- <https://www.wealthformula.com/blog/smart-grids-paving-the-way-for-sustainable-urban-development/>
- <https://www.nrel.gov/grid/power-electronics-inverters>

Schuld (2021) — Quantum Machine Learning Models: A Review

- <https://arxiv.org/abs/2012.09265>

Qiskit Textbook – Quantum Machine Learning (excellent for students)

- <https://learn.qiskit.org/course/machine-learning>

PennyLane QML demos (interactive & intuitive)

- <https://pennylane.ai/qml/>

Fujii & Nakajima (2017) — Quantum Reservoir Computing

- [https://en.wikipedia.org/wiki/Echo\\_state\\_network](https://en.wikipedia.org/wiki/Echo_state_network)
- <https://arxiv.org/abs/2001.06103>
- <https://arxiv.org/abs/1708.00758>

Nakajima et al. (2021) — Spatial Multiplexing in Quantum Reservoir Computing

- <https://arxiv.org/abs/2010.13236>
- <https://uw-madison-datascience.github.io/machine-learning-novice-sklearn/04-ensemble-methods.html>

Rasmussen & Williams (2006) — Gaussian Processes for Machine Learning

- <http://www.gaussianprocess.org/gpml/>

Distill-style explanation (very intuitive)

- <https://distill.pub/2019/visual-exploration-gaussian-processes/>

StatQuest video (excellent for beginners)

- <https://www.youtube.com/watch?v=UBDgSHPxVME>

Jaeger (2001) — Echo State Networks

- <https://www.ai.rug.nl/minds/uploads/EchoStatesTechRep.pdf>

Havlíček et al. (2019) — Quantum-Enhanced Feature Spaces

- <https://arxiv.org/abs/1804.11326>

Qiskit tutorial on quantum kernels

- <https://learn.qiskit.org/course/machine-learning/quantum-kernel-methods>

Huang et al. (2021) — Power of Data in Quantum Machine Learning

- <https://arxiv.org/abs/2011.01938>

Short explanatory article

- <https://quantum-journal.org/papers/q-2021-06-01-463/>

## Quantum Research Lab Tour - Superconducting & Cryogenic Setups - Jeff Thompson

Saffman, Walker, Mølmer (2010)

- <https://arxiv.org/abs/0909.4777>

Beginner-friendly overview (lecture notes)

- <https://www.phys.uconn.edu/~rcote/Projects/Rydberg/Rydberg.html>

Review summary of early Rydberg gates

- <https://arxiv.org/abs/1702.08825>

Physics Today explanation (accessible)

- <https://physicstoday.aip.org/editorial/in-praise-of-prizes>

Review on optical tweezer arrays

- <https://arxiv.org/abs/2004.10646>

Harvard/MIT lecture slides

- <https://arxiv.org/pdf/2002.07413>

Gate fidelity tutorial

- <https://arxiv.org/abs/1912.01724>

Neutral-atom quantum computing review

- <https://arxiv.org/abs/2011.08843>

Quantum simulation with Rydberg atoms (review)

- <https://arxiv.org/abs/2104.11293>

Beginner explanation of quantum simulators

- <https://www.quantamagazine.org/analog-vs-digital-the-race-is-on-to-simulate-our-quantum-universe-20250905/>

Quantum metrology primer

- <https://arxiv.org/abs/2001.06224>

Clock-based quantum sensing overview

- <https://www.nist.gov/publications/quantum-metrology>

Surface codes explained visually

- <https://quantum.cloud.ibm.com/learning/en/courses/foundations-of-quantum-error-correction/correcting-quantum-errors/introduction>

Error correction lecture notes

- <https://arxiv.org/abs/1907.11157>

Neutral atom hardware overview

- <https://arxiv.org/abs/2203.09510>

Company-agnostic neutral atom comparison

- <https://quantumcomputingreport.com/harvard-and-collaborators-demonstrate-scalable-fault-tolerant-architecture-with-448-neutral-atom-qubits/>

## Introduction to Quantum Computing and Qubits - Prof William Oliver

Key Dates in Computing & Quantum Computing (Context Timeline)

- <https://www.computerhistory.org/timeline/>
- <https://quantum.country/qcvc>

Rutherford (1911) & Bohr (1913)

- <https://www.khanacademy.org/science/ap-physics-2/x0e2f5a2c%3Amodern-physics/x0e2f5a2c%3Aatoms-and-light>
- [https://chem.libretexts.org/Bookshelves/Introductory\\_Chemistry/Book%3A\\_Introductory\\_Chemistry\\_\(CK-12\)/05%3A\\_Electrons\\_in\\_Atoms/5.06%3A\\_Bohr%27s\\_Atomic\\_Model](https://chem.libretexts.org/Bookshelves/Introductory_Chemistry/Book%3A_Introductory_Chemistry_(CK-12)/05%3A_Electrons_in_Atoms/5.06%3A_Bohr%27s_Atomic_Model)

Shor (1994–1995) — Factoring

Quantum Country (excellent pedagogy)

- <https://quantum.cloud.ibm.com/docs/en/tutorials/shors-algorithm>
- <https://news.mit.edu/2016/quantum-computer-end-encryption-schemes-0303>

Grover (1996)

- <https://quantum.country/search>
- <https://qiskit.org/textbook/ch-algorithms/grover.html>

HHL (2009) — Linear Systems

- [https://cocalc.com/github/quantum-kittens/platypus/blob/main/notebooks/ch-applications/hhl\\_tutorial.ipynb](https://cocalc.com/github/quantum-kittens/platypus/blob/main/notebooks/ch-applications/hhl_tutorial.ipynb)
- [https://github.com/Qiskit/textbook/blob/main/notebooks/ch-applications/hhl\\_tutorial.ipynb](https://github.com/Qiskit/textbook/blob/main/notebooks/ch-applications/hhl_tutorial.ipynb)

