Curriculum Vitae of Francesco Ticozzi

Francesco Ticozzi.
Born in Venice on May 3rd, 1978. Married.
Nationality: Italian.
Languages: Italian (native), English (fluent, certified for teaching).
Office Address:
Department of Information Engineering (DEI/A, Room 317),
Università di Padova, Via Gradenigo 6/B, 35131, Padova, Italy.

E-mail: ticozzi@dei.unipd.it,

EDUCATION

- January, 2007 **Dottorato (PhD)** in Automatic Control and Operations Research
  Department of Information Engineering, Università di Padova.
  Thesis: *Robustness issues in Quantum Control: A System-Theoretic Approach.*
  Advisors: Prof. A. Ferrante, Prof. M. Pavon.
- February, 2003 **Laurea Degree** in Management Engineering, Università di Padova.
  Thesis: *Problemi di Robustezza nel Controllo di Sistemi Quantistici*
  supervisors: Prof. A. Ferrante, Prof. M. Pavon.

RESEARCH INTERESTS

Quantum dynamical systems (modeling, estimation and control). Markov processes (analysis, control and algorithms). Analysis, control and estimation for networked dynamical systems and nonlinear systems. Algebraic methods in probability and mathematical physics. Variational methods in control and estimation. Quantum error correction. Quantum communications and information theory.

POSITIONS

- June 2024 - present **Full Professor** at the Department of Information Engineering, Università di Padova.
- July 2011 - present **Adjunct Faculty** at the Department of Physics and Astronomy, Dartmouth College, Hanover (NH), USA.
- January 2018 - May 2024 Associate Professor at the Department of Information Engineering, Università di Padova. In July, 2020 obtained *the national habilitation* to become a full professor.
- November, 2007 - December 2017 Assistant Professor (*Ricercatore*) at the Department of Information Engineering, Università di Padova. With tenure (*Ricercatore Confermato*) since November 2010. In October, 2014 obtained *the national habilitation* to become an associate professor.
- January, 2008 - April, 2008, November, 2008 - January, 2009, November, 2009 - January, 2010, and August 2010 - February 2011 Research visiting appointments at the Department of Physics and Astronomy, Dartmouth College, Hanover (NH), USA.
- February, 2007 - September, 2007 Research Associate at the Department of Information Engineering, Università di Padova.
- August, 2006 - October, 2006 Visiting researcher at the Department of Physics and Astronomy, Dartmouth College, Hanover (NH), USA.

- August, 2005 - June, 2006, Visiting Scholar (during the PhD program) at the Physics and Astronomy Department, Dartmouth College, Hanover (NH), under the supervision of Prof. L. Viola.

TEACHING

- February-June, **since 2021** "*Nonlinear Systems and Control*",
  1 semester, 48 hours course for the Control Systems Engineering M.S. program, Università di Padova, Department of Information Engineering.

- February-June, **since 2019** "*Control Engineering Laboratory*",
  1 semester, 72 hours course for the Control Systems Engineering M.S. program, Università di Padova, Department of Information Engineering (until 2021 the course was called "Control Laboratory").

- February-June, 2014-2020 "*Advanced Topics in Control*",
  1 semester, 48 hours course for the Automation Engineering M.S. program, focused on nonlinear systems and control, Università di Padova, Department of Information Engineering.

- February-June, 2018 "*Signals and Systems*",
  1 semester, 72 hours course for the Mechatronics Engineering B.S. programs , Università di Padova, Department of "tecnica e gestione dei sistemi industriali."

- June 2016, "*Quantum Statistical Dynamics and Control*",
  16 hours course, PhD Schools in Information Engineering and Computational Mathematics, Università di Padova, Department of Information Engineering.

- July, 2014 "*Quantum Dynamical Semigroups: Stability, Invriant Structures and Applications*",
  8 hours mini-course for the "Current Topics in Mathematical Physics" program, Department of Mathematics and Statistics, McGill University, Montreal (CA).

- February-June, 2012 and 2013 "*Digital control systems*",
  1 semester, 48 hours course for the Automation Engineering M.S. programs , Università di Padova, Department of Information Engineering.

- February-June, 2009, 2010 and 2019 "*Control Laboratory I*",
  1 semester, 78 hours course for the Automation Engineering B.S. and M.S. programs , Università di Padova, Department of Information Engineering.

- February-June, 2008 Teaching Assistant for "*Control Laboratory II*",
  1 semester, 78 hours course for the Automation Engineering B.S. and M.S. programs , Università di Padova, Department of Information Engineering. Instructor: Prof. R. Oboe.

- January-February, 2009, 2012, 2013, June 2010, "*Topics in Quantum Information*",
  16-20 hours course, PhD Schools in Information Engineering and Computational Mathematics, Università di Padova, Department of Information Engineering.

- May, 2006 "*An Invitation to Quantum Probability*", special lecture for P103, "*Quantum Mechanics II*". Dartmouth College, Hanover, NH. Instructor: L.Viola.

- January-March, 2006 Teaching Assistant for the course P91 "*Advanced Quantum Mechanics*", Dartmouth College, Hanover, NH, including office hours. Instructor: L.Viola.

