# Quantum Optics Institute of Southern California

Draft Business Plan rev 2 (Bold and underlined are links to URLs.)

Prepared For: Founding Stakeholders, Industry Partners, Academic Collaborators, and Prospective Investors

Prepared By Donn Silberman, QOISC Founding Director

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## Executive Summary

The Quantum Optics Institute of Southern California (QOISC, formerly the **OISC**) has been an education and outreach partner of the **Optical Society of Southern California (OSSC)** for over 23 years. It is now proposed to become a formal non-profit technical education and applied research institute focused on quantum optics, photonics, lasers, quantum networking, and emerging quantum technologies. Located in Orange County, California, the QOISC will combine classroom instruction, hands-on laboratory education, and collaborative industry experimentation with quantum optics training and innovation facilities that may be spread over a number of locations and in cooperation with a number of educational, research and commercial entities.

The institute will provide:

- Technical education and workforce development in optics, lasers, fiber-optics, photonics and quantum technologies, including teacher training and applications of these technologies with AI,
- Laboratory-based instruction with industry-standard quantum optical equipment,
- Access to a live quantum networking environment using Qunnect quantum networking infrastructure,
- Collaborative partnerships with UC Irvine, Chapman University and regional quantum and optics technology organizations and businesses
- Other educational institutions will be added as time and interest allows,
- Industry-accessible advanced quantum optics laboratories for experimentation and prototype development,
- Quantum technology outreach and consortium-building through the Quantum Orange County Consortium.
- Quantum Optics educational and outreach to the local community and beyond.

The QOISC will initially operate in close cooperation with **UC Irvine Division of Continuing Education - Engineering program,** to offer live in-person lectures and hands-on laboratory experiments in Quantum Optics as courses for the next level of optics education building on the 17 year success of their **Optical Engineering & Optical Instrument Design** programs. These programs were established by and continue to be supported by QOISC Founder Donn Silberman and the OSSC.

Over time, these lectures and hands-on laboratories will utilize approximately 7,200 square feet of educational and laboratory facility in Orange County, California, including: (See diagram on the last page of this document.)

- One classroom for lecture-based instruction
- One conference room for meetings and collaborations
- A primary Quantum Optics Laboratory for education
- Three Advanced Optics Laboratory suites for research and development
- Administrative offices
- IT server/networking room
- Utility and storage areas

The Institute's mission is to bridge the gap between academic theory and practical implementation of quantum technologies by training students and teachers, supporting industry experimentation, and participating in the development of regional quantum infrastructure.

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## Mission Statement

Educate, train, and support the next generation of quantum technology professionals and teachers through hands-on quantum optics + AI systems education, collaborative research, and industry partnerships.

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## Vision Statement

Establish Orange County California as a leading regional hub for quantum optics education, workforce development, and quantum networking innovation.

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## Organizational Overview

### Proposed Legal Structure

QOISC may operate as either:

- A California nonprofit educational institution
- A public benefit corporation with educational and research divisions

Final legal structure will depend on funding strategy, accreditation goals, and grant eligibility requirements.

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## Facility Overview (See diagram at the end of this document.)

### Location: Orange County, California

The Irvine location provides:

- Proximity to **UC Irvine's Eddleman Quantum Institute**, **Chapman University's Institute of Quantum Studies**, California State Universities at Fullerton & Pomona
- Proximity to many Orange County Community Colleges and K-12 schools.
- Connections to many Southern California optics, photonics, fiber-optics, semiconductor and quantum companies.
- Access to Southern California biomedical, telecommunications technology and defense industries
- Access to photonics and semiconductor companies
- Strong transportation infrastructure
- Availability of flex R&D / educational spaces

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## Facility Description

### Total Facility Size

Approximately 7,200 square feet

### Facility Components

#### Classroom

- Capacity: 30 students
- Primary use: lectures, seminars, theory instruction
- Includes projector / display systems and lecture desk

### Conference Room

- Capacity: 10 people
- Use cases:
    - Industry meetings
    - Consortium discussions
    - Curriculum planning and program development
    - Technical workshop planning

### Quantum Optics Laboratory

- Core instructional laboratory
- Six optical tables (6’ x 4’)
- Eyewash station and laboratory sink
- Qunnect quantum networking integration
- Storage cabinets and utility areas

### Advanced Optics Laboratory Suites

Three dedicated experimental suites containing:

- One 8’ x 4’ optical table in one suite and one 6’x4’ optical table in two suites
- Dedicated work desk and chair
- Storage cabinets
- Controlled experimental environment
- Quantum network access
- Emergency exit access

These suites will be leased to industry partners and research collaborators. They may also be used for educational Capstone projects by students seeking Certificate of Completion.