Lloyd (1996) — Universal Quantum Simulators

- <https://www.quantamagazine.org/analog-vs-digital-the-race-is-on-to-simulate-our-quantum-universe-20250905/>
- <https://arxiv.org/abs/quant-ph/9603028>

QAOA — Farhi et al. (2014)

- <https://quantum.cloud.ibm.com/docs/tutorials/quantum-approximate-optimization-algorithm>
- <https://qiskit.org/textbook/ch-applications/qaoa.html>

Sipser (2012)

- <https://people.csail.mit.edu/rww/6.045-2019/>

Theory of computation (Khan-style)

- <https://cs.stackexchange.com/questions/404/what-is-the-theory-of-computation>

Quantum error correction explained visually

- <https://quantum.cloud.ibm.com/learning/en/courses/foundations-of-quantum-error-correction/correcting-quantum-errors/introduction>

IBM-style QEC explainer

- <https://www.ibm.com/quantum/blog/advancing-quantum-error-correction>

Quantum internet overview

- <https://pme.uchicago.edu/news/quantum-internet-explained-0>
- <https://arxiv.org/abs/1809.01030>

## Visualizing Quantum Mechanics - Dr. Shaeema Zaman

University of Waikato – NanoLearn (2013)

- <https://www.sciencelearn.org.nz/concepts/nanoscience>

HyperPhysics: Classical Mechanics

- <https://hyperphysics.gsu.edu/hbase/chom.html>

Quantum Kate (2019)

- <https://www.youtube.com/watch?v=CXEACWZhLF4>

Schrödinger (1926) — Quantisierung als Eigenwertproblem

- <http://hyperphysics.phy-astr.gsu.edu/hbase/quantum/schr.html>
- [https://chem.libretexts.org/Bookshelves/Physical\\_and\\_Theoretical\\_Chemistry\\_Textbook\\_Maps/Physical\\_Chemistry\\_%28LibreTexts%29/03%3A\\_The\\_Schrodinger\\_Equation\\_and\\_a\\_Particle\\_in\\_a\\_Box/3.01%3A\\_The\\_Schrodinger\\_Equation](https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Physical_Chemistry_%28LibreTexts%29/03%3A_The_Schrodinger_Equation_and_a_Particle_in_a_Box/3.01%3A_The_Schrodinger_Equation)

QuVis Project (University of British Columbia)

- <https://www.st-andrews.ac.uk/physics/quvis/>
- [https://www.st-andrews.ac.uk/physics/quvis/simulations\\_html5/sims/infwell1d/infwell1d.html](https://www.st-andrews.ac.uk/physics/quvis/simulations_html5/sims/infwell1d/infwell1d.html)
- [https://www.st-andrews.ac.uk/physics/quvis/simulations\\_html5/sims/SuperpositionStates/SuperpositionStates.html](https://www.st-andrews.ac.uk/physics/quvis/simulations_html5/sims/SuperpositionStates/SuperpositionStates.html)

- [https://www.st-andrews.ac.uk/physics/quvis/simulations\\_html5/sims/blochsphere/blochsphere.html](https://www.st-andrews.ac.uk/physics/quvis/simulations_html5/sims/blochsphere/blochsphere.html)

IBM Quantum – What is a Qubit?

- <https://www.ibm.com/think/topics/qubit>

Quantum Entanglement

- <https://scienceexchange.caltech.edu/topics/quantum-science-explained/entanglement>

Nielsen & Chuang (2010)

- <https://qiskit.org/textbook/>
- <https://quantum.country/>

## Quantum Internet & quantum Networking Overview - Prineha Narang

Sensors — The Other Quantum Revolution

- <https://news.cnrs.fr/articles/sensors-the-other-quantum-revolution>

Giovannetti, Lloyd & Maccone (2001) — Quantum-Enhanced Measurements

- <https://arxiv.org/abs/2001.06224>
- <https://quantum.cloud.ibm.com/learning/en/courses/foundations-of-quantum-error-correction/correcting-quantum-errors/introduction>

Komar et al. (2014) — A Quantum Network of Clocks

- <https://www.quantamagazine.org/ultra-accurate-clocks-lead-search-for-new-laws-of-physics-20180416/>
- <https://arxiv.org/abs/1911.04501>

Zhang & Zhuang (2020) — Distributed Quantum Sensing

- <https://arxiv.org/abs/2010.14744>
- <https://www.nist.gov/pml/productsservices/quantum-networks-nist/applications-quantum-networks>

Gottesman, Jennewein & Croke (2012)

- <https://www.nist.gov/pml/quantum-networks-nist/technologies-quantum-networks/quantum-memory-and-repeaters>
- <https://www.aura-astronomy.org/blog/2024/04/12/charting-the-quantum-horizons-of-astronomy/>

## Quantum Networking - The Practical Distribution of Useful Entanglement - Noel Goddard

Original paper (open access):

- <https://arxiv.org/abs/2303.13866>

Wikipedia (free):

- [https://en.wikipedia.org/wiki/Quantum\\_teleportation](https://en.wikipedia.org/wiki/Quantum_teleportation)

Quanta Magazine (popular science):

- <https://www.quantamagazine.org/tag/quantum-teleportation/>

## Quantum in Scientific Computing - Brian McDermott

Navier–Stokes (1822–1845)

- [https://en.wikipedia.org/wiki/Navier%E2%80%93Stokes\\_equations](https://en.wikipedia.org/wiki/Navier%E2%80%93Stokes_equations)

MIT OpenCourseWare – Fluid Dynamics (free lectures):

- <https://ocw.mit.edu/courses/18-357-interfacial-phenomena-spring-2005/pages/lecture-notes/>

Fourier (1822) – Heat & Diffusion

- <https://archive.org/details/analyticaltheory00fourrich>
- [https://en.wikipedia.org/wiki/Fourier%27s\\_law](https://en.wikipedia.org/wiki/Fourier%27s_law)



