Curriculum

Nome Name:	Davide
Cognome Surname:	Bacco

ORCID:	n.d.
Scopus Author ID:	n.d.
WOS Author ID:	n.d.
Sito WEB WEB site:	n.d.

POSIZIONE PROFESSIONALE ATTUALE / CURRENT PROFESSIONAL POSITION:

Posizione attuale Current position:	In servizio
Qualifica Qualification:	Professore Associato confermato
Ateneo/Ente/Azienda University/Institution/Company:	Università degli Studi di FIRENZE
Nazione Ateneo/Ente/Azienda University/Institution/Company Country:	ITA
Anno inizio Start Year:	2023
Anno fine End Year:	n.d.

PRECEDENTI ESPERIENZE LAVORATIVE (ULTIMI 10 ANNI) / PREVIOUS WORK EXPERIENCE (LAST 10 YEARS):

LINGUE / LANGUAGES:

Lingua Language:	Inglese
Scrittura Writing:	C1
Comunicazione Comunication:	C1

AREA/SETTORE SCIENTIFICO-DISCIPLINARE / AREA/SECTOR SCIENTIFIC-DISCIPLINARY

Area scientifico-disciplinare Area scientific-disciplinary:	Scienze fisiche
Area scientifico-disciplinare codice Area scientific-disciplinary code:	02
Settore scientifico-disciplinare codice Sector scientific-disciplinary code:	-Fisica sperimentale della materia e applicazioni
Settore scientifico-disciplinare codice Sector scientific-disciplinary code:	-PHYS-03/A

DESCRIZIONE DEI PRINCIPALI RISULTATI SCIENTIFICI CONSEGUITI NEGLI ULTIMI 10 ANNI (CON ANNESSO ELENCO DI MASSIMO 10 PUBBLICAZIONI) / DESCRIPTION OF THE MAIN SCIENTIFIC RESULTS ACHIEVED IN THE LAST 10 YEARS (WITH ATTACHED LIST OF MAXIMUM 10 PUBLICATIONS):

Descrizione Description:	*My research career is based on the interests to engineer new systems for quantum communications. During my master thesis, I built a free-space quantum key distribution system (QKD), acts to exchange quantum keys in intra-city short distance link. This system was, not only used for research activities, but it was exploited for a public demonstration in Padova 2011. During my PhD, I worked on developing and testing new quantum protocols for long distance free-space quantum communications. I have obtained very encouraging results published in reputed journals (e.g., Nat. Commun. and Editorial suggestion in P.R.L.). In November 2015 (for 8 years), I joined DTU Fotonik first as a Marie Curie Postdoc Researcher and then as an Assistant Professor where I have initiated the activities on experimental quantum communications within the Fotonik Department. During the last 10 years, I have obtained several world-first achievements: I am author or co-author of 100 publications, including 40 peer reviewed journal papers (14 top-scored papers), 6 post deadline papers, 54 conference papers. Furthermore, I was an invited speaker at prestigious conferences like QCrypt, AQIS, CLEO Europe, ICOAM, ICIQP, OFC and ECOC. As part of my research activity, I have been always active in promoting and leading activities related to Dissemination and Exploitation, e.g., Culturenight (2017 and 2018) in Denmark, Notte dei Ricercatori, etc... In addition, I am one of the*

	co-founders of QTI s.r.l. the first Italian startup designing, commercializing and producing quantum key distribution systems. 1. D. Bacco et al., Field trial of a finite-key quantum key distribution system in the Florence metropolitan area,EPJ Quantum Technology 6, 5 (2019) 2. D. Bacco, et al., Boosting the secret key rate in a shared quantum and classical fibre communication system, Communication Physics 2, 140 (2019) 3. J. Wang, et al., High-Dimensional Quantum Key Distribution based on Multicore Fiber using Silicon Photonic Integrated Circuits, npj Quantum Information: 3:25 (2017) 4. D. Bacco, et al., Experimental quantum key distribution with finite-key security analysis for noisy channels, Nat. Commun. 4:2363(2013) 5. G. Vallone, et al., Experimental satellite quantum communications. Phys. Rev. Lett.115, 040502 (2015) 6. D. Llewellyn, et al., Chip-to-chip quantum teleportation and multi-photon entanglement in silicon, Nature Physics, 16 148-153 (2020) 7. B. Da Lio, et al, Path-encoded high-dimensional quantum key distribution over 2 km multicore fiber, npj Quantum Information 7.1. 1-6 (2021) 8. C. Vigliar, et al., Error protected qubits in a silicon photonic chip, Nature Physics 17 (10), 1137-1143 9. Y. Ren, et al., Distribution of Multiplexed Continuous-Variable Entanglement for Quantum Networks, Laser & Photonics Reviews: 2100586 (2022) 10. D. Ribezzo, et al. "Deploying an Inter-European Quantum Network." Advanced Quantum Technologies 6.2 (2023): 2200061.