### IT Server Room

- Quantum network infrastructure
- Optical networking equipment
- Local compute and storage systems
- Secure networking hardware

### Administrative Offices

- Administrative office 1
- Administrative office 2

### Reception Area

- Visitor management
- Student check-in
- Administrative coordination

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# Educational Programs

## Core Educational Philosophy

AI will be used throughout the courses and programs as appropriate. There will be significant emphasis on how to use AI to augment the learning process, especially as it relates to applications of these technologies to specific industries. The applications of these technologies will be a prime focus to engage students, teachers, researchers and business product development people.

**QOISC will emphasize:**

- Practical hands-on learning
- Laboratory-first instruction
- Industry-relevant quantum technologies
- Experimental optics and photonics
- Real-world quantum networking systems

**Students will directly interact with classical and quantum versions of the following:**

- Lasers
- Optical tables
- Fiber optics systems
- Quantum communication systems
- Photon detection systems
- Alignment equipment
- Interferometers
- Optical instrumentation

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# Initial Course Offerings

QOISC's educational curriculum is designed to support students, teachers, technicians, engineers, researchers, and industry professionals seeking practical and theoretical knowledge in optics, photonics, quantum technologies, fiber optics, and advanced laboratory systems.

The curriculum combines:

- Classroom theory
- Laboratory instruction
- Technical drafting and documentation
- Industry-oriented practical exercises
- Collaborative capstone projects
- Quantum networking demonstrations

Programs may be delivered as:

- Individual technical courses
- Professional certificates
- Workforce development programs
- Teacher training workshops
- Corporate training modules
- Continuing education workshops

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## Course Format and Tuition

UCI DCE - QOISC courses will be designed in several standard formats to meet the needs of students and instructors.

Initially, free online webinars will be offered covering the basic Quantum Optics technologies and applications to gauge interest in these courses. These will be prepared by Donn Silberman with assistance and overview by UCI DCE Instruction Design staff.

One standard course format will be the intensive 10-week instructional programs combining classroom instruction, laboratory exercises, technical demonstrations, and hands-on experimental activities. Laboratory notebooks and reports will be required.

### Standard Course Tuition

- Tuition: $900 per 10-week course
- Laboratory fees: Included
- Books and instructional materials: Not included

### Included Student Resources (teachers being trained are included as students here)

Course tuition includes access to:

- Laboratory facilities
- Optical and photonics equipment
- Fiber optics training systems
- Quantum networking demonstrations
- Safety equipment during scheduled laboratory sessions
- Technical software and instructional resources

### Additional Costs

Students may be responsible for:

- Textbooks
- Personal notebooks and lab materials
- Optional software licenses
- Advanced project materials for capstone activities

QOISC intends to maintain affordable tuition pricing to support workforce development accessibility and regional STEM education growth.

Potential future offerings may include:

- Multi-course certificate discounts
- Corporate training packages
- Sponsored scholarships
- Workforce development grants
- Student internship sponsorships

**Other Course Formats** may be developed in consultation with UCI DCE staff and specific requests by student groups, teacher groups, local companies, government organizations and agencies, non-profit partners and others.

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## Core Curriculum Overview: Course Titles and brief descriptions

### Applications of Optics, Lasers, Fiber-Optics, and Quantum Technologies

An introductory overview of how these technologies are used in real world applications. This will include human vision and rainbows as a starting point, leading to simple and advanced cameras, microscopes, telescopes, telecommunications, medical optics, semiconductors, computers and the internet. Some defense applications will be reviewed in both the historical and modern context.

### Introduction to Quantum Optics

Fundamental principles of quantum optics include theory of single photon properties such as entanglement, superposition, teleportation, polarization, interference and coherence / decoherence. Hands-on laboratory experiments will be a key component to this course.

### Quantum Laser Fundamentals

Introduction to laser physics, laser safety, beam propagation, laser systems, semiconductor lasers, and laboratory laser operation. This will include key features of single photon emission of lasers for quantum optics applications.

### Quantum Applications and Fiber-Optics

Fundamentals of optical fiber systems including fiber transmission, connectors, splicing, DWDM systems, classical optical networking, and key requirements for quantum fiber optic networking and infrastructure. Hybrid classical – quantum fiber optic operations will be presented and hands-on laboratory experiments will be provided.

### Quantum Level Optomechanics, Thermal and Vibration Control

Mechanical integration of optical systems including mounts, alignment systems, vibration isolation, optical breadboards, thermal stability, and laboratory environmental control at the quantum level is the next standard of high precision required.

