Francisco Revson Fernandes Pereira

Contact Information	Postdoctoral Room Sezione di Fisica Universita' di Camerino via Madonna delle Carceri 9B Postal Code: 62032 Camerino (MC), Italy
Personal	Citizenship Brazilian.
Research Interests	Block, Convolutional, Algebraic Geometry, and Quantum Codes Information Measuring, and Information Processing in Quantum Systems Decoding Algorithms, and Code-Based Cryptography

Research Positions

03/2020–03/2021	**Postdoctoral Researcher** in Physics	
	Project title: QUARTET	Supervisor: Stefano Mancini
	Department of Physics	*University of Camerino*, Italy

Education

Ph.D. Visitor Student Internship, Mathematics and Computing Science
Eindhoven University of Technology, The Netherlands   September 2018 - August 2019
Supervisor: Ruud Pellikaan
Research Areas: Quantum Error Correcting Codes, Algebraic Geometry Codes, Cyclic Codes

Doctor in Science, Electrical Engineering
Federal University of Campina Grande, Brazil   March 2016 - November 2020
Thesis: Algebraic Geometry Codes and their Applications in Quantum Coding Theory (In Portuguese)
Supervisors: Giuliano Gadioli La Guardia and Francisco Marcos de Assis
Summary: We investigate the use of algebraic geometry and cyclic codes in the construction of stabilizer codes, entanglement-assisted quantum error correcting codes, and classical and quantum convolutional codes. Both finite-length and asymptotic analysis are made.
Research Areas: Classical and Quantum Error Correcting Codes, Algebraic Geometry Codes, Convolutional Codes

Master in Engineering, Electrical Engineering
Federal University of Campina Grande, Brazil   August 2014 - February 2016
Thesis: Quantum Key Distribution via Shannon-Kotel'nikov Maps (In Portuguese)
Supervisor: Francisco Marcos de Assis
Summary: Quantum key distribution (QKD) schemes are a standard quantum-based method to exchange secret keys. A new QKD protocol using nonlinear modulation is proposed and analyzed. The theory of Shannon-Kotelnikov maps and bosonic channels are merged to synthesize such protocol.

Bachelor in Engineering, Electrical Engineering
Federal University of Campina Grande, Brazil   February 2009 - August 2014
Thesis: Classical Capacity of Noiseless Bosonic Channel (In Portuguese)
Supervisor: Francisco Marcos de Assis
Summary: In the quantum mechanical paradigm, optical channels belong to a larger family of quantum channels which are called bosonic channel. Considering noiseless bosonic channels, we computed the capacity of such channels and showed how to use classical PAM to achieve it.

Term Visiting Positions

09/2018–08/2019	Supervisor: Ruud Pellikaan	Department of Mathematics and Computing Science, *Eindhoven University of Technology*, The Netherlands
06/2019	Supervisor: Diego Ruano	Department of Algebra, Analysis, Geometry and Topology, *University of Valladolid*, Spain

