

Unit Name

Networked Quantum Devices Unit

Research Personnel

Faedi Loulidi, Postdoctoral Scholar

Daniel Nadeem Bhatti, Staff Scientist

Maria Quadeer, Postdoctoral Scholar

Ananda Gopal Maity, Postdoctoral Scholar, Senior researcher at Bose Center for basic sciences

Manuel Joao Duarte Serejo Goulao, Postdoctoral Scholar, Researcher at Instituto Superior Tecnico in Lisbon

Salome Catherine Hayes-Shuptar, OIST Student

Ilia Ryzov, OIST Student

Shin Sun, OIST Student

Casapao Joshua Carlo, OIST Student

Chen Jiajun, OIST Student

Scholarly Contributions and Creative Productions (by Faculty)

Conference Proceedings

1. Lirabi, G.; Loulidi, F.; Elkouss, D.
A General Purification Protocol with Imperfect State Preparation. In IEEE QCNC 2024; 2024.

Journal Article

1. Yehia, R.; Schiavon, M.; Marulanda Acosta, V.; Coopmans, T.; Kerenidis, I.; Elkouss, D.; Diamanti, E.
Connecting Quantum Cities: Simulation of a Satellite-Based Quantum Network. New Journal of Physics 2024, 26.
2. Elkouss, D.
Near-Term N to K Distillation Protocols Using Graph Codes. IEEE Journal on Selected Areas in Communications 2024.
3. Elkouss, D.
Thresholds for the Distributed Surface Code in the Presence of Memory Decoherence. AVS Quantum Science 2024.
4. Elkouss, D.
Noise Is Resource-Contextual in Quantum Communication. Physical Review Research 2024.
5. Elkouss, D.
Simultaneous Basis and Information Reconciliation in Quantum Key Distribution. IEEE Access 2024.

Presentation at Conference

1. Elkouss, D.
Optimizing NISQ Networks for Applications. PQE 2025 2025.

- <https://www.pgeconference.com/>
2. Elkouss, D.
Optimizing Entanglement Distribution in near-Term Quantum Networks.. QR.X-Workshop III - Recent developments in quantum repeater technology and theory. 2024.
 3. Elkouss, D.
Optimizing Protocols for near-Term Quantum Networks. 6th Seefeld Workshop on Quantum Information 2024.
<https://qt.eu/events/6th-seefeld-workshop-on-quantum-information>
 4. Elkouss, D.
Exploiting near-Term Quantum Networks. 27th RIKEN RQC Colloquium 2024.
https://rqc.riken.jp/events/20240924_27th-rqc-colloquium.html
 5. Elkouss, D.
Useful Quantum Network Applications and Minimal Assumptions in Cryptography. Workshop on quantum communication & Networks (QCN-24) 2024.
 6. Elkouss, D.
Pseudo Entanglement Is Necessary for EFI Pairs. Quantum Extreme Universe 2024.
<https://groups.oist.jp/exu-oist>
 7. Elkouss, D.
Towards Implementing Useful Quantum Network Applications. From Quantum Materials to Quantum Information 2024.
https://groups.oist.jp/tsqs_qms

Scholarly Contributions (by Unit Members)

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Ananda G. Maity	Journal Article	Emergent non-Markovianity and dynamical quantification of the quantum switch	Physical Review A	APS	2025-03-25
Ananda G. Maity	Journal Article	Efficient detection of non-classicality of continuous variable states using moments of Wigner function	Phys. Rev. A	APS	2025-03-04
Daniel Bhatti	Journal Article	Hardware-efficient preparation of architecture-specific graph states on near-term quantum computers	Scientific Reports	Nature Portfolio	2025-01-25
Ananda G. Maity	Journal Article	Interplay between the Hilbert-space dimension of the control system and the memory induced by quantum SWITCH	Phys. Rev. A	APS	2024-10-23
Ananda G. Maity	Journal Article	Activating information backflow with the assistance of quantum SWITCH	J. Phys. A: Math & Theo.	IOP	2024-03-15
Ananda G. Maity	Journal Article	Assessing non-Markovian dynamics through the moments of Choi-states	Phys. Rev. A	APS	2024-2-29