Boltzmann (1872) – Statistical Mechanics

- [https://en.wikipedia.org/wiki/Boltzmann\\_equation](https://en.wikipedia.org/wiki/Boltzmann_equation)

Cercignani lecture-style notes (free PDF):

- <https://bpb-us-e1.wpmucdn.com/sites.psu.edu/dist/c/168431/files/2023/07/boltz.pdf>

Schrödinger (1926)

- [https://en.wikipedia.org/wiki/Schr%C3%B6dinger\\_equation](https://en.wikipedia.org/wiki/Schr%C3%B6dinger_equation)

MIT OCW – Quantum Mechanics I:

- <https://ocw.mit.edu/courses/8-04-quantum-physics-i-spring-2016/>

Monte Carlo Methods

- [https://en.wikipedia.org/wiki/Monte\\_Carlo\\_method](https://en.wikipedia.org/wiki/Monte_Carlo_method)

Lattice Boltzmann Methods

- [https://en.wikipedia.org/wiki/Lattice\\_Boltzmann\\_methods](https://en.wikipedia.org/wiki/Lattice_Boltzmann_methods)

Gaussian Processes

- <http://www.gaussianprocess.org/gpml/chapters/>
- <https://distill.pub/2019/visual-exploration-gaussian-processes/>

Bayesian Neural Networks

- <https://www.inference.org.uk/mackay/PhD.html>
- [https://en.wikipedia.org/wiki/Bayesian\\_neural\\_network](https://en.wikipedia.org/wiki/Bayesian_neural_network)

GANs (Goodfellow 2014)

- <https://developers.google.com/machine-learning/gan>

Physics-Informed ML (PINNs)

- <https://arxiv.org/abs/2001.04536>
- <https://github.com/maziarraissi/PINNs>

Chuang & Barba (2023)

- <https://arxiv.org/abs/2306.00230>
- [https://barbagroup.github.io/essential\\_skills\\_RRC/](https://barbagroup.github.io/essential_skills_RRC/)

PNAS paper (free PDF):

- <https://www.pnas.org/doi/10.1073/pnas.1810286115>

Nat Comm article (open):

- <https://www.nature.com/articles/s41467-020-17142-3>

Bony et al. (2015)

- [https://en.wikipedia.org/wiki/Cloud\\_feedback](https://en.wikipedia.org/wiki/Cloud_feedback)

NASA explainer:

- <https://earthobservatory.nasa.gov/features/Clouds>

Chandrasekhar (1960); Mayer (2009)

- <https://archive.org/details/radiativetransfe0000chan>
- <https://atmos.washington.edu/~robwood/teaching/301/>

Harrow, Hassidim & Lloyd (2009)

- [https://en.wikipedia.org/wiki/Quantum\\_algorithm\\_for\\_linear\\_systems\\_of\\_equations](https://en.wikipedia.org/wiki/Quantum_algorithm_for_linear_systems_of_equations)

Aaronson (2015)

- <https://www.ecmwf.int/en/about/media-centre/news/2015/quiet-revolution-numerical-weather-prediction>

Quantum complexity primer:

- <https://quantum.country/>

Remote Sens. 7(2), 1667–1701

- <https://www.mdpi.com/2072-4292/7/2/1667>

NASA remote sensing basics:

- <https://earthdata.nasa.gov/learn/backgrounders/remote-sensing>



# Quantum for Computational Fluid Dynamics - Madhava Syamlal

Womantum / Waer Quantum Program

- <https://doi.org/10.1023/A:1024980525678>

Van Dyke (1982); BMW Motorsport CFD (2017)

- <https://album-of-cfm.com>

Batchelor; White; Anderson

- [https://en.wikipedia.org/wiki/Fluid\\_mechanics](https://en.wikipedia.org/wiki/Fluid_mechanics)

MIT OpenCourseWare – Fluid Dynamics:

- <https://ocw.mit.edu/courses/18-357-interfacial-phenomena-fall-2010/>

NASA Beginner's Guide to Aerodynamics:

- <https://www.grc.nasa.gov/www/k-12/airplane/>

Kolmogorov (1941); Pope (2000)

- [https://en.wikipedia.org/wiki/Kolmogorov\\_microscale](https://en.wikipedia.org/wiki/Kolmogorov_microscale)

Turbulence overview:

- <https://en.wikipedia.org/wiki/Turbulence>
- [https://fluids.ac.uk/files/resources/TB\\_16January2013.1518781067.pdf](https://fluids.ac.uk/files/resources/TB_16January2013.1518781067.pdf)

Banerjee (2014)

- <https://hal.archives-ouvertes.fr/>

NASA turbulence in space:

- <https://science.nasa.gov/heliophysics/focus-areas/space-weather/>

Cary, Slotnick & Alonso (2020)

- <https://www.cfd2030.com/report.html>

OLCF User Guide (2023)

- <https://www.olcf.ornl.gov/olcf-resources/>

Intro to supercomputing:

- <https://www.olcf.ornl.gov/olcf-resources/for-users/>

Krüger et al. (2017)

- [https://en.wikipedia.org/wiki/Lattice\\_Boltzmann\\_methods](https://en.wikipedia.org/wiki/Lattice_Boltzmann_methods)
- <https://www.lattice-boltzmann.com/foreword/>

Quantum CFD Overviews

- <https://arxiv.org/abs/2409.09736>
- <https://arxiv.org/abs/2406.18749>

Quantum computing for PDEs:

- <https://quantum-journal.org/papers/q-2021-11-10-574/>

McClean et al.; Cerezo et al.; Tilly et al.

VQA explained:

- [https://en.wikipedia.org/wiki/Variational\\_quantum\\_algorithm](https://en.wikipedia.org/wiki/Variational_quantum_algorithm)
- <https://arxiv.org/abs/2012.09265>

VQE intuition:

- <https://quantum.cloud.ibm.com/learning/courses/quantum-diagonalization-algorithms/vqe>

Lubasch et al.; Todorova & Steijl; Jaksch et al.