Peer-reviewed Articles	1. Francisco Revson F. Pereira, Giuliano G. La Guardia, Francisco M. de Assis. "Classical and Quantum Convolutional Codes Derived from Algebraic Geometry Codes," *IEEE Transactions on Communications*, vol. 67, no. 1, pages 73–82, January 2019
	2. Giuliano G. La Guardia, Francisco Revson F. Pereira, "Good and asymptotically good quantum codes derived from algebraic geometry codes," *Quantum Information Processing*, vol. 16, no. 6, article no. 165, June 2017. arXiv:1612.07150
Preprints	3. Francisco Revson F. Pereira, Stefano Mancini, "Error Probability Mitigation in Quantum Reading using Reed-Solomon Codes." January 2021 (Submitted to 2021 ISIT)
	4. Francisco Revson F. Pereira, Stefano Mancini, "Polar Codes for Quantum Reading." arXiv:2012.07198, December 2020 (Submitted to IEEE Trans. on Information Theory)
	5. Francisco Revson F. Pereira, "Quantum Cyclic Entanglement-Assisted Codes." arXiv:1911.06384, November 2019
	6. Francisco Revson F. Pereira, Ruud Pellikaan, Giuliano G. La Guardia, Francisco M. de Assis, "Entanglement-assisted Quantum Codes from Algebraic Geometry Codes." arXiv:1907.06357, July 2019 (Submitted to IEEE Trans. on Information Theory)
Conference Articles	1. Francisco Revson F. Pereira, Ruud Pellikaan, Giuliano G. La Guardia, Francisco M. de Assis, "Application of Complementary Dual AG Codes to Entanglement-Assisted Quantum Codes," Proceedings of the *IEEE International Symposium on Information Theory*, Paris, France, 2019
	2. Francisco Revson F. Pereira, "Quantum BCH and Reed-Solomon Entanglement-Assisted Codes," Proceedings of the *40th WIC Symposium on Information Theory in the Benelux*, Gent, Belgium, 2019
	3. Francisco Revson F. Pereira, Ruud Pellikaan, Giuliano G. La Guardia, Francisco M. de Assis, "Entanglement-assisted Quantum Codes from Algebraic Geometry Codes," Proceedings of the *WCC 2019: The Eleventh International Workshop on Coding and Cryptography*, Saint-Jacut- de-la-Mer, France, 2019
	4. Francisco Revson F. Pereira, Giuliano G. La Guardia, "Códigos Convolucionais Quânticos Derivados de Códigos Algébrico-Geométricos," Proceedings of the *XXXVI Simpósio Brasileiro de Telecomunicações e Processamento de Sinais*, Campina Grande, Brazil, 2018
	5. Francisco Revson F. Pereira, Giuliano G. La Guardia, "Novos Códigos Convolucionais Derivados de Códigos Algébrico-Geométricos," Proceedings of the *XXXV Simpósio Brasileiro de Telecomunicações e Processamento de Sinais*, São Pedro, Brazil, 2017
	6. Bárbara Carnauba, Danieverton Moretti, Francisco Revson F. Pereira, "Modified Mach-Zehnder interferometer and quantum interference between a coherent state and single-photon entangled states," Proceeding of the *XXXIV NNE Brazilian Physics Meeting*, Natal, Brazil, 2016
	7. Francisco Revson F. Pereira, Elloá B. Guedes, Francisco M. de Assis, "Protocolo para Autenticação Quântica de Mensagens Clássicas Utilizando Variáveis Contínuas," Proceedings of the *XXXIII Simpósio Brasileiro de Telecomunicações*, Juiz de Fora, Brazil, 2015
	8. Francisco Revson F. Pereira, Edmar J. do Nascimento, Francisco M. de Assis, "Distribuição Quântica de Chave Utilizando Modulação Não Linear," Proceedings of the *XXXIII Simpósio Brasileiro de Telecomunicações*, Juiz de Fora, Brazil, 2015
	9. Francisco Revson F. Pereira, Francisco M. de Assis, "Modulação Não-Linear de Estados Coerentes," Proceedings of the *IV Workshop-School in Quantum Computation and Information*, Campina Grande, Brazil, 2015
	10. Francisco Revson F. Pereira, Elloá B. Guedes, Francisco M. de Assis, "Simulating the Quantum Fourier Transform," Proceedings of the *II WEIT*, Rio Grande, Brazil, 2013
	11. Francisco Revson F. Pereira, Danieverton Moretti, Elloá B. Guedes, "Quantum Memories via Electromagnetically Induced Transparency in Three-Level Systems," Proceedings of the *IV Workshop-School in Quantum Computation and Information*, Fortaleza, Brazil, 2012
	12. Francisco Revson F. Pereira, Danieverton Moretti, "A brief review about EIT," Proceeding of the *XXX NNE Brazilian Physics Meeting*, Salvador, Brazil, 2012