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Daniel Bhatti	Journal Article	Heralding Higher-Dimensional Bell and Greenberger-Horne-Zeilinger States Using Multiport Splitters	New Journal of Physics	IOP Science	2025
Joshua Casapao	Poster Presentation at Conference	Disti-Mator: an entanglement distillation-based state estimator	ISNTT2024		
Ananda G. Maity	Poster Presentation at Conference	Noise is resource-contextual in quantum communication	Theory of Quantum Computation, Communication and Cryptography (TQC2024)		
Daniel Bhatti	Poster Presentation at Conference	Heralding Higher-Dimensional Bell and Greenberger-Horne-Zeilinger States Using Multiport Splitters	Quantum Innovation 2024		
Joshua Casapao	Poster Presentation at Conference	Disti-Mator: an entanglement distillation-based state estimator	Quantum Innovation 2024		
Shin Sun	Poster Presentation at Conference	Enhancing quantum key distribution with entanglement distillation and classical advantage distillation	Quantum Innovation 2024		
Shin Sun	Poster Presentation at Conference	Enhancing quantum key distribution with entanglement distillation and classical advantage distillation	ISNTT2024		
Faedi Loulidi	Poster Presentation at Conference	A max-flow approach to random tensor networks	28th Quantum Information Processing Conference (QIP2025)		
Ananda G. Maity	Poster Presentation at Conference	Noise is resource-contextual in quantum communication	Quantum Information Processing 2024		
Faedi Loulidi	Presentation at Conference	A max-flow approach to random tensor networks	International Congress of Mathematical Physics 2024(ICMP)		
Daniel Bhatti	Presentation at Conference	Heralding Higher-Dimensional Bell and Greenberger-Horne-Zeilinger States Using Multiport Splitters	ISNTT2024		
Siddhant Singh	Presentation at Conference	Modular architectures and entanglement schemes for error corrected distributed quantum computing	106th RQC at Riken		
Faedi Loulidi	Presentation at Conference	Random tensor networks.	Quantum Information Theory and Free Probability Theory conference in Abu Dhabi.		
Ananda Maity	Presentation at Conference	Noise is resource-contextual in quantum communication.	International conference on Photonics, Quantum Information, and Quantum Communication,		

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
			Kolkata, under BoseStat@100: Centenary of Bose Statistics.		
Ananda G. Maity	Presentation at Conference	Noise is resource contextual in quantum communication	QCMC 2024		
Ananda G. Maity	Presentation at Conference	Noise is resource-contextual in quantum communication	International Conference on Photonics, Quantum Information and Quantum Communication (ICPQIQ2024)		
Faedi Loulidi	Presentation at Conference	A max-flow approach to random tensor networks	Random quantum channels: entanglement and entropies (CIRM)		
Faedi Loulidi	Seminars	A max-flow approach to random tensor networks	Gravity, Quantum Geometry and Field Theory Unit (OIST)		
Ananda G. Maity	Seminars	Communication in the quantum world: unusual phenomena and state estimation	Workshop on quantum communication & Networks (QCN-24), Indian Institute of Technology (IIT), Bombay, India		
Daniel Bhatti	Seminars	Heralding Higher-Dimensional Bell and Greenberger-Horne-Zeilinger States Using Multiport Splitters	University of Stuttgart		

Honors, Awards & Fellowships (only by unit members)

2024-12-01	Shin Sun, NTT BRL Scholarship, NTT BRL 奨学金, 2024, Nippon Telegraph and Telephone Corporation, N/A
2024-10-24	Shin Sun, Poster prize, ポスター賞, 2024, Quantum Innovation 2024, N/A
2024-07-23	Manuel Goulao, Vencer o Adamastor Award, Vencer o Adamastor 賞, 2024, Instituto de Engenharia de Sistemas e Computadores (INESC) and Público Newspaper, “Vencer o Adamastor”賞の授賞式は、2024 年 7 月 23 日午後 5 時に、フィデラリダデが後援するテクニコイノベーションセンターで開催されます。

この賞は、情報通信技術分野の若手科学者による革新的な研究を認識するためのもので、科学的卓越性だけでなく、経済発展の可能性も重視されています。賞金は 20,000 ユーロです。