- October-December, 2003 and 2004
  Teaching Assistant for the course *"Signals and Systems"*, B.S. in Computer Engineering at the Università di Padova, in collaboration with "Padova Ricerche". About four hours a week for nine weeks, about 40 hours of lectures and tutorials. Instructor: L.Finesso.

- May, 2003 *"Introduction to Quantum Control and Computation"*,
  20 hours course for the Ph.D. program in "Automatic Control and Operation Resarch", Università di Padova, Department of Information Engineering.

MENTORING

Research Associates, advisor

- Tommaso Grigoletto, 2023-now. Research project on *approximate model reduction for classical and quantum networked systems*. Publications [6, 50, 89, 5, 88].
- Weichao Liang, 2021-22. Research project on *optimized switching quantum control and state estimation*. Publications [4, 49, 89, 87].

Doctoral students, advisor

- Marco Peruzzo, 2023-now. Project on *Enhancing classical and quantum network control with memory and lifts*. Publications [48] and in preparation.
- Miguel Angel Casanova, 2023. Master Thesis on *New algorithms to find quantum correctable codes*. Publication in preparation. Currently supervised as PhD student.
- Tommaso Grigoletto, 2020-2023. *PhD student*, School of Information Engineering, Department of Information Engineering. Research project on *model reduction for classical and quantum systems*. Publications [6, 50, 89, 5, 88]. Currently research associate at DEI.
- Luca Mazzarella, 2011-2014. *PhD student*, School of Information Engineering, Department of Information Engineering. Research project on *modeling and control of discrete-time dynamics on quantum networks*. Currently quantum engineer at QuTech, Delft University of Technology and TNO (NL). Publications [21, 23, 29, 59, 60]

Doctoral students, co-advising and collaborating

- Simon Apers, 2015-2016. *PhD Candidate*, Electrical Engineering Dept., Ghent University. Research on *classical and quantum walks, Markov chains and feedback models*. Publications [53, 10, 7].
- Salini Karuvade, 2015-2017. *PhD Candidate*, Physics and Astronomy Department, Dartmouth College. Research on *stabilizability of entanglement in multipartite systems*. Publications [9, 11].
- Peter D. Johnson, 2014-2016. *PhD Candidate*, Physics and Astronomy Department, Dartmouth College. Research on *quasi-local dynamics and states on networks*. Publications [14, 18, 54, 12].
- Giacomo Baggio, 2014-2016. *PhD Candidate*, School of Information Engineering, Department of Information Engineering. Research on *quantum dead-beat behaviors on networks*. Publication [8].
- Nicola Dalla Pozza, 2011-2012. *PhD Candidate* School of Information Engineering, Department of Information Engineering. Research on *quantum communication and optimal information encoding*. Publications [90, 27].
- Mattia Zorzi, 2011-2012. *PhD Candidate*, School of Information Engineering, Department of Information Engineering. Research on *quantum channel estimation*. Publications [61, 27, 26].
- Saverio Bolognani, 2009-2010. *PhD Candidate* , Department of Information Engineering. Research on *quantum discrete-time feedback*. Related publications [37, 69, 68].

Master and Bachelor Thesis

- Marco Peruzzo, 2023. Master Thesis on *Enhancing network controllability with memory and lifts*. Publications [48] and in preparation. Currently supervised as PhD student.

- Marco Cortese, 2023. Master Thesis on *An novel algebraic approach to positive model reductions.* Publication in preparation.
- Miguel Angel Casanova, 2023. Master Thesis on *New algorithms to find quantum correctable codes.* Publication in preparation. Currently supervised as PhD student.
- Manuel Guatto, 2023. Master Thesis on *Reinforcement Learning for robust quantum feedback control.* Publication in preparation. Now PhD student at Jülich Forschungenszentrum, Quantum Control Department (DE).
- Linda Greggio, 2022. Master Thesis on *Asymptotic properties of repeated quantum measurements and quantum feedback.* Now PhD student at Ecole de Mine/INRIA-CNRS group in Paris (FR).
- Luca Gasparini, 2022. Master Thesis on *Sliding mode control for robotic manipulators.* Publication in preparation. Now PhD student at TU Wien (AU).
- Davide Rossato, 2020. Bachelor Thesis on *Modeling and feedback control of loudspeakers.*
- Luigi Laratta, 2020. Bachelor Thesis on *Internal stabilization and pole placement in frequency domain.*
- Manuel Guatto, 2020. Bachelor Thesis on *Variational auto-encoders for identification of low-complexity dynamical models.*
- Sara Callegari, 2020. Bachelor Thesis on *Control-oriented identification using regularization techniques.*
- Giovanni Trabucco, 2020. Bachelor Thesis on *Dynamical systems in epidemic modeling.*
- Tommaso Grigoletto, 2019-2020. Master Thesis on *Measurement-based switching of quantum dynamics for stabilization.* Related publication [6].
- Angela Fontan, 2016. Master Thesis on *non-trivial equilibria of cooperative nonlinear dynamics.*
- Luca Zuccato, 2015. Master Thesis on *von Neumann's alternated projection theorem, extensions and applications.* Related publication [12].
- Antonio Orvieto, 2015. Bachelor Thesis on *quantum probability approaches to quantum mechanics and its fundamental issues.*
- Luca Tosetto, 2014. Master Thesis on *model-predictive control: from theory to applications in driving simulators.*
- Ilaria Panardo, 2014. Master Thesis on *periodic systems in control theory and applications.*
- Precious Ugo Abara, 2014. Master Thesis on *stability of nonlinear network dynamics.* Related publication [13, 58].
- Pierre Scaramuzza, 2014. Master Thesis on *switching methods for controlled quantum dynamics.* Related publications [20, 57]
- Giuseppe Ilario Cirillo, 2014. Master Thesis on *invariance and Convergence for Discrete-Time Quantum Dynamical Semigroups.* Related publication [22]
- Alberto Dalla Libera, 2012. Bachelor Thesis on *quantum walks.*
- Marco Gazzola, 2012. Bachelor Thesis on *dissipative systems and feedback interconnections.*
- Giacomo Baggio, 2011. Bachelor Thesis, research project on *discrete-time feedback for state stabilization.* Related publication [63].