### Quantum Technologies – Overview

This survey course covers quantum computing, quantum communication, quantum sensing, quantum materials, and quantum networking technologies.

### Quantum Computing

Introduction to qubits, quantum gates, quantum algorithms, quantum hardware platforms, error correction concepts, and practical quantum computing architectures. This course will provide online access to real quantum computing facilities as the laboratory course work.

### Quantum Networks

Study of quantum communication systems, entanglement distribution, quantum repeaters and memories, quantum key distribution, timing systems, and fiber-based, free space and satellite quantum networking. Hands-on laboratory access to one or more of these technologies will be available to students.

### Quantum Sensors

Overview of quantum-enhanced sensing systems including atomic clocks, magnetometers, interferometric sensors, imaging systems, and precision measurement technologies. Some hands-on laboratory experimentation will be provided for students in this course.

### Quantum Optics & Photonics Technical Drawings

Technical documentation course covering optical layouts, laboratory diagrams, engineering drawings, CAD fundamentals, quantum optical schematics, and photonics documentation standards.

### Thin Film Coatings for Quantum Optics Applications

Introduction to optical thin films, dielectric coatings, reflective coatings, deposition methods, coating performance, and optical characterization. Specific details will be provided for quantum optics applications after the basics are covered. Hands-on testing of thin film optical coatings will be available in the laboratory setting at some level.

### Quality Assurance for Quantum Optics

Inspection and quality control techniques for quantum optical components and photonics systems including surface inspection, interferometry, tolerancing, testing procedures, and standards compliance will be taught. Hands-on laboratory equipment will be available for experiencing the techniques required for testing these components, assemblies, sub-systems and some complete systems.

### Advanced Lab Capstone Project

Final hands-on collaborative laboratory course where students design, build, align, test, and document a complete quantum optics-related experimental system.

Capstone projects may include:

- Fiber optics communication systems
- Quantum networking demonstrations
- Laser measurement systems
- Optical sensing systems
- Quantum optics experiments
- Interferometric instrumentation
- Optical alignment systems

Students will keep laboratory notebooks and produce:

- Experimental documentation
- Technical drawings
- Laboratory reports
- System demonstrations
- Final presentations

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## Introduction to Quantum Mechanics for Technicians & Engineers

Topics include:

- Quantum states
- Wavefunctions
- Superposition
- Measurement
- Entanglement
- Quantum information concepts

Laboratory components:

- Photon counting
- Quantum interference demonstrations
- Polarization state experiments

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### Quantum Optics Laboratory

Topics include:

- Single photon experiments
- Interferometry
- Quantum communication principles
- Quantum key distribution concepts
- Fiber-based optical systems

Laboratory components:

- Fiber coupling
- Photon detection
- Interferometers
- Quantum optics demonstrations

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### Fiber Optics and Quantum Networking

Topics include:

- Optical fiber systems
- DWDM concepts
- Quantum repeaters and memories
- Quantum networking protocols
- Timing and synchronization

Laboratory components:

- Fiber splicing
- Network diagnostics
- Optical transmission experiments
- Qunnect integration exercises

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## Regional Quantum Ecosystem Collaborations

### Quantum Orange County and Quantum City Irvine

QOISC intends to actively collaborate with Quantum Orange County and the Quantum City Irvine initiative to help establish Irvine and Orange County as a nationally recognized center for quantum technology innovation, workforce development, and quantum networking infrastructure.

These collaborations will support:

- Regional quantum ecosystem development
- Workforce training and technical education
- Quantum startup engagement
- Public-private partnerships
- Quantum networking infrastructure deployment
- Community STEM outreach and awareness

Potential collaborative activities include:

- Joint technical events and symposiums
- Industry networking programs
- Workforce development initiatives

- Educational workshops and demonstrations
- Quantum technology awareness campaigns
- Regional quantum infrastructure planning

QOISC's laboratory facility and educational programs provide a practical workforce development and applied laboratory component that complements broader regional economic development initiatives.

