

Advance Quantum Networks (A-QNET) Kickoff

Cristián Peña
October 31, 2023



Northwestern
University

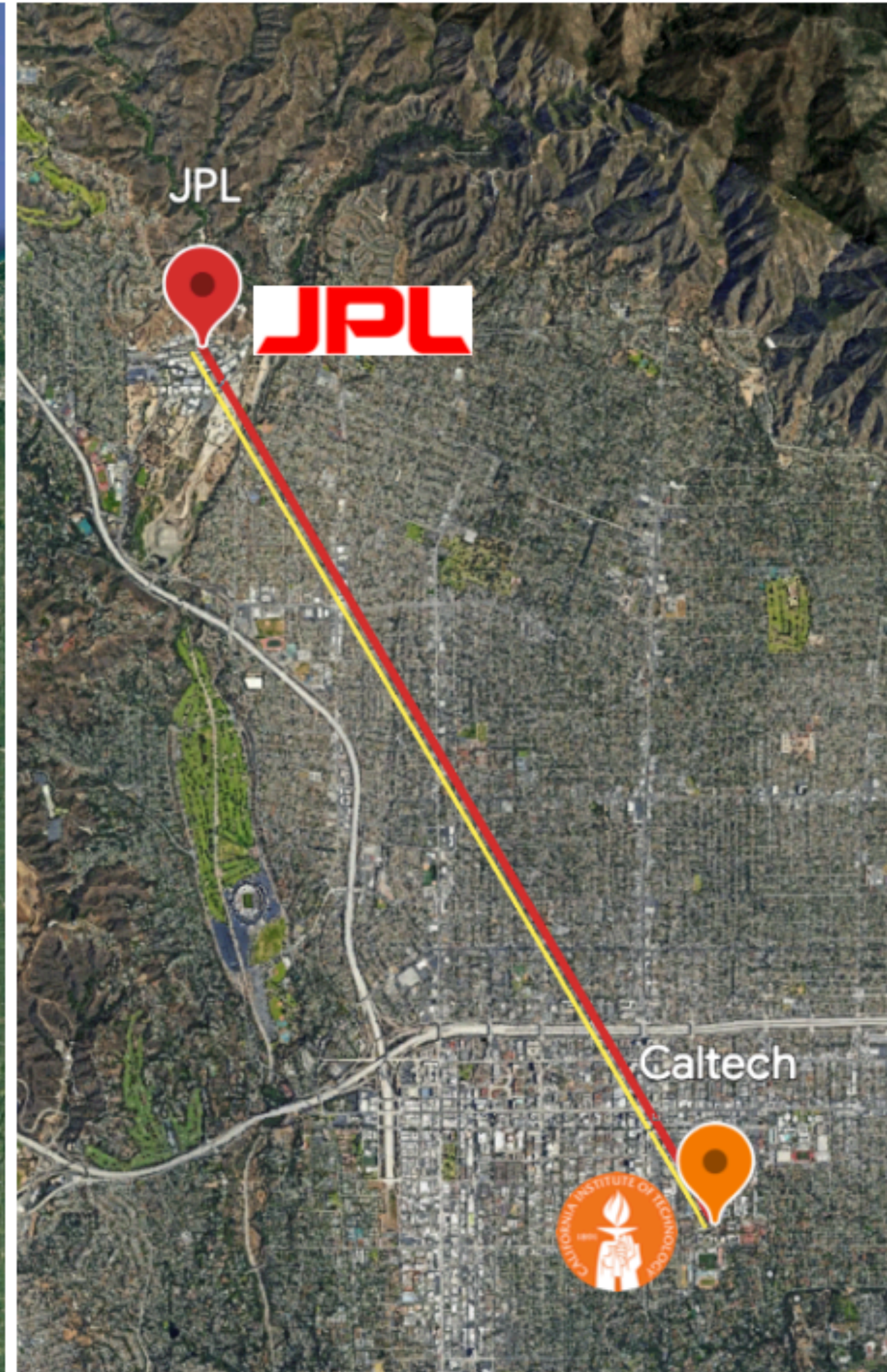
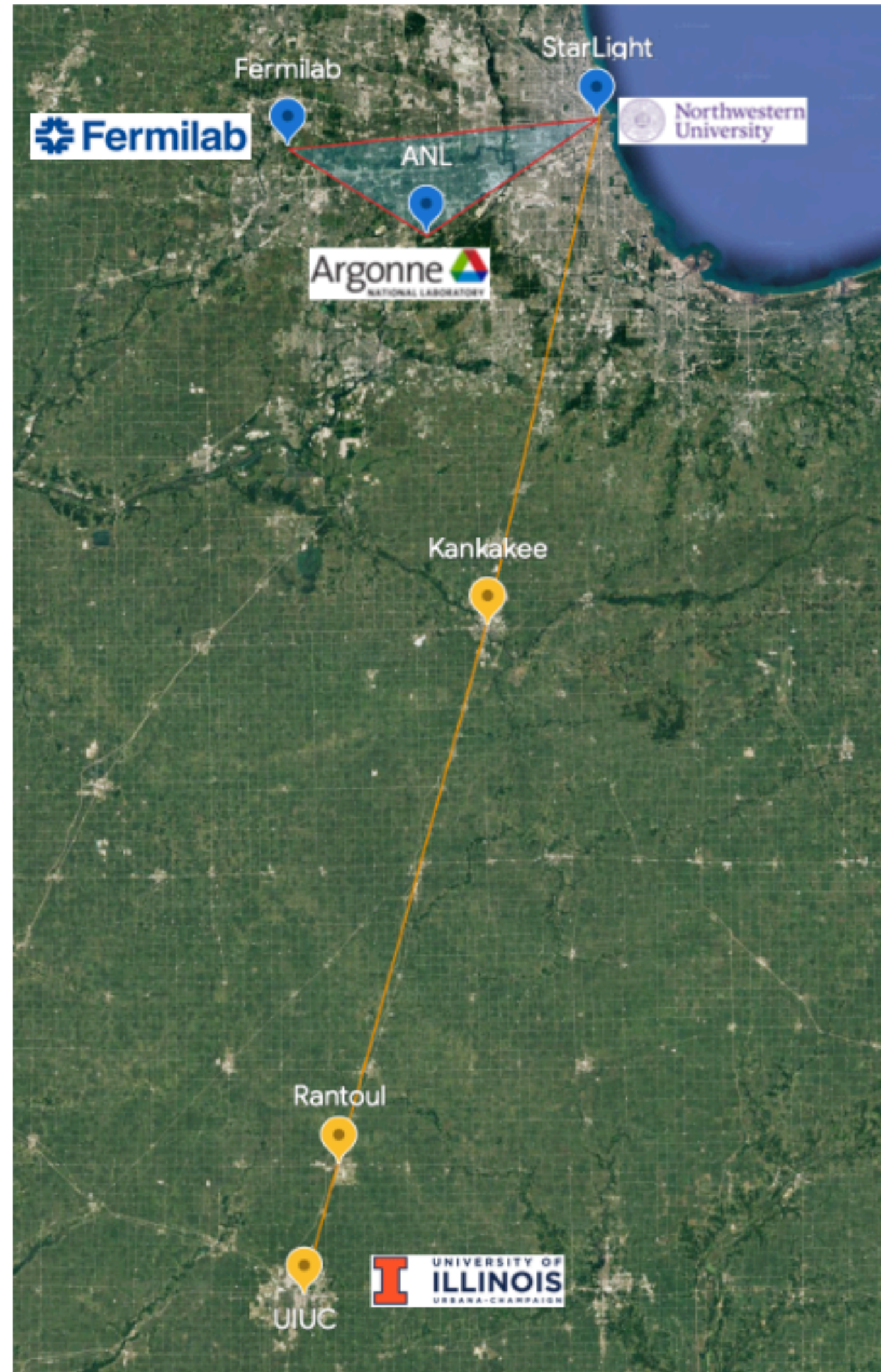