- Stefano Patron, 2011. Bachelor Thesis, research project on *conditions for convergence in consensus: an analysis of limit cases.*
- Riccardo Lucchese, 2010. Bachelor Thesis, research project on *speed of convergence of quantum dynamical semigroups.* Related publications [66, 33].
- Francesco Guarato, 2008 Master Thesis, research project on *Lyapunov analysis of discrete-time feedback control of quantum systems*, co-advised with Prof. M. Pavon.
- Enrico Avventi, 2005 Master Thesis, research project on *Hamiltonian compensation of quantum jumps*, co-advised with Prof. M. Pavon and Prof. A. Ferrante.

ADMINISTRATIVE AND PROFESSIONAL ROLES

- October 2021 – present **Coordinator (*presidente*) of the program in *Control System Engineering*,** Department of Information Engineering, Università di Padova.
- 2021 – present **Coordinator** of the proposal for a new bachelor curriculum in *Automation and Systems Engineering*, at the Department of Information Engineering, Università di Padova. Designed coordinator of the program from academic year 2024-25.
- March 2020 – September 2021 vice-coordinator (*vice-presidente*) of the program in *Control System Engineering*, Department of Information Engineering, Università di Padova.
- **Associate Editor** of *IEEE Control Systems Letters*, since 2022.
- **Associate Editor** of *System and Control Letters*, since January 2017.
- Panelist of the "*Mathematical Sciences Challenges in Quantum Information*" conference, organized by the Mathematical Division of the National Science Foundation in February 2015.
- Co-organizer with Prof. P. Dai Prà and Prof. M. Pavon of the Workshop "New challenges in reciprocal processes, Schrödinger bridges and optimal transport with applications to control engineering problems for classical and quantum systems", at the Università di Padova, Padova, Italy, May 29, 2015.
- Co-organizer with Prof. M. Pavon of the Workshop "Mathematical Aspects in Quantum Modeling, Estimation and Control" at the Università di Padova, Padova, Italy, June 25-27, 2013.
- Co-organizer with Prof. A. Sarlette of the Invited Session "Control of Quantum Mechanical Systems" at the FAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control, Bertinoro, Italy, August 2012.
- Co-organizer with Prof. D. D'Alessandro, Dr. F. Albertini and Dr. R. Romano of the special session "Mathematical Theory of Control of Quantum Systems" at the AMS meeting, Boston, MA. January 4-7, 2012.
- Co-organizer with Dr. F. Albertini and Prof. M. Pavon of the Workshop "Quantum Control Theory: Probabilistic and Geometrical Aspects", Università di Padova, Padova, Italy, September 28-29, 2009. Supported by the GNAMPA group of the *Istituto Nazionale di Alta Matematica* (INDAM), the Dept. of Pure and Applied Mathematics, the Dept. of Information Engineering and the University of Padova.
- Co-organizer with Prof. M. Pavon of the Invited Session "Control of Quantum Mechanical Systems" at the PHYSCON 2007 conference, Potsdam, Germany, September 2007.
- Member of IEEE, SIDRA (Società Italiana Docenti e Ricercatori in Automatica), Istituto Nazionale di Alta Matematica (INDAM, GNAMPA group) and IPACS (International Physics and Control Society).

- Reviewer of research proposals for the *Natural Science and Engineering Research Council of Canada* (NSERC).
- Referee for international journals on automatic control, theoretical and mathematical physics, including the *IEEE Transactions on Automatic Control*, *Automatica*, *Systems and Control Letters*, *IEEE Transactions on Control Systems Technology*, *International Journal of Control*, *Physics Review Letters*, *New Journal of Physics* ,*Journal of Physics A and B*, *Journal of Statistical Physics*, *Quantum Information and Computation*, and for the *IEEE Control and Decision Conference*, *American Control Conference*, *Symposiums on Mathematical Theory of Network and Systems* and *Physics and Control Conference*.