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## Southern California Quantum Alliance

QOISC plans to participate in the Southern California Quantum Alliance to support coordination among:

- Universities
- Research laboratories
- Quantum startups
- Defense contractors
- Telecommunications companies
- Workforce development organizations
- Public agencies

Participation in the Southern California Quantum Alliance will help QOISC:

- Align educational programs with industry needs
- Expand collaborative research opportunities
- Support regional grant proposals
- Increase visibility within the Southern California quantum ecosystem
- Facilitate industry and academic partnerships

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## Quantum California Collaboration

QOISC also intends to collaborate with Quantum California, and related statewide and regional initiatives that support California's leadership in:

- Quantum computing
- Quantum networking
- Quantum sensing
- Photonics and semiconductor technologies
- Quantum workforce development

Through these collaborations, QOISC aims to contribute to California's broader quantum technology ecosystem by:

- Providing technical workforce training
- Supporting applied optics and networking education
- Participating in statewide outreach and demonstration programs
- Contributing educational and laboratory infrastructure for collaborative projects

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### Membership in the:

## Quantum Economic Development Consortium (QED-C®)

QOISC intends to pursue membership in the Quantum Economic Development Consortium (QED-C®), a leading industry-driven consortium focused on accelerating the growth of the U.S. quantum industry and workforce. QOISC Director Donn Silberman has been an individual QED-C member since November 2022 when he was invited to present at the 1st Quantum World Congress in Washington, D.C.

(**Video recording here**. **Slides here**.)

Participation in QED-C® would provide enhanced opportunities for:

- Collaboration with national and international quantum industry leaders
- Workforce development alignment with national & global standards
- Participation in technical working groups
- Access to emerging industry best practices
- Collaboration on education and training initiatives
- Increased visibility for Southern California quantum ecosystem activities

QED-C® membership would help position QOISC within the broader national and global quantum technology community while supporting its mission of workforce development, applied education, and regional ecosystem growth.

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## Quantum Orange County Consortium

### Consortium Purpose

The Quantum Orange County Consortium will function as a collaborative regional initiative connecting:

- Academic institutions
- Quantum startups
- Defense contractors
- Telecommunications companies
- Research laboratories
- Students and educators

The consortium will:

- Host technical events & organize workshops and seminars
- Promote workforce development
- Support collaborative research
- Facilitate industry networking

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## Public Library Quantum Network Initiative

### Community Quantum Networking Vision

QOISC proposes the development of a Public Library Quantum Network initiative designed to introduce quantum technologies, fiber optics, photonics, and quantum communications concepts to the broader public through partnerships with local public libraries and educational community spaces. The systems envisioned to be installed at local public libraries will be based on standard industry methods of optical instrument design and manufacture (in the USA) for reliability and reproducibility. These quantum optics system will be developed with display boards and downloadable information will be user friendly. They will be designed to function with the commercial grade quantum network equipment provided by Qunnect to the local universities as part of the QOISC – UCI DCE program and in cooperation with the Chapman University Institute of Quantum Studies.

The initiative will provide public-facing educational access to:

- Quantum networking demonstrations
- Fiber optics educational systems
- Interactive photonics exhibits
- Quantum communication concepts
- STEM workforce awareness programs
- Public lectures and workshops

The Public Library Quantum Network initiative is intended to help demystify quantum technologies while creating accessible educational pathways for students, educators, and the public.

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## Educational Objectives

The Public Library Quantum Network initiative will:

- Increase public awareness of quantum technologies
- Support STEM outreach and engagement
- Create educational pathways into optics and photonics careers
- Provide hands-on demonstrations of fiber optics and quantum communication systems
- Encourage secondary and post-secondary student participation in quantum workforce development programs

Potential educational activities include:

- Portable optics demonstrations
- Fiber optics workshops
- Quantum networking exhibits
- Introductory laser demonstrations
- Public science seminars
- Student outreach events

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## Regional Library Partnerships

QOISC intends to collaborate with:

- **CENIC – The Corporation for Education Network Initiatives in California**
- **Cox Business**
- **Orange County public libraries** and local city run libraries like **Newport Beach** and **Irvine Public Libraries**
- Community learning centers
- Makerspaces
- STEM education organizations
- Local school districts

These partnerships will help expand access to quantum technology education throughout Southern California.

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## Quantum Network Demonstration Nodes

As the QOISC quantum networking infrastructure expands, selected public educational sites may host educational quantum networking demonstration nodes connected to the QOISC and **Qunnect quantum network** infrastructure.

Potential future capabilities include:

- Educational fiber-linked demonstrations
- Public quantum key distribution demonstrations
- Remote optics laboratory participation
- Interactive networking experiments
- Educational quantum communication visualizations

This initiative aligns with QOISC's broader mission of workforce development, regional ecosystem growth, and public STEM engagement.

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## Quantum Network Infrastructure

### Qunnect Quantum Network Node

QOISC intends to deploy a quantum networking node using Qunnect technologies; pending funding for this system and the facility.