- <https://arxiv.org/abs/1904.12469>
- <https://arxiv.org/abs/2002.02843>

Streamfunction–vorticity explanation:

- <https://en.wikipedia.org/wiki/Vorticity>

Sim, Johnson & Aspuru-Guzik (2019)

- [https://pennylane.ai/qml/demos/tutorial\\_expressivity\\_fourier\\_series](https://pennylane.ai/qml/demos/tutorial_expressivity_fourier_series)

Noise & barren plateaus:

- <https://www.nature.com/articles/s41467-021-27045-6>

NSF Quantum-Enhanced CFD Award

- [https://www.nsf.gov/awardsearch/showAward?AWD\\_ID=2318334](https://www.nsf.gov/awardsearch/showAward?AWD_ID=2318334)

## **Ion Trap Quantum lab tour - Quantum Hardware in action - Masako Yamada**

IonQ Blog:

<https://ionq.com/blog/april-14-2022-peter-chapman-letter-to-stockholders>

Trapped-ion quantum computing (core concept)

- [https://en.wikipedia.org/wiki/Trapped\\_ion\\_quantum\\_computer](https://en.wikipedia.org/wiki/Trapped_ion_quantum_computer)
- <https://www.nist.gov/programs-projects/quantum-computing-trapped-ions>

Quantum hardware comparison (neutral, academic):

- <https://www.ibm.com/quantum/hardware>

Cerezo et al. (2021) – Variational quantum algorithms

- <https://arxiv.org/abs/2012.09265>

## **Cryogenic & Cooling Infrastructure for Quantum Hardware - Corban Tillemann-Dick**

Where Will Quantum Computers Create Value—and When? (BCG, 2019)

<https://www.bcg.com/publications/2019/quantum-computers-create-value-when>

## **Future of HPC, Quantum Computing, and AI - Stephan Kister**

Par-Tec Quantum + HPC overview: <https://par-tec.com/qc-ai/>

- <https://orcacomputing.com/partec-ag-and-orca-computing-announce-partnership-to-deliver-quantum-accelerated-ai-factories/>

Orca Computing. (n.d.). Home.

- <https://orcacomputing.com>

ORCA Computing

- <https://quantumcomputingreport.com/orca-and-partec-partner-to-integrate-room-temperature-quantum-systems-into-Europes-largest-AI-supercomputers/>

## **Quantum Computing and High Performance Computing - Katherine Klymko, Daan Camps**

U.S. Department of Energy, Office of Science

- <https://science.osti.gov/>

National Energy Research Scientific Computing Center (NERSC)

- <https://www.nersc.gov/about/>

Darbha et al. (2404.12360) — False vacuum decay and nucleation dynamics in neutral atom systems

- <https://arxiv.org/abs/2404.12360>

Lee et al. (2019) — Generalized unitary coupled cluster wave functions

- <https://doi.org/10.1021/acs.jctc.8b01004>

von Burg et al. (2021) — Quantum enhanced computational catalysis

- <https://doi.org/10.1103/PhysRevResearch.3.033055>

Charlebois et al. (2020) — Hubbard model & tensor networks

- <https://doi.org/10.1103/PhysRevX.10.041039>

Geim & Novoselov (2007) — The rise of graphene

- <https://doi.org/10.1038/nmat1849>

## Scalable Quantum Computing and Hybrid Architectures - John Levy

Seeqc — Company Overview

- <https://seeqc.com/about/>

HYPRES, Inc. — Superconducting Electronics

- <https://www.hypres.com/>

Metz (2019) — Google Claims a Quantum Breakthrough

- <https://www.nytimes.com/2019/10/23/technology/quantum-computing-google.html>

Mandrà et al. (2020) — Establishing the Quantum Supremacy Frontier

- <https://arxiv.org/abs/1905.00444>

## AI, Supercomputing and the future of Quantum - Dr. Sam Stanwyck

Krizhevsky, Sutskever & Hinton (2012) — AlexNet

- <https://papers.nips.cc/paper/2012/file/c399862d3b9d6b76c8436e924a68c45b-Paper.pdf>

Vaswani et al. (2017) — Attention Is All You Need

- <https://arxiv.org/abs/1706.03762>

NVIDIA — AI Accelerated Computing Platform

- <https://www.nvidia.com/en-us/data-center/solutions/accelerated-computing/>

CUDA basics:

- <https://developer.nvidia.com/cuda-zone>

Nakaji et al. (2024) — Generative Quantum Eigensolver (GQE)

- <https://arxiv.org/abs/2401.09253>

Sivak et al. (2022) — Model-Free Quantum Control

- <https://arxiv.org/abs/2205.07696>

Bausch et al. (2023) — Transformer-Based Decoding

- [https://en.wikipedia.org/wiki/Surface\\_code](https://en.wikipedia.org/wiki/Surface_code)
- <https://jalammar.github.io/illustrated-transformer/>

CUDA-Quantum (CUDA-Q)

- <https://developer.nvidia.com/cuda-quantum>

NVIDIA Developer Blog — Enabling Quantum Computing with AI

- <https://developer.nvidia.com/blog/enabling-quantum-computing-with-ai/>

## QAOA for Order Fulfillment & Supply Chain Optimisation - Yancho Gerdjikov

Qiskit 0.40 Circuit API Documentation (IBM)

- <https://quantum.cloud.ibm.com/docs/api/qiskit/circuit>
- <https://quantum.cloud.ibm.com/docs>

## Quantum for Warehouse Optimisation - Vardaan Sahgal

Amazon Web Services (2021). Amazon Fulfillment Center Tour with AW

- <https://www.youtube.com/watch?v=8nKPC-WmLjU>

Wang, F., Wang, Y., & Chang, D. (2023). Joint Optimization of Order Allocation and Rack Selection

- <https://doi.org/10.3390/systems11040179>

## Scalable Quantum Hardware Lab tour - John Levy, Katie Porsch

MIT OpenCourseWare – Semiconductor Processing

- <https://ocw.mit.edu>

# How to build a successful quantum startup? Insights from quantum Founders and CEOs - Dr. Christopher Savoie, Amir Naveh, Corban Tillemann-Dick, Ethan Hansen, Jan Goetz

Foundational Quantum Computing

Deutsch, 1989.