RESEARCH GROUP: QUANTUM CONTROL AND QUANTUM INFORMATION

Since 2009, F.T. has coordinated the research activities in the area of quantum control and quantum information theory of the sector. The research results that has been obtained have established it as one of the references one for quantum control theory, with multiple invitations to contribute to international schools and workshops, not only from the control community but also in the area of theoretical and mathematical physics. In particular, we proposed:

- A *system-theoretic approach to the stability and stabilization of open quantum dynamics*; The framework has been successfully applied to open-loop control design as well as feedback, and extended to cover dissipative genration of entangled states over networks using local resources;
- A first *generalization of the consensus problem to quantum networks*, and distributed algorithms for its solution;
- An *analysis of the fundamental limits in quantum control and thermodynamics towards effective cooling*;
- A *feedback implementation of quantum dynamical decoupling*, a technique that has been widely used for protection of encoded quantum information. The method has been implemented also experimentally by the MIT group of Prof. Cappellaro;
- The first full solution of the *minimum relative entropy problem in the estimation of quantum states and channels*, developing techniques that have been later applied in cryptographic analysis.
- A *construction of Schrödinger's bridges for quantum dynamics.*

Part of the research, focused has been developed in collaboration Prof. Viola's group at Dartmouth College (NH, USA), where F.T. has been granted an adjoint position to support his contribution to the Physics and Astronomy department and the co-mentoring of numerous PhD students during multiple research visits. The Padova group has enjoyed fruitful research visit from some of the key contributors to the field, including Prof. D'Alessandro (IOWA state), Prof. Altafini (Linkoping Univ.), Prof. Viola (Dartmouth College), Prof. Sarlette (INRIA-CNRS), Prof. Pellegrini (Toulouse Univ.). Prof. Kentaro Ohki form Kyoto Univ. recently spent 5 months in Padova, funded on his own grants, to start a new collaboration with the Padova team. The group also developed various projects in collaboration of the applied optics group of DEI, focused on quantum states and channels estimation methods, a key task towards the design of quantum communication and cryptography systems.

GRANTS AND FELLOWSHIPS

- 2022-present "*National Centre for HPC, Big Data and Quantum Computing*", in the framework of the National Plan for Recovery and Resilience (PNRR), coordinator of the DEI unit.
- 2023-present *Quantum Secure Networks Partnership* (QSNP). Horizon Specific Grant HORIZON-CL4-2022-QUANTUM-04-SGA.

- 2020-2023 Secure And cryptoGrAphic (SAGA) Mission by ESA.
- 2015-2016 *"New challenges in reciprocal processes, Schroedinger bridges, optimal transport and their respective geometries with applications to control engineering problems for classical and quantum systems."* – research grant, Università di Padova. Co-proposer. Funded for 25k Euro.
- 2009-2012 *"QuantumFuture: Communication at the Quantum Limit"* research project, Università di Padova. Co-Principal Investigator for the Control Theory Unit, funded by the Ministry of Education and Università di Padova for 154k Euro (Project total: 1.4M Euro, Principal investigator: Prof. P. Villoresi).
- 2009-2010 *"Schroedinger Bridges for Quantum Channels: A New Approach to Information Encoding and Control Design"* – CPDA080209/08 research grant, Università di Padova. Principal Investigator. Funded for 40k Euro.
- 2008-2010 Co-Proposer of "QUINTET: A strategic project on Quantum Information Engineering @ DEI", leading to the opening of 4 assistant professor positions. Selected for funding by the Department of Information Engineering, Università di Padova.
- 2007 *C. Offelli Award* for the best young researchers in the Department of Information Engineering, Università di Padova.
- January, 2006 Foundation *A. Gini* scholarship to support a ten months research period at Dartmouth College, Hanover (NH).
- 2005 and 2006 *C. Offelli* nomination for best young researchers in the Department of Information Engineering, Università di Padova.
- November, 2003 Three years scholarship for Ph.D. in Automatic Control and Operation Research (first in the scholarship selection), Università di Padova.

SELECTED INVITED TALKS AND RESEARCH SEMINARS

- March, 2024 Invited speaker at the workshop "Open Quantum Systems", Toulouse, 2024
- January, 2024 Quantum Seminar at Dartmouth College, NH, USA.
- April, 2022 Invited Research Seminar at Nottingham University, UK.
- June, 2016 Invited Research Seminar at Ecolè de Mines, Paris, France.
- May, 2016 Invited Lecturer at the first MISTEQ (*"Mesures Indirectes et Statistique des États Quantiques"*) meeting, Toulouse, France.
- May, 2016 Invited speaker at the "Workshop on Quantum Dynamics and Control", Institute Henri Poincarè, Paris, France.
- January, 2016 Research Seminar at the Dept. of Electrical and Computer Engineering, McGill University, Montreal, Canada.
- September, 2015 Invited speaker at the workshop "Quantum Thermodynamics and Quantum Information Theory", Toulouse, September 9-11, 2015.
- August, 2015 Invited speaker at the Gordon Research Conference "Quantum Control of Light and Matter", Mt. Holyoke College, South Hadley, Mass. (USA). August 2-7, 2015.
- August, 2014 Invited speaker at the "Principles & Applications of Control to Quantum Systems (PRACQSYS)", Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, August 4-8, 2014.
- July, 2013 Invited speaker at the IVth QCCC Symposium on "Frontiers of Large Quantum Systems", Munich and Prien, Germany, October 17-21, 2013.
- July, 2013 Invited speaker at the AQOS summer school, Autrans, France, July 12-19, 2013.
- February, 2012 Invited speaker at a COQUIT workshop, Munich, Germany, February 12-14, 2012.
- January, 2012 Invited Research Seminar at the Departamento de Física Teórica of the Universidad Complutense de Madrid, Madrid, Spain, January 25-27, 2012. Invited by Dr. A. Rivas.
- November, 2011 Invited speaker at the workshop "Open Quantum Systems and Quantum Information Theory", Toulouse, November 16-18, 2011.
- December, 2010 *Quantum Seminar* at the Physics and Astronomy Dept., Dartmouth College (NH, USA).
- July, 2009 Research Seminar at the University of Cambridge, Cambridge, United Kingdom. Invited by Dr. S. Schirmer.
- November, 2008 Invited speaker at the "Open Quantum Systems: Decoherence and Control" workshop. ITAMP, Harvard University, Cambridge (MA).
- April, 2007 Research Seminar at SISSA-ISAS, Trieste, Italy.
- March, 2006 Research Seminar at McGill University, Montreal, Canada.