The node will:

- Connect to UC Irvine research infrastructure
- Support quantum networking experiments
- Enable educational demonstrations
- Provide industry partner access
- Facilitate collaborative quantum communication research

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## UC Irvine Collaboration

### Proposed Collaboration

QOISC plans to implement its collaboration with:

**UC Irvine Division of Continuing Education – Engineering Programs**

**Professor Howard Lee's laboratory at UC Irvine** Located at:

**UC Irvine Beall Applied Innovation**

**Eddleman Quantum Institute at UCI**

Potential collaboration areas include:

- Quantum networking experiments
- Fiber-based quantum communication
- Educational workshops
- Joint demonstrations
- Student research opportunities
- Industry engagement
- Quantum Materials & Device development and test

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## Chapman University Institute for Quantum Studies

### Proposed Academic Collaboration with outstanding faculty:

- **Andrew Jordan**
- **John Howell**
- **Ebrahim Karimi**

QOISC intends to pursue collaborative engagement with the Chapman University Institute for Quantum Studies, a nationally recognized center for research and education in quantum mechanics, quantum information science, and foundational quantum physics.

This collaboration would strengthen Southern California's regional quantum ecosystem by connecting:

- Applied technical education
- Academic quantum research

- Workforce development
- Industry experimentation
- Public outreach initiatives

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## Potential Areas of Collaboration

Potential collaborative activities may include:

- Joint educational workshops
- Quantum science public lectures
- Student pathway programs
- Research seminars and symposiums
- Collaborative grant opportunities
- Quantum networking demonstrations
- Visiting researcher and guest lecturer programs
- Student laboratory experiences and mentorship

QOISC's applied laboratory environment complements Chapman University's theoretical and research-focused quantum science programs. Chapman University's new facility will include advanced research and education in quantum networks that could be a very good match with the QOISC.

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## Student and Workforce Development Pathways

QOISC, UC Irvine and Chapman University may work together to help establish educational pathways connecting:

- Secondary education programs
- Community college technical programs
- Workforce development initiatives
- Undergraduate & graduate quantum science education
- Industry internship opportunities

This collaboration could help students transition from introductory optics and photonics training into advanced quantum science and engineering studies.

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## Quantum Education and Outreach

QOISC will support UC Irvine & Chapman University (and others) outreach activities through:

- Public demonstrations
- Community STEM events
- Quantum education workshops
- Public Library Quantum Network programs
- Regional consortium events

The collaboration would further strengthen Southern California's visibility as an emerging center for quantum technology education and innovation.

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# Strategic Educational and Industry Partnerships

## Optical Society of Southern California (OSSC)

QOISC will maintain a close collaborative relationship with the Optical Society of Southern California (OSSC), one of the region's leading professional organizations supporting optics, photonics, laser science, and optical engineering communities.

Through collaboration with OSSC, QOISC will:

- Participate in regional optics and photonics educational initiatives
- Support technical seminars and professional networking events
- Promote student engagement with the Southern California optics industry
- Facilitate guest lectures from industry experts and researchers
- Provide workforce development pathways into optics and quantum technology careers
- Connect students to internships and employment opportunities

OSSC's established relationships with Southern California optics and photonics companies provide an important bridge between classroom education and industry participation.

Potential collaborative activities include:

- Joint technical workshops
- Industry-sponsored laboratory demonstrations
- Student scholarship and mentorship programs
- Career exploration events
- Technical conference participation

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## Vital Link Partnership

QOISC collaborates with Vital Link, a Southern California workforce development and career pathway organization that connects secondary educational institutions with technical industries. QOISC Director Donn Silberman has been an active volunteer with Vital Link for over a dozen years and has served on their Board of Directors for several years.

Through partnership with Vital Link, QOISC plans to:

- Support STEM career awareness programs
- Introduce secondary school students to optics and quantum technologies
- Participate in workforce readiness initiatives
- Develop educational pathways from high school into quantum technology careers
- Support internships, apprenticeships, and industry mentorship programs

Vital Link's strong relationships with Orange County school districts and career technical education programs provide a valuable framework for expanding awareness of optics, lasers, fiber optics, photonics, and quantum technologies among secondary students.

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## Regional Workforce Development Ecosystem

Together, QOISC, OSSC, Vital Link, universities, and industry partners will help establish a coordinated regional workforce development ecosystem for:

- Optics and photonics education
- Laser technology training
- Fiber optics workforce development
- Quantum technology awareness
- Quantum networking workforce preparation
- Engineering career pathways

This ecosystem will help create direct educational pipelines connecting:

- Orange County secondary schools
- Community colleges
- Universities
- Research laboratories
- Quantum and photonics companies

- Telecommunications providers
- Defense and aerospace organizations

QOISC's role within this ecosystem will be to provide:

- Hands-on laboratory instruction
- Industry-accessible quantum networking infrastructure
- Technical workshops and demonstrations
- Applied optics and quantum systems education
- Industry collaboration opportunities

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# Industry Partner Program

## Advanced Optics Lab Leasing Program

The three Advanced Optics Laboratory suites will be leased to industry partners.