- <https://royalsocietypublishing.org/rspa/article-abstract/425/1868/73/16304/Quantum-computational-networks?redirectedFrom=fulltext>

Aspuru-Guzik et al., 2005

- <https://www.science.org/doi/10.1126/science.1113479>

Preskill, 2018

- <https://quantum-journal.org/papers/q-2018-08-06-79/>

McClean et al., 2016

- <https://iopscience.iop.org/article/10.1088/1367-2630/18/2/023023>

Peruzzo et al., 2014

- <https://www.nature.com/articles/ncomms5213>

Cerezo et al., 2021

- <https://www.nature.com/articles/s42254-021-00348-9>

Kandala et al., 2017

- <https://doi.org/10.1038/nature23879>

Babbush et al., 2018

- <https://doi.org/10.1103/PhysRevX.8.011044>

Reiher et al., 2017

- <https://doi.org/10.1073/pnas.1619152114>

Ball, 2011

- <https://doi.org/10.1038/474272a>

Engel et al., 2007

- <https://doi.org/10.1038/nature05678>

Lambert et al., 2013

- <https://doi.org/10.1038/nphys2474>

Ritz et al., 2000

- [https://doi.org/10.1016/S0006-3495\(00\)76629-X](https://doi.org/10.1016/S0006-3495(00)76629-X)

Auerswald & Branscomb, 2003

- <https://www.ideals.illinois.edu/items/306/bitstreams/2135/data.pdf>

## Future of Quantum Science & Research - William Phillips

Einstein (1917) — On the Quantum Theory of Radiation

- <https://einsteinpapers.press.princeton.edu/>
- <https://archive.org>

Bose (1924) — Planck's Law and the Hypothesis of Light Quanta

- <https://cds.cern.ch/record/40588>
- [https://en.wikipedia.org/wiki/Bose%E2%80%93Einstein\\_statistics](https://en.wikipedia.org/wiki/Bose%E2%80%93Einstein_statistics)

Einstein (1925) — Quantum Theory of the Monatomic Ideal Gas

- <https://einsteinpapers.press.princeton.edu/>

Ashkin (1970) — Radiation Pressure Trapping

- <https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.24.156>

Wineland & Dehmelt (1975) — Ion Trapping Proposal

- [https://en.wikipedia.org/wiki/Ion\\_trap](https://en.wikipedia.org/wiki/Ion_trap)

Feynman (1982) — Simulating Physics with Computers

- <https://link.springer.com/article/10.1007/BF02650179>

Chu, Cohen-Tannoudji & Phillips (1998) — Laser Cooling

- <https://journals.aps.org/rmp/abstract/10.1103/RevModPhys.70.685>

Cornell & Wieman (2002) — Bose–Einstein Condensation

- <https://journals.aps.org/rmp/abstract/10.1103/RevModPhys.74.875>

Regal, Greiner & Jin (2004)

- <https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.92.040403>

Giorgini, Pitaevskii & Stringari (2008)

- <https://journals.aps.org/rmp/abstract/10.1103/RevModPhys.80.1215>

## **Global Quantum Ecosystem & Career Opportunities - Celia Merzbacher**

Assessing the Needs of the Quantum Industry

- <https://arxiv.org/abs/2109.03601>

Quantum Marketplace — YouTube

- <https://www.youtube.com/@QuantumMarketplace>

## **Quantum computing for Chemistry - Nicole Holtzmann**

Litinski, D. (2019). A Game of Surface Codes: Large-Scale Quantum Computing with Lattice Surgery

- <https://doi.org/10.22331/q-2019-03-05-128>

da Jornada et al. (2025). Real-Time Chemical Dynamics Framework

- <https://arxiv.org/abs/2504.06348>

## **Harnessing Quantum Computing for Weather Modeling - Reuben Demirdjian**

ECMWF overview:

- <https://www.ecmwf.int/en/about/media-centre/news/2015/quiet-revolution-numerical-weather-prediction>

Intro to NWP:

- [https://www.atmos.albany.edu/facstaff/brose/classes/ATM623\\_Spring2015/](https://www.atmos.albany.edu/facstaff/brose/classes/ATM623_Spring2015/)

Springer / Acta Mathematica:

- <https://link.springer.com/article/10.1007/BF02547748>

Kowalski & Steeb (1991)

- <https://worldscientific.com/worldscibooks/10.1142/1347>

Liu & Wang (2008)

- <https://doi.org/10.1016/j.jmaa.2008.05.045>

Lloyd, Garnerone & Zanardi (2014)

- <https://arxiv.org/abs/1307.0371>
- <https://www.nature.com/articles/ncomms5014>

Liu, Arunachalam & Temme (2021)

- <https://arxiv.org/abs/2011.03185>
- <https://doi.org/10.1103/PhysRevA.104.062410>

Peruzzo et al. (2014)

- <https://arxiv.org/abs/1304.3061>
- <https://www.nature.com/articles/ncomms5213>

McClean et al. (2018)

- <https://arxiv.org/abs/1803.11173>
- <https://www.nature.com/articles/s41467-018-07090-4>

## **IQM Lab tour – Julia Lamprich, Dr Stefan Seegerer, Tianyi Li**

IQM Quantum Computers: General Overview.