PUBBLICAZIONI / PUBLICATIONS:

Anno della pubblicazione Year of publication:	2024
Citazione Citation:	Zahidy, Mujtaba, Ribezzo, Domenico, De Lazzari, Claudia, Vagniluca, Ilaria, Biagi, Nicola, Müller, Ronny, Occhipinti, Tommaso, Oxenløwe, Leif K., Galili, Michael, Hayashi, Tetsuya, Cassioli, Dajana, Mecozzi, Antonio, Antonelli, Cristian, Zavatta, Alessandro, Bacco, Davide (2024). Practical high-dimensional quantum key distribution protocol over deployed multicore fiber. NATURE COMMUNICATIONS, vol. 15, 1651, ISSN: 2041-1723, doi: 10.1038/s41467-024-45876-x

Anno della pubblicazione Year of publication:	2025
Citazione Citation:	Tagliavacche, Noemi, Borghi, Massimo, Guarda, Giulia, Ribezzo, Domenico, Liscidini, Marco, Bacco, Davide, Galli, Matteo, Bajoni, Daniele (2025). Frequency-bin entanglement-based Quantum Key Distribution. NPJ QUANTUM INFORMATION, vol. 11, 60, ISSN: 2056-6387, doi: 10.1038/s41534-025-00991-5

Anno della pubblicazione	2020

Year of publication:	
Citazione Citation:	Llewellyn, D, Ding, YH, Faruque, II, Paesani, S, Bacco, D, Santagati, R, Qian, YJ, Li, Y, Xiao, YF, Huber, M, Malik, M, Sinclair, GF, Zhou, XQ, Rottwitt, K, O'Brien, JL, Rarity, JG, Gong, QH, Oxenlowe, LK, Wang, JW, Thompson, MG (2020). Chip-to-chip quantum teleportation and multi-photon entanglement in silicon (vol 16, pg 48, 2019). NATURE PHYSICS, vol. 16, p. 367, ISSN: 1745-2473, doi: 10.1038/s41567-020-0840-x

Anno della pubblicazione Year of publication:	2021
Citazione Citation:	Caterina Vigliar, Stefano Paesani, Yunhong Ding, Jeremy C. Adcock, Jianwei Wang, Sam Morley-Short, Davide Bacco, Leif K. Oxenl??we, Mark G. Thompson, John G. Rarity, Anthony Laing (2021). Error-protected qubits in a silicon photonic chip. NATURE PHYSICS, vol. 17, p. 1137-+, ISSN: 1745-2473, doi: 10.1038/s41567-021-01333-w

Anno della pubblicazione Year of publication:	2018
Citazione Citation:	Jianwei Wang, Stefano Paesani, Yunhong Ding, Raffaele Santagati, Paul Skrzypczyk, Alexia Salavrakos, Jordi Tura, Remigiusz Augusiak, Laura Mančinska, BACCO D, Damien Bonneau, Joshua W Silverstone, Qihuang Gong, Antonio Acín, Karsten Rottwitt, Leif K Oxenløwe, Jeremy L O'Brien, Anthony Laing, Mark G Thompson (2018). Multidimensional quantum entanglement with large-scale integrated optics. SCIENCE, vol. 360, p. 285-291, ISSN: 1095-9203, doi: 10.1126/science.aar7053