### Target Industry Partners

Potential tenants include:

- Quantum technology startups
- Photonics companies
- Defense contractors
- Optical communications companies
- Sensor developers
- Academic spinouts

### Included Features

Each suite includes:

- Optical table
- Laboratory workspace
- Storage cabinet
- Desk and workstation
- Quantum network access
- Shared conference room access
- Shared utility infrastructure

### Potential Uses

- Prototype development
- Quantum optics testing
- Quantum networking experiments
- Fiber communication experiments
- Optical sensing research

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# Revenue Model

## Primary Revenue Streams

### 1. Educational Tuition

Revenue sources:

- Individual courses
- Certificate programs
- Corporate training
- Teacher training
- Laboratory workshops

### 2. Industry Lab Leasing

Revenue from:

- Advanced optics lab suites
- Shared equipment access
- Quantum network access fees

### Laboratory Leasing Rates

***Large Advanced Optics Laboratory***

The large Advanced Optics Laboratory space includes:

- One 8' x 4' optical table
- Dedicated workspace
- Storage cabinets
- Quantum network connectivity
- Shared conference room access
- Shared facility utilities

**Lease rates:**

- $4,000 per month
- $1,500 per week
- $750 per day

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**Advanced Optics Laboratory Spaces 2 & 3**

Each laboratory includes:

- One 8' x 4' optical table
- Desk and chair
- Storage cabinet
- Quantum network access
- Shared facility infrastructure

**Lease rates per laboratory:**

- $3,000 per month
- $1,000 per week
- $500 per day

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**Additional services that may be available include:**

- Fiber connectivity support
- Optical equipment setup assistance
- Laser safety coordination
- Technical consulting
- Shared equipment scheduling
- Event and workshop hosting

### 3. Corporate Training

Customized training programs for:

- Engineering teams
- Telecommunications companies
- Defense contractors
- Semiconductor companies

### 4. Teacher Training

Customized training programs for:

- K-12 teachers – possibly grouped by districts
- Career Technical Education specialists
- Community college instructors
- University instructors, professors, lab managers

### 5. Research Partnerships

Potential funding from:

- Career Technical Education specialists
- Community college instructors
- University instructors, professors

#### Industry Professionals

- Optical engineers
- Telecommunications engineers
- Semiconductor engineers
- Defense technology personnel

#### Corporate Partners

- Optics, Lasers, Fiber Optics & Quantum technology firms
- Aerospace and defense companies
- Telecom providers
- Research organizations
- Joint development projects
- Sponsored experiments
- Research grants
- Federal programs

### 6. Consortium Memberships

Potential membership structure for:

- Corporate members
- Institutional partners
- Startup participants

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## Target Markets

### Primary Audiences

#### Students

- STEM students
- Physics students
- Career transition professionals
- Graduate students
- Technical workforce trainees

#### Teachers

- K-12 teachers

## Competitive Advantages

### Differentiators

#### Hands-On Learning Environment

Unlike many theoretical programs, QOISC emphasizes direct laboratory interaction.

#### Live Quantum Networking Infrastructure

Access to real quantum networking systems through Qunnect infrastructure.

#### Industry-Integrated Facility

Co-location of educational and commercial experimentation.

#### Regional Ecosystem Development

Direct integration with the Southern California quantum ecosystem.

#### Flexible Industry Collaboration

Dedicated rentable experimental laboratory suites.

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## Technology Infrastructure

### Core Equipment

#### Optical Equipment

- Optical tables
- Lasers
- Beam steering systems
- Interferometers
- Optical mounts
- Fiber optics tools
- Detectors
- Oscilloscopes

#### Networking Equipment

- Qunnect quantum networking systems
- Fiber distribution hardware
- Precision timing systems
- Network monitoring systems

#### Computing Infrastructure

- Local servers
- Network management systems
- Data acquisition systems
- Simulation workstations

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## Staffing Plan

### Initial Staffing

#### Executive Director

Responsibilities:

- Strategic leadership
- Industry partnerships
- Fundraising
- Academic coordination

#### Laboratory Director

Responsibilities:

- Lab operations
- Safety management
- Equipment oversight
- Experimental support

#### Instructors

Part-time and full-time instructors in:

- Optics
- Quantum mechanics
- Fiber optics
- Laser systems

### IT/Network Administrator

Responsibilities:

- Quantum network support
- Server infrastructure
- Network security

### Administrative Coordinator

Responsibilities:

- Student services
- Scheduling
- Reception operations

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## Marketing Strategy

### Marketing Channels with Partners

#### Digital Presence

- Website
- Technical blog
- Social media
- Educational videos

#### Academic Outreach

- University, Community College & K-12 partnerships
- Non-profit student engagement entities {Vital Link, Boys & Girls Clubs, etc.}
- Student workshops
- Guest lectures

#### Industry Outreach

- Consortium events
- Industry presentations
- Technical conferences

#### Community Engagement

- Public demonstrations
- STEM outreach
- High school partnerships

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## Financial Overview

### Startup Costs

### Estimated Categories

- Facility leasehold improvements
- Optical tables and lab equipment (donations from local optics companies.)
- Quantum networking hardware (Qunnect Inc.)
- Furniture and fixtures
- IT infrastructure
- Insurance and legal expenses
- Marketing and branding

### Potential Funding Sources

- Private investment
- Corporate sponsorships
- Federal grants
- Educational grants
- Industry partnerships
- Consortium memberships

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## Risk Factors

### Key Risks

### Technology Costs

Quantum and photonics equipment can be expensive and specialized.

### Regulatory and Safety Compliance

Laser safety and laboratory compliance requirements must be carefully managed.

### Market Education

The quantum technology market remains emerging and may require sustained outreach.

### Talent Recruitment

Qualified instructors and laboratory staff may be difficult to recruit.

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## Growth Strategy

### Phase 1

- Develop and host initial free webinars with UCI-DCE
- Launch foundational educational courses with UCI – DCE
    - Determine which courses to offer first based on feedback from the webinars
    - Identify hands-on portable laboratory experiment kits that can be included in traditional classrooms
- Build Consortium Membership
- Pursue grant funding

### Phase 2

- Expand course offerings
- Secure educational laboratory space for more advanced hands-on experiments and test equipment
- Create certificate programs
- Establish Qunnect node
- Secure advanced laboratory space for lease to industry partners
- Increase industry partnerships

### Phase 3

- Establish accredited technical programs
- Develop Public Quantum Network hardware, software and display + downloadable information
- Expand quantum networking infrastructure
- Establish Public Quantum Network at local libraries
- Develop regional innovation center capabilities

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## Long-Term Objectives

- Become a leading quantum workforce development center
- Support regional quantum technology commercialization
- Build an expanded operational Southern California quantum networking hub
    - Los Angeles, San Diego, Riverside, Ventura, Santa Barbara
- Develop industry-recognized training programs
- Foster startup incubation and collaborative experimentation

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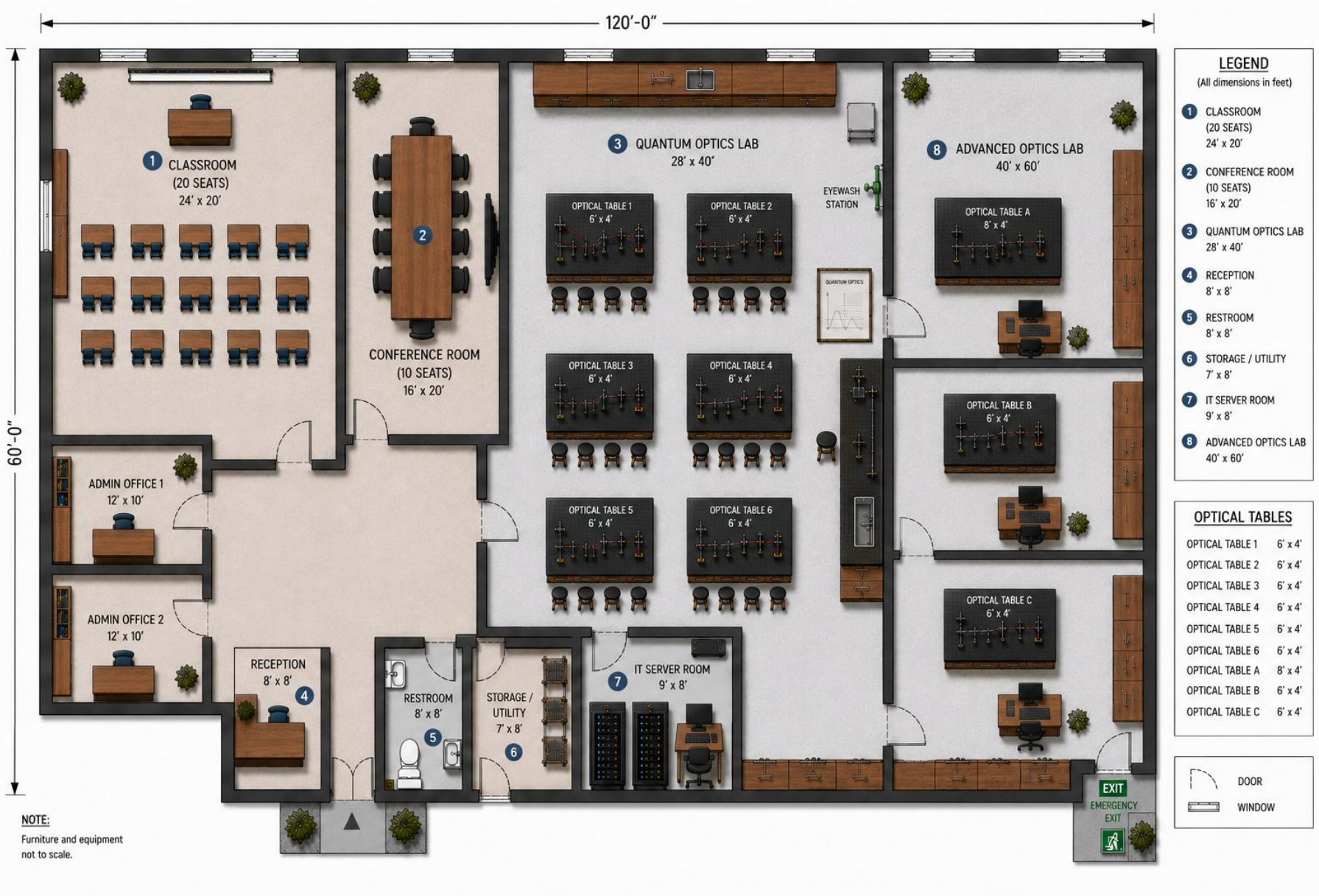
## Conclusion