- [https://en.wikipedia.org/wiki/IQM\\_Quantum\\_Computers](https://en.wikipedia.org/wiki/IQM_Quantum_Computers)

IQM Quantum Computers

- <https://meetiqm.com/technology/>

Amazon Bracket Announcement (2025): Cloud access to IQM QPUs.

- <https://aws.amazon.com/about-aws/whats-new/2025/07/amazon-braket-54-qubit-quantum-processor-iqm/>

## **NKT Photonics Lab tour – Rayssa Bruzaca, Hugo Kerdoncuff, Alexandre Wetzel, Lukasz Krzczanowicz, Asger Sellerup Jensen**

Deutsch (1989)

- <https://quantum.country/qcvc>
- <https://royalsocietypublishing.org/doi/10.1098/rspa.1989.0099>

Aspuru-Guzik et al. (2005)

- <https://arxiv.org/abs/quant-ph/0401021>
- <https://chemistry.mit.edu/areas-of-research/computational-theoretical/>

Reiher et al. (2017)

- <https://arxiv.org/abs/1605.03590>
- <https://www.quantum.gov/applications/chemistry/>

Babbush et al. (2018)

- <https://arxiv.org/abs/1706.00023>
- [DOE QIS Roadmap \(PDF on quantum.gov\)](https://www.doe.gov/quantum/roadmap)

Peruzzo et al. (2014)

- <https://arxiv.org/abs/1304.3061>
- <https://quantum.country/qcvc>

McClean et al. (2016)

- <https://arxiv.org/abs/1509.04279>

Kandala et al. (2017)

- <https://arxiv.org/abs/1704.05018>
- <https://quantum.cloud.ibm.com/learning/en/courses/variational-algorithm-design/variational-algorithms>

Cerezo et al. (2021)

- <https://arxiv.org/abs/2012.09265>

Preskill (2018)

- <https://arxiv.org/abs/1801.00862>

Engel et al. (2007)

- <https://www.quantumbiology.org/research>

Lambert et al. (2013)

- <https://arxiv.org/abs/1206.2036>

Ritz et al. (2000)

- [https://doi.org/10.1016/S0006-3495\(00\)76629-X](https://doi.org/10.1016/S0006-3495(00)76629-X)

Ball (2011)

- <https://www.nature.com/articles/474272a>

Auerswald & Branscomb (2003)

- <https://www.nist.gov/blogs/taking-measure/mind-gap-bridging-valley-death-us-biomanufacturing>

## Why Quantum Algorithms Matter Now - Dr. Travis L. Scholten

<https://quantumai.google>

[https://www.youtube.com/results?search\\_query=stephen+jordan+quantum+algorithms](https://www.youtube.com/results?search_query=stephen+jordan+quantum+algorithms)

<https://quantumalgorithmzoo.org>

<https://arxiv.org/abs/2212.11192>

<https://arxiv.org/abs/2207.09994>

<https://arxiv.org/abs/2309.02863>

<https://arxiv.org/abs/2312.00997>

<https://arxiv.org/abs/2403.16718>

<https://arxiv.org/abs/2405.05068>

Low & Chuang (2016) – Quantum Signal Processing

- <https://arxiv.org/abs/1610.06546>

Gilyén et al. (2019) – Quantum Singular Value Transformation

- <https://arxiv.org/abs/1806.01838>

Low & Chuang (2019) – Qubitization

- <https://quantum-journal.org/papers/q-2019-07-12-163/>

Martyn et al. (2021) – Grand unification of quantum algorithms

- <https://arxiv.org/abs/2105.02859>

SQD seminar (IBM):

- [https://www.youtube.com/results?search\\_query=sample+based+quantum+diagonalization](https://www.youtube.com/results?search_query=sample+based+quantum+diagonalization)

## Overview of Quantum Algorithms - Prof. Andrew Childs

Bennett, C. H., Bernstein, E., Brassard, G., & Vazirani, U. (1997). Strengths and weaknesses of quantum computing. *SIAM Journal on Computing*, 26(5), 1510–1523.

<https://doi.org/10.1137/S0097539796300933>

Simon, Daniel R. (1997). On the Power of Quantum Computation. *SIAM Journal on Computing*, 26(5), 1474–1483.

Brassard, G., Høyer, P., & Tapp, A. (1997). Quantum cryptanalysis of hash and claw-free functions. In *LATIN '98: Theoretical Informatics* (pp. 163–169). Springer. <https://doi.org/10.1007/BFb0054319>

Aaronson, S., & Shi, Y. (2004). Quantum lower bounds for the collision and the element distinctness problems. *Journal of the ACM*, 51(4), 595–605.

<https://doi.org/10.1145/1008731.1008735>

Peter W. Shor (1994). Algorithms for quantum computation: Discrete logarithms and factoring. *Proceedings of the 35th Annual Symposium on Foundations of Computer Science (FOCS)*.

K. Cheung, M. Mosca (2001). Decomposing finite abelian groups. *Quantum Information & Computation*.

Kiran S. Kedlaya (2006). Quantum computation of zeta functions of curves. *Computational Complexity*.



Sean Hallgren (2002). Polynomial-time quantum algorithms for Pell's equation and the principal ideal problem.

Sean Hallgren (2005). Fast quantum algorithms for computing the unit group and class group of a number field.

Sean Hallgren, Kirsten Eisenträger, Alexei Kitaev, Fang Song (2014). A quantum algorithm for computing the unit group of an arbitrary number field. *SIAM Journal on Computing*.

Jean-François Biasse, Fang Song (2016). Efficient quantum algorithms for computing class groups and solving the principal ideal problem in arbitrary number fields. *Proceedings of SODA*.

Sean Hallgren, Kirsten Eisenträger (2010). Quantum algorithms for computing the class group and the regulator of a number field. *LMS Journal of Computation and Mathematics*.

Regev, O. (2002). Quantum computation and lattice problems. *SIAM Journal on Computing*, 33(3), 738–760.