PUBLICATIONS

Journal Papers:

[1] M. Casanova, M. Cortese, F.Ticozzi Stabilizing Wall States to Protect Quantum Information IEEE Control Systems Letters (early access), 2024.

[2] T. Grigoletto, F.Ticozzi Exact model reduction for discrete-time conditional quantum dynamics IEEE Control Systems Letters, vol.8, pag. 1–6, 2024.

[3] W. Liang, T. Grigoletto, F. Ticozzi Switching stabilization of quantum stochastic master equations. Automatica, vol. 165, 2024

[4] W. Liang, F. Ticozzi, G. Vallone. Optimizing Measurements Sequences for Quantum State Verification *Quantum Information Processing,* preprint arXiv:2307.00881, 2023

[5] T. Grigoletto, F. Ticozzi Algebraic Model Reduction for Hidden Markov Models *IEEE Transactions on Automatic Control*, doi: 10.1109/TAC.2023.3279209, 2023

[6] T. Grigoletto, F. Ticozzi, Stabilization via feedback switching for quantum stochastic dynamics *IEEE Control Systems Letters* 6, 235-240, 2022

[7] S. Apers, F. Ticozzi, A. Sarlette. Characterizing limits and opportunities in speeding up Markov chain mixing *Stochastic Processes and their Applications* 136, 145-191, 2021

[8] G. Baggio, F. Ticozzi, P.D. Johnson, L. Viola Dissipative encoding of quantum information *Quantum Information and Computation*, Vol. 21, No. 9-10, 0737-0770, 2021

[9] S. Karuvade, P.D. Johnson, F. Ticozzi, L. Viola. Uniquely determined pure quantum states need not be unique ground states of quasi-local Hamiltonians *Physical Review A*, 99,062104, 2019.

[10] S. Apers, A. Sarlette, F. Ticozzi. Simulation of Quantum Walks and Fast Mixing with Classical Processes, *Physical Review A*, 98,032155, 2018.

[11] S. Karuvade, P.D. Johnson, F. Ticozzi, L. Viola. Generic pure quantum states as steady states of quasi-local dissipative dynamics. *Journal of Physics A: Mathematical and Theoretical* 51:145304, 2018.

[12] F. Ticozzi, L. Zuccato, P. D. Johnson, L. Viola. Alternating Projections Methods for Discrete-time Stabilization of Quantum States. *IEEE Transactions on Automatic Control*,63(3):819–826, 2018.

[13] P. Ugo Abara, F. Ticozzi, C. Altafini. Spectral conditions for existence, uniqueness and stability of positive equilibria for a class of nonlinear cooperative systems. *IEEE Transactions on Automatic Control*, 63(2):402-417, 2018.

[14] P. D. Johnson, F. Ticozzi, L. Viola. Exact stabilization of entangled states in finite time by dissipative quantum circuits. *Physical Review A*, 96: 012308, 2017.

[15] F. Ticozzi, L. Viola. Quantum and classical resources for unitary design of open-system evolutions. Quantum Science and Technology, 2(3):034001, 2017.

[16] T. Benoist, C. Pellegrini, F. Ticozzi. Exponential Stability of Subspaces for Quantum Stochastic Master Equations. *Annales Henri Poincaré*, 18:2045, 2017.

[17] F. Ticozzi. Symmetrizing quantum dynamics beyond gossip-type algorithms *Automatica*, 74:38-46, 2016.

[18] P.D. Johnson, F. Ticozzi, L. Viola. General fixed points of quasi-local frustration-free quantum semigroups: from invariance to stabilization *Quantum Information and Computation*, 16(7&8): 0657–0699, 2016.

[19] M. Schiavon, P. Vallone, F. Ticozzi, P. Villoresi. Heralded single photon sources for QKD applications. *Physical Review A*, 93:012331, 2016.

[20] P. Scaramuzza, F. Ticozzi. Switching Quantum Dynamics for Fast Stabilization. *Physical Review A*, 91: 062314, 2015.