Anno della pubblicazione Year of publication:	2023
Citazione Citation:	Zahidy, M., Ribezzo, D., Müller, R., Riebesehl, J., Zavatta, A., Galili, M., Oxenløwe, L. K., Bacco, D. (2023). Single-photon-based clock analysis and recovery in quantum key distribution. AVS QUANTUM SCIENCE, vol. 5, 041403, ISSN: 2639-0213, doi: 10.1116/5.0167549

Anno della pubblicazione Year of publication:	2023
Citazione Citation:	Francesconi, Saverio, Biagi, Nicola, Vagniluca, Ilaria, Ribezzo, Domenico, Occhipinti, Tommaso, Zavatta, Alessandro, Bacco, Davide (2023). Efficient Implementation of Time-Bin BB84-QKD Protocol with Phase-Randomized Weak Coherent States. In: CLEO. OPTICA, doi: 10.1109/cleo/europe-eqec57999.2023.10231757

Anno della pubblicazione Year of publication:	2024
Citazione Citation:	Zahidy, Mujtaba, Mikkelsen, Mikkel T., Müller, Ronny, Da Lio, Beatrice, Krehbiel, Martin, Wang, Ying, Bart, Nikolai, Wieck, Andreas D., Ludwig, Arne, Galili, Michael, Forchhammer, Søren, Lodahl, Peter, Oxenløwe, Leif K., Bacco, Davide,

	Midolo, Leonardo (2024). Quantum key distribution using deterministic single-photon sources over a field-installed fibre link. NPJ QUANTUM INFORMATION, vol. 10, 2, ISSN: 2056-6387, doi: 10.1038/s41534-023-00800-x

Anno della pubblicazione Year of publication:	2020
Citazione Citation:	Ilaria Vagniluca, Beatrice Da Lio, Davide Rusca, Daniele Cozzolino, Yunhong Ding, Hugo Zbinden, Alessandro Zavatta, Leif K. Oxenløwe, Davide Bacco (2020). Efficient Time-Bin Encoding for Practical High-Dimensional Quantum Key Distribution. PHYSICAL REVIEW APPLIED, vol. 14, ISSN: 2331-7019, doi: 10.1103/physrevapplied.14.014051

DESCRIZIONE DEI PRINCIPALI PROGETTI DI RICERCA E PREMI CONSEGUITI NEGLI ULTIMI 10 ANNI (CON ANNESSO ELENCO DI MASSIMO 10 RISULTATI, INCLUDENDO, A TITOLO DI ESEMPIO, PRINCIPAL INVESTIGATOR O COORDINATORE LOCALE DI PROGETTI DI RICERCA COMPETITIVI NAZIONALI O INTERNAZIONALI, SIGNIFICATIVI PREMI CONSEGUITI PER LA PROPRIA ATTIVITÀ DI RICERCA)/ DESCRIPTION OF THE MAIN RESEARCH PROJECTS AND AWARDS AWARDED IN THE LAST 10 YEARS (WITH ATTACHED LIST OF MAXIMUM 10 ACHIEVEMENTS, INCLUDING, FOR EXAMPLE, PRINCIPAL INVESTIGATOR OR LOCAL COORDINATOR OF NATIONAL OR INTERNATIONAL COMPETITIVE RESEARCH PROJECTS, SIGNIFICANT AWARDS AWARDED FOR YOUR RESEARCH ACTIVITY):

Descrizione Description:	*Premi: 2021 BIRD (Best Italian Researcher in Denmark) price 2022 2020 Best Cover of Advanced Photonics 2019" (link) 2019 DOPS (Danish Optical Society) Best Young Researcher price. 2017-2019 H.C. Ørsted Postdoc MSCA COFUND DTU- Department of Photonic Engineering 2012-2015 PhD scholarship Italian Space Agency: Quantum communication between Earth and Space Progetti di Ricerca: 2023-2028 ERC StG Grant QOMUNE: Quantum Optical Multidimensional Network Total Grant 1.5 M€ 2023-2025 Work Package Leader EQUO: European quantum ecosystem , Digital Europe Programme DIGITAL-2021-QCI-01 Total Grant 5.1 M€, QTI budget 1.2 M€ 2022-2025 Principal Investigator @ QTI s.r.l. Title: QuSub Quantum Submarine Communication Total Grant 3.7 M€, QTI budget 1 M€ 2022-2026 Co-Principal Investigator DFF-RP2 Title: QUAntum photonic Reservoir COMputing (QUARCOM) Total grant 6.1 MDKK (818 k€) 2022-2025 Co-Principal Investigator Prometheus Title: PROgraMmable photonics Enabling ultra-fast spiking and quanTum nEUral networkS Total grant 5M€, DTU*