第 2 回目となるこの賞の審査委員会は、ジョゼ・トリボレット教授が議長を務め、マヌエル・ゴウラオ氏の研究「ポスト量子安全な多者計算：量子コンピュータに打破される可能性のある暗号技術に対抗するプライバシー保護のための暗号学」を受賞作として選出しました。この研究は、量子コンピュータによってこれまで使用されてきた暗号が破られる可能性に対抗し、通信のプライバシーを保護する方法を開発することに焦点を当ててい

ます。

マヌエル・ゴウラオ氏は、リスボンの技術高等学院（Instituto Superior Técnico）を卒業し、現在は日本の沖縄科学技術大学院大学（Okinawa Institute of Science and Technology）で研究員として活動しています。」

External Service

2025-02-20 - Ongoing	Associate editor IEEE Transactions on Networking, IEEE
2025-02-09 - Ongoing	Associate editor ACM Transactions on Quantum Computing, ACM
2025-02-02	Co-track chair: International Conference on Quantum Communications, Networking, and Computing (QCNC 2025), IEEE
2024-09-10	Chair local organizing committee TQC 2024, TQC
2024-07-01	Co-track chair: International Conference on Quantum Communications, Networking, and Computing (QCNC 2024), IEEE
2024-03-01 - Ongoing	Guest editor IEEE Journal on Selected Areas in Communications, IEEE, Special issue: Building a More Secure Future: Developing Unbreakable Communication Protocols for the Quantum Era
2023-03-01	Guest editor IEEE Wireless Communications, IEEE, Issue: Quantum Communications, Quantum Internet, and Applications
2023-02-01	TPC co-chair Workshop on Quantum Systems and Computation, ACM, SIGMETRICS Workshop on Quantum Systems and Computation

Outreach Activities (For Unit Members Only)

2025-10-09	Shin Sun, Science presentation feedback for Yokohama Science Frontier high school, OIST
2025-03-13	Shin Sun, Science presentation feedback for high school, OIST
2025-03-12	Shin Sun, OIST SEED Program, Okayama prefecture Super Science Highschool
2024-12-11	Shin Sun, Science presentation feedback for Nagasaki Minami high school, OIST
2024-10-15	Salome Hayes-Shuptar, Les Houches Predoc School on Cold Atoms, CNRS

Workshops and Seminars (Organized and Hosted by Faculty/Units)

Speaker Name(s)	Title	Location	Date
Maria Flors Mor-Ruiz	Merging-Based Quantum Repeater (and the Noisy Stabilizer Formalism)	OIST L5D23, 2025-03-14	2025-03-14
Jyotirmoy Basak	Studies on the Quantum Private Query primitive in the Device Independent paradigm	OIST B503, 2025-03-11	2025-03-11
Jorge Miguel-Ramiro	The unexpected consequences of superposing quantum channels	OIST B503, 2025-03-03	2025-03-03
Uthirakalyani G.	A Converse for fault-tolerant Quantum Computation	OIST L5D23, 2025-02-18	2025-02-18
Satoya Imai	Metrological usefulness of entanglement and nonlinear Hamiltonians	OIST L5D23, 2025-01-15	2025-01-15

Speaker Name(s)	Title	Location	Date
TQC2024	The Theory of Quantum Computation, Communication and Cryptography (TQC)2024	OIST, 2024-09-09-09-13	2024-09-09
Thinh Le	Full-stack quantum computing for quantum advantage	OIST L5D23, 2024-09-04	2024-09-04
Kenneth Goodenough	On noise in swap ASAP repeater chains: exact analytics, distributions and tight approximations	OIST L5D23, 2024-08-27	2024-08-27
Saronath Halder	Quantum versus classical: Identifying the value of a random variable unambiguously	OIST L5D23, 2024-03-11	2024-03-11
Stav Haldar	Policies for entanglement distribution in quantum networks: theory and practical performance analysis	OIST, 2024-02-27	2024-02-27
Ariel Shlosberg	Minimizing Resources for Quantum Tasks: Error Correction and Algorithms	OIST B503, 2024-01-26	2024-01-26