Hallgren, S., Moore, C., Rötteler, M., Russell, A., & Sen, P. (2006). Limitations of quantum coset states for graph isomorphism. *Journal of the ACM*, 57(6), Article 1.

Kuperberg, G. (2005). A subexponential-time quantum algorithm for the dihedral hidden subgroup problem. *SIAM Journal on Computing*, 35(1), 170–188.

Childs, A. M., Jao, D., & Soukharev, V. (2014). Constructing elliptic curve isogenies in quantum subexponential time. *Journal of Mathematical Cryptology*, 8(1), 1–29.

Childs, A. M., Cleve, R., Deotto, E., Farhi, E., Gutmann, S., & Spielman, D. A. (2003).

Exponential algorithmic speedup by quantum walk. *Proceedings of the 35th Annual ACM Symposium on Theory of Computing (STOC)*, 59–68. <https://doi.org/10.1145/780542.780552>

Ambainis, A. (2004). Quantum walk algorithm for element distinctness. *SIAM Journal on Computing*, 37(1), 210–239.

Berry, D. W., Ahokas, G., Cleve, R., & Sanders, B. C. (2007). Efficient quantum algorithms for simulating sparse Hamiltonians. *Communications in Mathematical Physics*, 270(2), 359–371.

Berry, D. W., Childs, A. M., Cleve, R., Kothari, R., & Somma, R. D. (2015). Simulating Hamiltonian dynamics with a truncated Taylor series. *Physical Review Letters*, 114(9), 090502.

Childs, A. M., Su, Y., Tran, M. C., Wiebe, N., & Zhu, S. (2019). A theory of Trotter error. *Physical Review X*, 11(1), 011020.

Hallgren, S. (2002). Polynomial-time quantum algorithms for Pell's equation and the principal ideal problem. *Journal of the ACM*, 54(1), 1–19.

Hastings, M. B., Kothari, R., & Low, G. H. (2018). Nearly optimal lattice simulation by product formulas. *Quantum*, 2, 98.

Lloyd, S. (1996). Universal quantum simulators. *Science*, 273(5278), 1073–1078.

Shor, P. W. (1994). Algorithms for quantum computation: Discrete logarithms and factoring. *Proceedings of the 35th Annual Symposium on Foundations of Computer Science (FOCS)*.

Suzuki, M. (1992). General theory of fractal path integrals with applications to many-body theories and statistical physics. *Journal of Mathematical Physics*, 32(2), 400–407.

Quantum Algorithm Zoo. Quantum Algorithm Zoo. <https://quantumalgorithmzoo.org>

Childs, A. M. Lecture notes on quantum algorithms. University of Maryland. <https://cs.umd.edu/~amchilds/qa/>

Montanaro, A. (2016). Quantum algorithms: An overview. arXiv:1511.04206.

Gilyén, A. (2020). Quantum algorithms tutorial [Video]. QIP. <https://www.koushare.com/video/videodetail/4073>

Childs, A. M. (2021). Quantum algorithms tutorial [Video]. YouTube. <https://youtu.be/M0e5gkf7QSQ>

Santha, M. (2008). Quantum walk based search algorithms. <https://arxiv.org/abs/0808.0059>

Reitzner, D., Nagaj, D., & Buzek, V. (2012). Quantum walks. <https://arxiv.org/abs/1207.7283>

Childs, A. M., & van Dam, W. (2010). Quantum algorithms for algebraic problems. <https://arxiv.org/abs/0812.0380>

Arunachalam, S., & de Wolf, R. (2017). A survey of quantum learning theory. <https://arxiv.org/abs/1701.06806>

Harrow, A. W., Hassidim, A., & Lloyd, S. (2009). Quantum algorithm for linear systems of equations. *Physical Review Letters*, 103(15), 150502.

Ambainis, A., Childs, A. M., Kothari, R., & Somma, R. D. (2017). Variable-time amplitude amplification and quantum algorithms for linear systems. <https://arxiv.org/abs/1512.03461>

Kerenidis, I., & Prakash, A. (2017). Quantum recommendation systems. <https://arxiv.org/abs/1603.08675>

Tang, E. (2019). A quantum-inspired classical algorithm for recommendation systems. *Proceedings of STOC 2019*.

Arunachalam, S., & de Wolf, R. (2017). A survey of quantum learning theory. <https://arxiv.org/abs/1701.06806>

Berry, D. W. (2014). High-order quantum algorithms for solving linear differential equations. *Journal of Physics A: Mathematical and Theoretical*, 47(10), 105301.

Farhi, E., Goldstone, J., & Gutmann, S. (2000). A quantum approximate optimization algorithm. <https://arxiv.org/abs/1411.4028>

Dür, C., & Høyer, P. (1996). A quantum algorithm for finding the minimum. <https://arxiv.org/abs/quant-ph/9607014>

Dür, C., Heiligman, M., Høyer, P., & Mhalla, M. (2004). Quantum query complexity of some graph problems. *SIAM Journal on Computing*, 35(6), 1310–1328.

Ambainis, A., & Špalek, R. (2007). Quantum algorithms for matching and network flows. <https://arxiv.org/abs/quant-ph/0607108>

Montanaro, A. (2016). Quantum walk speedup of backtracking algorithms. *Theory of Computing*, 14(1), 1–24.

Ambainis, A., Balodis, K., Iraids, J., Kokainis, M., Prūsis, K., & Vihrovs, J. (2018). Quantum speedups for exponential-time dynamic programming algorithms. [arXiv:1807.05209](https://arxiv.org/abs/1807.05209).

Brandão, F. G. S. L., Svore, K. M. (2017). Quantum speedups for semidefinite programming. *Proceedings of FOCS 2017*.

van Apeldoorn, J., Gilyén, A. (2019). Improvements in quantum SDP-solving with applications. [arXiv:1804.05058](https://arxiv.org/abs/1804.05058).