[21] L. Mazzarella, A. Sarlette, F. Ticozzi. Extending Robustness and Randomization from Consensus to Symmetrization Algorithms. *SIAM Journal of Control and Optimization,* 53(4): 2076–2099, 2015.

[22] G. I. Cirillo, F. Ticozzi. Decompositions of Hilbert Spaces, Stability Analysis and Convergence Probabilities for Discrete-Time Quantum Dynamical Semigroups. *Journal of Physics A: Mathematical and Theoretical*, 48(8):085302, 2015.

[23] L. Mazzarella, A. Sarlette, F. Ticozzi. Consensus for Quantum Networks: Symmetry from Gossip Interactions. *IEEE Transactions on Automatic Control*, 60(1): 158 - 172, 2015.

[24] F. Ticozzi, L. Viola. Quantum resources for purification and cooling: fundamental limits and opportunities. *Scientific Reports* (Nature Publishing Group), 4: 5192, 2014

[25] C. Sparaciari, S. Olivares, F. Ticozzi, M. G. A. Paris. Exact and approximate solutions for the quantum minimum-Kullback-entropy estimation problem. *Physical Review A* 89: 042124 (2014).

[26] M. Zorzi, F. Ticozzi and A. Ferrante. Minimum Relative Entropy for Quantum Estimation: Feasibility and General Solution. *IEEE Transactions on Information Theory,* 60 (1): 357–367, 2014.

[27] M. Zorzi, F. Ticozzi and A. Ferrante. On quantum channel estimation with minimal resources. *Quantum Information Processing,* 13 (3): 683–707, 2014.

[28] F. Ticozzi and L. Viola. Steady-state entanglement by engineered quasi-local Markovian dissipation. *Quantum Information and Computation*, 14(3-4): 0265-0294, 2014.

[29] L. Mazzarella, F. Ticozzi, A. V. Sergienko, G. Vallone, P. Villoresi. Asymmetric architecture for heralded single photon sources. *Physical Review A*, 88(2): 023848, 2013.

[30] F. Ticozzi, K. Nishio and C. Altafini. Stabilization of Stochastic Quantum Dynamics via Open and Closed Loop Control. *IEEE Transactions on Automatic Control* 58(1), 74–85, 2013.

[31] F. Ticozzi and L. Viola. Stabilizing entangled states with quasi-local quantum dynamical semigroups. *Philosophical Transaction of the Royal Society A*, 370(1978): 5259-5269, 2012.

[32] C. Altafini and F. Ticozzi. Modeling and Control of Quantum Systems: An Introduction. *IEEE Transactions on Automatic Control*, 57(8):1898–1917, 2012.

[33] F. Ticozzi, R. Lucchese, P. Cappellaro, and L. Viola. Hamiltonian Control of Quantum Dynamical Semigroups: Stabilization and Convergence Speed. *IEEE Transactions on Automatic Control*, 57(8):1931–1944, 2012.

[34] F. Albertini and F. Ticozzi. Discrete-Time Controllability for Feedback Quantum Dynamics. *Automatica* 47 (2011): 2451–2456, 2011.

[35] A. Ferrante, F. Ramponi and F. Ticozzi. On the convergence of an efficient algorithm for Kullback-Leibler approximation of spectral densities. *IEEE Transactions on Automatic Control*, 56(3):506-515, 2011.

[36] F. Ticozzi, S. G. Schirmer and X. Wang. Stabilizing Quantum States by Constructive Design of Open Quantum Dynamics. *IEEE Transactions on Automatic Control*, 55(12):2901-2905, 2010.

[37] S. Bolognani and F. Ticozzi. Engineering Stable Discrete-Time Quantum Dynamics via a Canonical QR Decomposition. *IEEE Transactions on Automatic Control*, 55(12):2721-2734, 2010.

[38] F. Ticozzi and M. Pavon. On Time-reversal and space-time harmonic processes for Markovian quantum channels. *Quantum Information Processing*, 9(5):551-574, 2010.

[39] M. Pavon and F. Ticozzi. Maximum entropy on path space for classical and quantum Markov processes. *Journal of Mathematical Physics*, 51:042104, 2010.

[40] F. Ticozzi and L. Viola Quantum information encooding, protection and correction via trace-norm isometries. *Physical Review A*, 81(3):032313, 2010. Selected for the March 2010 issue of the *Virtual Journal of Quantum Information*.

[41] F. Ticozzi and L. Viola Analysis and synthesis of attractive quantum Markovian dynamics. *Automatica*, 45:2002–2009, 2009.

[42] F. Ticozzi and L. Viola. Quantum Markovian Subsystems: Invariance, Attractivity and Control. *IEEE Transactions on Automatic Control*, 53(9):2048-2063, 2008.

[43] F. Ticozzi and A. Ferrante. Dynamical Decoupling in Quantum Control: A System Theoretic Approach. *Systems and Control Letters*, 55:578–584, 2006.

[44] M. Pavon and F. Ticozzi. On entropy production for controlled Markovian evolution. *Journal of Mathematical Physics*, 47:063301, 2006.