	budget 272 k€ 2022-2025 Co-Principal Investigator SEQUOIA Title: SENSING USING QUANTUM OCT WITH AI Total grant 6.4M€, DTU budget 905 k€ 2020-2024 Principal Investigator @ DTU of Innovation Fund Denmark Title: Field-ready single-photon quantum technology (FIRE-Q) Total grant 27 MDKK (3,62 M€), DTU budget 3,5 MDKK (470 k€) 2021-2025 Co-Principal Investigator of Danish National Research Foundation, Center of Excellence SPOC II 41,5MDKK (5,57 M€) 2019-2022 Co-Principal Investigator of OpenQKD-Quantum Key Distribution testbed H2020 (PI AIT Austria, 38 partners) Total Budget: 15M€ (130K€ at DTU) 2018-2022 Co-Principal Investigator of SQUARE-European project H2020 2018-2021 (PI Prof. Karsten Rottwitt) Total Budget: 1.934.307 €

Descrizione Description:	ERC StG Grant QOMUNE: Quantum Optical Multidimensional Network Total Grant 1.5 M€

Descrizione Description:	Co-Principal Investigator of SQUARE-European project H2020 2018-2021 (PI Prof. Karsten Rottwitt) Total Budget: 1.934.307 €

Descrizione Description:	Work Package Leader EQUO: European quantum ecosystem , Digital Europe Programme DIGITAL-2021-QCI-01 Total Grant 5.1 M€, QTI budget 1.2 M€

Descrizione Description:	Principal Investigator @ QTI s.r.l. Title: QuSub Quantum Submarine Communication Total Grant 3.7 M€, QTI budget 1 M€

Descrizione Description:	Co-Principal Investigator DFF-RP2 Title: QUAntum photonic Reservoir COMputing (QUARCOM) Total grant 6.1 MDKK (818 k€)

Descrizione Description:	Co-Principal Investigator Prometheus Title: PROgraMmable photonics Enabling ultra-fast spiking and quanTum nEUral networkS Total grant 5M€, DTU budget 272 k€

Descrizione Description:	Co-Principal Investigator SEQUOIA Title: SENSING USING QUANTUM OCT WITH AI Total grant 6.4M€, DTU budget 905 k€

Descrizione Description:	Principal Investigator @ DTU of Innovation Fund Denmark Title: Field-ready single-photon quantum technology (FIRE-Q) Total grant 27 MDKK (3,62 M€), DTU budget 3,5 MDKK (470 k€)

Descrizione Description:	Co-Principal Investigator of Danish National Research Foundation, Center of Excellence SPOC II 41,5MDKK (5,57 M€)

Descrizione Description:	Co-Principal Investigator of OpenQKD-Quantum Key Distribution testbed H2020 (PI AIT Austria, 38 partners) Total Budget: 15M€ (130K€ at DTU)

DESCRIZIONE DEI PRINCIPALI RISULTATI CONSEGUITI NEGLI ULTIMI 10 ANNI IN TERMINI DI SVILUPPO DI RETI E RELAZIONI SCIENTIFICHE NAZIONALI E INTERNAZIONALI (CON ANNESSO ELENCO DI MASSIMO 5 RISULTATI, INCLUDENDO, A TITOLO DI ESEMPIO, PARTECIPAZIONE O ORGANIZZAZIONE DI CONVEGNI NAZIONALI E INTERNAZIONALI; CONTRIBUTI A CONSORZI DI RICERCA) / DESCRIPTION OF THE MAIN RESULTS ACHIEVED IN THE LAST 10 YEARS IN TERMS OF DEVELOPMENT OF NATIONAL AND INTERNATIONAL SCIENTIFIC NETWORKS AND RELATIONS (WITH ATTACHED LIST OF MAXIMUM 5 RESULTS, INCLUDING, FOR EXAMPLE, PARTICIPATION OR ORGANIZATION OF NATIONAL AND INTERNATIONAL CONFERENCES; CONTRIBUTIONS TO RESEARCH CONSORTIA):