Brandão, F. G. S. L., Kalev, A., Li, T., Lin, C. Y., Svore, K. M., & Wu, X. (2019). Quantum algorithms for Gibbs sampling and hitting-time estimation. [arXiv:1807.05209](https://arxiv.org/abs/1807.05209).

Jordan, S. P. (2005). Fast quantum algorithm for numerical gradient estimation. *Physical Review Letters*, 95(5), 050501.

Rebentrost, P., Schuld, M., Wossnig, L., Petruccione, F., Lloyd, S., & Prakash, A. (2019). Quantum gradient descent and Newton’s method. *Physical Review Letters*, 122(1), 010504.

van Apeldoorn, J., Gilyén, A., Gribling, S., & de Wolf, R. (2020). Quantum SDP solvers: Better upper and lower bounds. *Quantum*, 4, 230.

Chakrabarti, S., Childs, A. M., Li, T., & Wu, X. (2020). Quantum algorithms for convex optimization. [arXiv:2006.08929](https://arxiv.org/abs/2006.08929).

Garg, A., Kothari, R., Netrapalli, P., & Sherif, S. (2020). No quantum speedup for non-smooth convex optimization. [arXiv:2004.09090](https://arxiv.org/abs/2004.09090).

## **Introduction to ZX Calculus - Ivica Turkalj**

Abramsky, S., & Coecke, B. (2004). A categorical semantics of quantum protocols. *Proceedings of the 19th Annual IEEE Symposium on Logic in Computer Science*, 415–425. <https://doi.org/10.1109/LICS.2004.1319636>

Bennett, C. H., Brassard, G., Crépeau, C., Jozsa, R., Peres, A., & Wootters, W. K. (1993). Teleporting an unknown quantum state via dual classical and Einstein–Podolsky–Rosen channels. *Physical Review Letters*, 70(13), 1895–1899. <https://doi.org/10.1103/PhysRevLett.70.1895>

Choi, M. D. (1975). Completely positive linear maps on complex matrices. *Linear Algebra and Its Applications*, 10(3), 285–290. [https://doi.org/10.1016/0024-3795\(75\)90075-0](https://doi.org/10.1016/0024-3795(75)90075-0)

Coecke, B., & Duncan, R. (2011). Interacting quantum observables: Categorical algebra and diagrammatics. *New Journal of Physics*, 13(4), 043016. <https://doi.org/10.1088/1367-2630/13/4/043016>

Nielsen, M. A., & Chuang, I. L. (2010). *Quantum computation and quantum information* (10th anniversary ed.). Cambridge University Press.

Raussendorf, R., & Briegel, H. J. (2001). A one-way quantum computer. *Physical Review Letters*, 86(22), 5188–5191. <https://doi.org/10.1103/PhysRevLett.86.5188>

Wootters, W. K., & Zurek, W. H. (1982). A single quantum cannot be cloned. *Nature*, 299(5886), 802–803. <https://doi.org/10.1038/299802a0>

## **Quantum Resource Estimation - Michal Stechly**

Gonthier, J. F., Radin, M. D., Buda, C., Daskocil, E. J., Abuan, C. M., & Romero, J. (2020). Identifying challenges towards practical quantum advantage through resource estimation: The measurement roadblock in the variational quantum eigensolver. *arXiv*. <https://doi.org/10.48550/arXiv.2012.04001>

von Burg, V., Low, G. H., Häner, T., Steiger, D. S., Reiher, M., Roetteler, M., & Troyer, M. (2021). Quantum computing enhanced computational catalysis. *Physical Review Research*, 3(3), 033055. <https://doi.org/10.1103/PhysRevResearch.3.033055>

IBM Quantum. (2023, November). IBM's roadmap for scaling quantum technology [Press release]. Retrieved from <https://www.ibm.com/quantum/roadmap>

PsiQuantum. (2024, April). PsiQuantum announces world's first utility-scale quantum computer to be built in Brisbane, Australia [Press release]. Retrieved from <https://www.psiquantum.com/news/psi-quantum-announces-worlds-first-utility-scale-quantum-computer-to-be-built-in-brisbane-australia>

Steudtner, M., Morley-Short, S., Pol, W., Sim, S., Cortes, C. L., Loipersberger, M., Parrish, R. M., Degroote, M., Moll, N., Santagati, R., & Streif, M. (2023). Fault-tolerant quantum computation of molecular observables. *arXiv*. <https://doi.org/10.48550/arXiv.2308.05077>

Microsoft. (2024). Understand the results of the Azure Quantum Resource Estimator [Webpage]. Azure Quantum documentation. Retrieved from <https://learn.microsoft.com/en-us/azure/quantum/overview-resource-estimator-output-data>

Campbell, E. T., & Howard, M. (2022). A resource estimation framework for quantum algorithms [Preprint]. *arXiv*. <https://doi.org/10.48550/arXiv.2211.07629>

QRE Community. (n.d.). QRE Community YouTube channel [YouTube channel]. YouTube. Retrieved from <https://www.youtube.com/@qre-community>

Musty Thoughts. (n.d.). Musty Thoughts blog [Blog]. Retrieved from <https://www.mustythoughts.com>

IEEE Quantum Week 2024 – QRE Workshops. (2024). QRE workshop homepage [Workshop website]. Retrieved from <https://sites.google.com/view/qce2024-qre-workshops>

Quantum Resource Estimation. (n.d.). QRE workshops and resources [Organization website]. Retrieved from <https://www.quantumresource.org>

Litinski, D. (2018). A game of surface codes: Large-scale quantum computing with lattice surgery [Preprint]. arXiv. <https://doi.org/10.48550/arXiv.1808.02892>

Pesah, A. (n.d.). Arthur Pesah's blog [Blog]. Retrieved from <https://arthurpesah.me/blog/>