[45] F. Ticozzi and L. Viola. Single-bit feedback and quantum dynamical decoupling. *Physical Review A* 74, 052328, 2006. Selected for the December 2006 issue of the *Virtual Journal of Quantum Information*.

[46] F. Ticozzi. Optimal commuting approximation of Hermitian operators. *Linear Algebra and its Applications*, 400C:319–325, 2005.

[47] F. Ticozzi, A. Ferrante, and M. Pavon. Robust steering of n-level quantum systems. *IEEE Transactions on Automatic Control*, 49(10):1742–5, 2004.

Conference Papers:

[48] M. Peruzzo, G. Baggio, F. Ticozzi. Exploring the Impact of Memory on Network Controllability. invited paper, ECC, 2023

[49] W. Liang, K. Ohki, F. Ticozzi. On the Robustness of Stability for Quantum Stochastic Systems 2023 IEEE 62st Conference on Decision and Control (CDC), *to appear*.

[50] T. Grigoletto, F. Ticozzi. Minimal resources for exact simulation of quantum walks 2022 IEEE 61st Conference on Decision and Control (CDC), 5155-5160

[51] F. Ticozzi, G.Baggio and L. Viola. Quantum Information Encoding from Stabilizing Dynamics 2019 IEEE 58th Conference on Decision and Control (CDC), 413-418, 2019

[52] F. Ticozzi, S. Karuvade, L. Viola. The Whole from the Parts: Markovian Stabilizing Dynamics and Ground-State Cooling under Locality Constraints 2019 IEEE 58th Conference on Decision and Control (CDC), 2310-2315, 2019

[53] S. Apers, A. Sarlette and F. Ticozzi. When does memory speed up mixing?. IEEE Conference on Decision and Control proceedings, 4940–4945, 2017.

[54] F. Ticozzi, P. D. Johnson, L. Viola. Distributed finite-time stabilization of entangled quantum states on tree-like hypergraphs. IEEE Conference on Decision and Control proceedings, 5517–5522, 2017.

[55] S. Apers, F. Ticozzi, A. Sarlette. Bounding the convergence time of local probabilistic evolution *International Conference on Geometric Science of Information*, 754-762, 2017.

[56] P. Ugo Abara, F. Ticozzi, C. Altafini. An infinitesimal characterization of nonlinear contracting interference functions IEEE Conference on Decision and Control proceedings, 5257–5262, 2016.

[57] P. Scaramuzza, F. Ticozzi. Switching quantum dynamics for fast preparation of pure states. 54th IEEE Conference on Decision and Control proceedings, 6434–6440, 2015.

[58] P. Ugo Abara, F. Ticozzi, C. Altafini. Existence and stability properties of positive equilibria for a class of nonlinear cooperative systems IEEE Conference on Decision and Control proceedings, 4406–4411, 2015.

[59] F. Ticozzi, L. Mazzarella, A. Sarlette, Symmetrization for Quantum Networks: a Continuous-Time Approach. *Proceedings of the Sixteenth International Symposium on Mathematical Theory of Network and Systems*, 2014.

[60] L. Mazzarella, A. Sarlette, F. Ticozzi. A New Perspective on Gossip Iterations: from Symmetrization to Quantum Consensus. 52st IEEE Conference on Decision and Control proceedings, 250-255, 2013.

[61] M. Zorzi, F. Ticozzi, A. Ferrante. Minimal Resources for the Estimation of Trace-Preserving Quantum Channels. 51st IEEE Conference on Decision and Control proceedings, 1674–1679, 2012.

[62] F. Ticozzi, K. Nishio and C. Altafini. Environment-Assisted and Feedback-Assisted Stabilization of Quantum Stochastic Evolutions. 51st IEEE Conference on Decision and Control proceedings, 3620–3625, 2012.

[63] G. Baggio, F. Ticozzi and L. Viola. Quantum State Preparation by Controlled Dissipation in Finite Time: From Classical to Quantum Controllers. 51st IEEE Conference on Decision and Control proceedings, 1072–1077, 2012.

[64] F. Ticozzi and L. Viola, On the Role of Hamiltonians for Dissipative Entanglement Engineering. fourth IFAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control proceedings, Volume 4, Part 1, 220–225, 2012.

[65] R. Corvaja, I. Capraro, A. Dall'Arche, N. Dalla Pozza, F. Gerlin, A. Tomaello, M. Zorzi, A. Assalini, A. Ferrante, G. Pierobon, F. Ticozzi, G. Vallone, P. Villoresi. Engineering a Long Distance Free-Space Quantum Channel. Invited paper at *Isabel 2011* conference, Barcelona, Spain, 2011.

[66] R. Lucchese and F. Ticozzi. Computing and controlling the convergence speed of a quantum dynamical semigroup, *IEEE CDC 2010 conference proceedings*, 3022-3027, December 2010.

[67] M. Pavon and F. Ticozzi. Schrödinger Bridges for Discrete-Time, Classical and Quantum Markovian Evolutions. *Proceedings of the Sixteenth International Symposium on Mathematical Theory of Network and Systems*, July, 2010.

[68] S. Bolognani and F. Ticozzi. On a Canonical QR Decomposition and Feedback Control of Discrete-Time Quantum Dynamics. *Proceedings of the Sixteenth International Symposium on Mathematical Theory of Network and Systems*, July, 2010.