Descrizione Description:	*Conference organization: Program Chair Quantum Astronomy 18-19 December 2023, Florence, Scientific Committee Member (https://www.qticompany.com/from-quantum-astronomy-to-quantum-communications-workshop/) Program Chair of International conference on Integrated quantum photonics ICIQP 2022, 5-7th October Copenhagen (https://www.conferencemanager.dk/iciqp2022) Technical Program Committee Member Qcrypt 2020 Technical Program Committee Member Single-photon workshop 2019 Collaboration (I have several papers with my collaborators): Assoc. Professor, Francesco Da Ros, Technical University of Denmark (DTU), Prof. Fabio Sciarrino (Sapienza University, Rome) ; Dr. Marcus Huber (IQOQI, Wien) , Assoc. Prof. Mehul Malik (HWU Edinburgh); Prof. Jietai Jing (East China Normal University), Prof. Alberto Tosi (University of Milano) ; Prof. Ulrik Lund Andersen (DTU Physics) ; Dr. Marco Bellini (LENS, University of Florence) ; Dr. Alessandro Zavatta (LENS, University of Florence, Italy), Prof. Mark Thompson and Anthony Laing (University of Bristol); Prof. Anders Sørensen (University of Copenhagen) Invited presentations and invited conferences: (2017) Crossing Seminar- Technical University of Darmstadt; (2017) Politecnico di Milano; (2017) Center for quantum technology (CQT) Singapore; (2018) LENS- European Laboratory for Non-Linear Spectroscopy, Firenze; (2018) CNIT, Pisa; (2019) ICTON Conference; (2019) META Conference; (2019) IQC Waterloo Seminar; (2019) SPIE-COS Photonic Asia ;(2020) IEEE Photonic Society summer topical conference; (2020) Bristol quantum information science, workshop; (2021) CLEO USA; (2022) UCOMMS 10th Underwater Communications and Networking (Keynote invited speaker); (2022) QCRYPT 12th Quantum cryptography conference, (Invited talk) Industry*

	session contribution; (2022) NATO underwater workshop (Invited talk); ICOP (Italian Conference on Optics and Photonics); (2022) OFC Optical Fiber Conference (Invited talk); (2022) IQIS (Italian Quantum Information Science conference) (Invited talk); ECOC (Invited talk) (2022); OFC 2024 (Invited Talk)

Descrizione Description:	Program Chair Quantum Astronomy 18-19 December 2023, Florence, Scientific Committee Member (https://www.qticompany.com/from-quantum-astronomy-to-quantum-communications-workshop/)

Descrizione Description:	Program Chair of International conference on Integrated quantum photonics ICIQP 2022, 5-7th October Copenhagen (https://www.conferencemanager.dk/iciqp2022)

Descrizione Description:	Technical Program Committee Member Qcrypt 2020

Descrizione Description:	Technical Program Committee Member Single-photon workshop 2019

DESCRIZIONE DEI PRINCIPALI RISULTATI CONSEGUITI NEGLI ULTIMI 10 ANNI IN TERMINI DI SUPPORTO ALLA COMUNITÀ SCIENTIFICA (CON ANNESSO ELENCO DI MASSIMO 5 RISULTATI, INCLUDENDO, A TITOLO DI ESEMPIO, RESPONSABILITÀ DI DIREZIONE DI COMITATI EDITORIALI; INCARICHI DI VALUTAZIONE DELLA RICERCA PRESSO ISTITUZIONI NAZIONALI O INTERNAZIONALI; RESPONSABILITÀ ISTITUZIONALI ALL'INTERNO DELL'ISTITUZIONE DI APPARTENENZA O DI ALTRE ISTITUZIONI) / DESCRIPTION OF THE MAIN RESULTS ACHIEVED IN THE LAST 10 YEARS IN TERMS OF SUPPORT TO THE SCIENTIFIC COMMUNITY (WITH ATTACHED LIST OF MAXIMUM 5 RESULTS, INCLUDING, FOR EXAMPLE, MANAGEMENT RESPONSIBILITIES OF EDITORIAL COMMITTEES; RESEARCH EVALUATION ROLES AT NATIONAL OR INTERNATIONAL INSTITUTIONS; INSTITUTIONAL RESPONSIBILITIES WITHIN THE INSTITUTION OF AFFILIATION OR OTHER INSTITUTIONS):