JPL



UNIVERSITY OF
ILLINOIS
URBANA-CHAMPAIGN

A-QNET Vision



- Building upon existing capabilities and infrastructure and increase QNode capabilities
- Hybrid free-space to fiber
- Long-range swapping (with coexitance)
- Protocols towards error correction: hyper entanglement and purifications
- Error mitigation and Controls (QICK)
- Transduction & Memories
- Theory & Simulation
- Adding the SoCal QNET

A-QNET Deliverables & Organization

Exciting, ambitious and large number of topics and deliverables

Topic/deliverable	Institutions
Ultra-low jitter SNSPD deployment	FNAL/Caltech/JPL
high-rate entanglement sources	FNAL/Caltech/JPL
QICK controls	FNAL
FNAL-ANL swapping	FNAL-ANL
Coexistence	Northwester/FNAL/Caltech
public quantum node	UIUC/FNAL

Topic/deliverable	Institutions
Hyper Entanglement & Memories	Caltech/UIUC
Error correction protocols & demos	UIUC/FNAL/Caltech
Hybrid free-space to fiber	UIUC/Caltech/JPL/FNAL
Transduction protocols and demo	FNAL/Caltech
Entanglement purification demo	UIUC/Caltech/FNAL

A-QNET Deliverables & Organization

Exciting, ambitious and large number of topics and deliverables


- To improve organization and provide ample time for technical discussions, we will create two “Topical Areas”:
 - **Topical Area 1** (Si Xie): Ultra-low jitter SNSPD deployment, high-rate entanglement sources, QICK controls, FNAL-ANL swapping, coexistence, public quantum node
 - **Topical Area 2** (Raju Valivarthi): Hyper entanglement and memories, error correction protocols, entanglement purification demos, hybrid free-space to fiber demos, transduction protocols & demos


A-QNET Deliverables & Organization

- We will have bi-weekly meetings which will focus on one of the Topical Areas
- Topical Area 1 and Topical Area 2 will alternate. Effectively each topical area will meet once every 4 weeks
 - Each group is expected to present — **with slides** — the progress on each deliverable during the corresponding Topical Area meeting
- Slides will be posted on INDICO: to help us maintain a record and history of our progress. Requested by the PM








A-QNET Deliverables & Organization

Kickoff Meeting

 Tuesday Oct 31, 2023, 12:00 PM → 1:00 PM America/Chicago

 Cristián Peña (Fermilab)

Description **ZOOM:** <https://fnal.zoom.us/j/95160417248?pwd=eXJDV0UzNFRJckxtMk84SHZmblowUT09>

12:00 PM	→ 12:10 PM	Introduction and Organization Speaker: Cristián Peña (Fermilab)	🕒 10m 
12:10 PM	→ 12:20 PM	Fermilab Speaker: Si Xie (Fermilab)	🕒 10m 
12:20 PM	→ 12:30 PM	Caltech&JPL Speakers: Boris Korzh, Raju Valivarthi	🕒 10m 
12:30 PM	→ 12:40 PM	ANL  A_QNET_slide.pptx	🕒 10m 
12:40 PM	→ 12:50 PM	Northwestern	🕒 10m 
12:50 PM	→ 1:00 PM	UIUC	🕒 10m 

In person kickoff & General Meeting

- Current proposal: in person kickoff at Fermilab: Week of December 11.
 - One day event with visits to Fermilab facilities and in-depth discussion about the project. Cristian will organize.
 - Need to know your availability ASAP
- Additionally, every 2 months we will have a general meeting. Overview of project status with the whole team.