[69] S. Bolognani and F. Ticozzi. Pure state stabilization with discrete-time quantum feedback 2010. Invited paper, *Proceedings of the 4th International Symposium on Communications, Control and Signal Processing* (ISCCSP2010).

[70] F. Ticozzi and M. Pavon. Time-reversal and strong H-theorem for quantum discrete-time Markov channels. September 2009. *From Physics to Control through an Emergent View* (selected papers from the PhysCon09 conference proceedings), Eds. L. Fortuna, A. Fradkov and M. Frasca, World Scientific Series on Nonlinear Science, Series B - Vol. 15. IPACS on-line library: `http://lib.physcon.ru/?item=1918`

[71] M. Pavon and F. Ticozzi. Schrödinger bridges for classical and quantum discrete-time Markovian evolutions. September 2009. PhysCon09 conference. IPACS on-line library: `http://lib.physcon.ru/?item=1917`

[72] L. Viola and F. Ticozzi. Attractive quantum subsystem and feedback-stabilization problems. September 2007. PhysCon07 conference. IPACS on-line library: `http://lib.physcon.ru/?item=1317`

[73] F. Ticozzi and A. Ferrante. Finding quantum noiseless subsystems: A linear-algebraic approach. September 2007. PhysCon07 conference. IPACS on-line library: `http://lib.physcon.ru/?item=1377`

[74] M. Pavon and F. Ticozzi. Controlling the density evolution of classical, thermodynamic and quantum systems. December 2005. *IEEE CDC-ECC '05 conference proceedings*, CD-ROM, Paper N. 1800.

[75] M. Pavon and F. Ticozzi. Controlling the relative entropy evolution of classical, thermodynamic and quantum systems. August 2005. *PHYSCON 2005 conference proceedings*, CD-ROM, Paper N. 1.

[76] F. Ticozzi and A. Ferrante. Linear algebraic techniques for quantum dynamical decoupling. December 2005. *IEEE CDC-ECC '05 conference proceedings*, CD-ROM, Paper N. 1806.

[77] F. Ticozzi, A. Ferrante, and M. Pavon. Stability and robustness in coherent quantum control. *Proceedings of the Sixteenth International Symposium on Mathematical Theory of Network and Systems*, July, 2004.

PhD Thesis:

[78] F. Ticozzi. *Robustness Issues in Quantum Control: A System-Theoretic Approach.* Dottorato in "Automatica e Ricerca Operativa", XIX Ciclo. Dipartimento di Ingegneria dell'Informazione, Università di Padova December, 2006.

Posters:

[79] F. Ticozzi, L. Viola. Quantum Dynamical Semigroups for Entangled Pure State Preparation. *Gordon Research Conference 2013* on "Quantum Control of Light and Matter", Mount Holyoke College, August 2013.

[80] N. Dalla Pozza, N. Laurenti, F. Ticozzi. Optimal Binary Codes and Measurements for Classical Communication over Qubit Channels. International Conference on Ultrafast Structural Dynamics Berlin, Germany. March 19-21, 2012.

[81] F. Ticozzi, R. Lucchese, P. Cappellaro and L. Viola. Computing and controlling the convergence speed of controlled Markovian dynamics, *Quantum Science and Technologies* workshop, Rovereto, May 2011. December 2010.

[82] F. Ticozzi, L. Viola. Engineering Quantum Information in Markovian Dynamical Systems. *Gordon Research Conference 2009* on "Quantum Control of Light and Matter", Mount Holyoke College, August 2009.

[83] F. Ticozzi, L. Viola. Engineering Quantum Information in Markovian Dynamical Systems. *IQIS '08 Poster Session*, Università di Camerino, October 2008.

[84] F. Ticozzi, L. Viola. Information, Feedback and Quantum Dynamical Decoupling. *PRACQSYS '06 Poster Session*, Harvard University, August 2006.

[85] F. Ticozzi, A. Ferrante, and M. Pavon. Robustness in coherent quantum control. *CIRA Poster Session*, Cagliari, 2004.

Under Review and Preprint:

[86] M.Cortese, T.Grigoletto, A. Ferrante, F.Ticozzi Robust positive model reduction via monotone matrices. Under review, 2024.

[87] W. Liang, K. Ohki, F. Ticozzi. Exploring the Robustness of stabilizing controls for stochastic quantum evolutions. preprint arXiv:2311.04428, 2023

[88] T. Grigoletto, F. Ticozzi Model Reduction for Quantum Systems: Quantum Walks and Open Markov Dynamics. preprint arxiv.org:2307.06319, 2023

[89] W. Liang, T. Grigoletto, F. Ticozzi Switching stabilization of quantum stochastic master equations. preprint arXiv:2209.11709 2022

[90] N. Dalla Pozza, N. Laurenti, F. Ticozzi. Optimal Binary Codes and Measurements for Classical Communication over Qubit Channels. arxiv:1304.0014, 2013.

[91] C. Altafini, F. Ticozzi. Almost Global Stochastic Feedback Stabilization of Conditional Quantum Dynamics. arXiv:quant-ph/0510222, 2005.