The Quantum Optics Institute of Southern California represents a unique opportunity to combine education, quantum networking, and applied quantum optics experimentation with collaboration among multiple facilities and entities.

By integrating hands-on laboratory instruction, industry-accessible research spaces, and regional quantum networking infrastructure, QOISC can become a foundational institution supporting the emerging Southern California quantum ecosystem.

The combination of workforce development, industry collaboration, and experimental quantum networking creates a compelling model for sustainable growth and long-term regional impact.


120′-0″
60′-0″
1 CLASSROOM
(20 SEATS)
24′ x 20′
2
CONFERENCE ROOM
(10 SEATS)
16′ x 20′
3 QUANTUM OPTICS LAB
28′ x 40′
OPTICAL TABLE 1
6′ x 4′
OPTICAL TABLE 2
6′ x 4′
OPTICAL TABLE 3
6′ x 4′
OPTICAL TABLE 4
6′ x 4′
OPTICAL TABLE 5
6′ x 4′
OPTICAL TABLE 6
6′ x 4′
EYEWASH
STATION
QUANTUM OPTICS
8 ADVANCED OPTICS LAB
40′ x 60′
OPTICAL TABLE A
8′ x 4′
OPTICAL TABLE B
6′ x 4′
OPTICAL TABLE C
6′ x 4′
ADMIN OFFICE 1
12′ x 10′
ADMIN OFFICE 2
12′ x 10′
RECEPTION
8′ x 8′
4
RESTROOM
8′ x 8′
5
STORAGE /
UTILITY
7′ x 8′
6
7 IT SERVER ROOM
9′ x 8′
EXIT
EMERGENCY
EXIT
LEGEND
(All dimensions in feet)
1 CLASSROOM (20 SEATS) 24′ x 20′
2 CONFERENCE ROOM (10 SEATS) 16′ x 20′
3 QUANTUM OPTICS LAB 28′ x 40′
4 RECEPTION 8′ x 8′
5 RESTROOM 8′ x 8′
6 STORAGE / UTILITY 7′ x 8′
7 IT SERVER ROOM 9′ x 8′
8 ADVANCED OPTICS LAB 40′ x 60′
OPTICAL TABLES
OPTICAL TABLE 1 6′ x 4′
OPTICAL TABLE 2 6′ x 4′
OPTICAL TABLE 3 6′ x 4′
OPTICAL TABLE 4 6′ x 4′
OPTICAL TABLE 5 6′ x 4′
OPTICAL TABLE 6 6′ x 4′
OPTICAL TABLE A 8′ x 4′
OPTICAL TABLE B 6′ x 4′
OPTICAL TABLE C 6′ x 4′
DOOR
WINDOW
NOTE:
Furniture and equipment
not to scale.