Descrizione Description:	*Reviewer for Journals Nature Photonics, Nature Physics, Optica, Physical Review Research, Physical Review X, Nature Communications, Science Advances, Quantum Science and Technology, Nature Communication Physics,Physical Review Applied, Scientific*

	Reports, Physical Review A., Journal of Lightwave Technology, Journal of Selected Topics in Quantum Electronics, Machine Learning: Science and Technology, Photonics, Optics Letter, Optics Express, Applied Physics Letter, Physica Scripta, Cryptography, Revista Mexicana De Fisica, Entropy, IEEE Sensors, Applied Sciences. Reviewer for Funding bodies Horizon Europe Expert, Research Foundation Flanders (FWO-Opening new Horizons), OSA Travel grant awards, H2020 Fet Open Action, Innovation Foundation Denmark Natural Sciences and Engineering Research Council of Canada Regular Fondecyt National Projects Competition. SIRTEQ (Science et Ingénierie en Région Ile-de-France pour les Technologies Quantiques). Natural Sciences and Engineering Research Council of Canada (NSERC). Assoc. Editor and Guest Editor IEEE Photonics Journal, Nature Scientific Reports Applied Sciences MDPI, Special Issue on Quantum Communication PhD thesis reviewer Gabriele Riccardi, University of l´Aquila (2018) Cédric Bruynsteen, University of Ghent (2023) Evelyn, Technical University of Wien (2023)

DESCRIZIONE DEI PRINCIPALI RISULTATI CONSEGUITI NEGLI ULTIMI 10 ANNI IN TERMINI VALORIZZAZIONE DELLE CONOSCENZE (CON ANNESSO ELENCO DI MASSIMO 3 RISULTATI, RELATIVI ALLA PARTECIPAZIONE DEL CANDIDATO ALLE ATTIVITÀ DI VALORIZZAZIONE DELLE CONOSCENZE) / DESCRIPTION OF THE MAIN RESULTS ACHIEVED IN THE LAST 10 YEARS IN TERMS OF KNOWLEDGE VALORIZATION (WITH ATTACHED LIST OF MAXIMUM 3 RESULTS, RELATING TO THE CANDIDATE'S PARTICIPATION IN KNOWLEDGE VALORIZATION ACTIVITIES):

Descrizione Description:	*Socio Cofondatore QTI s.rl., Quantum Telecommunication Italy L´azienda ora e´di proprietá al 49% del gruppo TIM, nello specifico il 49% del capitale sociale e´detenuto dalla societá Telsy, leader nazionale da oltre 50 anni nella sicurazza informatica Brevetto 1 Ricevitore di distribuzione di chiavi quantistiche e metodo per rilevare una chiave crittografica Numero: IT20210013571 20210525, CA3221200, WO2022248503 Brevetto 2 Trasmettitore per distribuzione a chiave quantistica Numero: IT20210005462 20210309, BR112023018383, CA3212999, WO2022189523*

Descrizione Description:	Socio Cofondatore QTI s.rl., Quantum Telecommunication Italy L´azienda ora e´di proprietá al 49% del gruppo TIM, nello specifico il 49% del capitale sociale e´detenuto dalla societá Telsy, leader nazionale da oltre 50 anni nella sicurazza informatica

Descrizione Description:	Brevetto 1 Ricevitore di distribuzione di chiavi quantistiche e metodo per rilevare una chiave crittografica Numero: IT20210013571 20210525, CA3221200, WO2022248503

Descrizione Description:	Brevetto 2 Trasmettitore per distribuzione a chiave quantistica Numero: IT20210005462 20210309, BR112023018383, CA3212999, WO2022189523

Informazioni aggiornate alla data di candidatura 29-05-2025

Davide Bacco

Il presente curriculum costituisce allegato e parte integrante dell'incarico sottoscritto