Recent Conference Talks

1. (Invited Talk) *Entanglement-Assisted Quantum AG Codes*. International Congress on Industrial and Applied Mathematics. Valencia, Spain, 2019

2. *Application of Complementary Dual AG Codes to Entanglement-Assisted Quantum Codes*. IEEE International Symposium on Information Theory. Paris, France, 2019

3. *Quantum BCH and Reed-Solomon Entanglement-Assisted Codes*. 40th WIC Symposium on Information Theory in the Benelux. Gent, Belgium, 2019

4. *Entanglement-assisted Quantum Codes from Algebraic Geometry Codes*. WCC 2019, Saint-Jacut-de-la-Mer, France, 2019

5. *Quantum BCH and Reed-Solomon Entanglement-Assisted Codes*. Codes, Cryptology and Curves – Celebrating the influence of Ruud Pellikaan. Eindhoven, The Netherlands, 2019

6. *Entanglement-assisted Quantum Error Correcting Codes from Algebraic Geometry Codes*. DIAMANT Symposium, Veenendaal, The Netherlands, 2018

7. *New Convolutional Codes Derived from Algebraic Geometry Codes*. XXXV Simpósio Brasileiro de Telecomunicações e Processamento de Sinais, São Pedro, Brazil, 2017

Other Talks

- *Algebraic-Geometric Codes: Introduction, Properties, and Applications*. ICT Lab, Eindhoven University of Technology, The Netherlands, 2019

- *Quantum Error-Correcting Codes: From Basics to Research Trends*. Ei/PSI Seminar, Eindhoven University of Technology, The Netherlands, 2018

Event Participation

- *Executive School on Post-Quantum Cryptography 2019*, Eindhoven, The Netherlands, 2019
- *International Congress on Industrial and Applied Mathematics*, Valencia, Spain, 2019
- *2019 IEEE International Symposium on Information Theory*, Paris, France, 2019
- *40th WIC Symposium on Information Theory in the Benelux*, Gent, Belgium, 2019
- *DIAMANT Symposium Spring*, Veenendaal, The Netherlands, 2019
- *Dutch Mathematical Congress*, Veenendaal, The Netherlands, 2019
- *The Eleventh International Workshop on Coding and Cryptography (WCC)*, Saint-Jacut-de-la-Mer, France, 2019
- *Codes, Cryptology and Curves – Celebrating the influence of Ruud Pellikaan*, Eindhoven, The Netherlands, 2019
- *WIC MidWinter Meeting*, Eindhoven, The Netherlands, 2019
- *DIAMANT Symposium Fall*, Veenendaal, The Netherlands, 2018
- *Crypto Working Group*, Utrecht, The Netherlands, 2018
- *Latin American Week on Coding and Information – LAWCI*, Campinas, Brazil, 2018
- *XXXV Simpósio Brasileiro de Telecomunicações e Processamento de Sinais*, São Pedro, Brazil, 2017
- *V Workshop-School in Quantum Computation and Information*, Campina Grande, Brazil 2015
- *IV Workshop-School in Quantum Computation and Information*, Fortaleza, Brazil, 2012

Teaching Experience

Spring	2019	Teaching Assistant, *Algebra and Discrete Mathematics*, Eindhoven University of Technology, The Netherlands
First semester	2016	Teaching Assistant, *Stochastic Process*, Federal University of Campina Grande, Brazil
Full year	2010	Teaching Assistant, *Linear Algebra*, Federal University of Campina Grande, Brazil

Honors and Awards	06/2019	Scholarship for Diamant Ph.D. Travel Grants at *University of Valladolid*, Spain, provided by the Dutch Diamant cluster
	09/2018–08/2019	Scholarship for Visitor Ph.D. Student at Eindhoven University of Technology, The Netherlands, provided by the Brazilian government through CNPq
	2014	*Student Awards of Academic Excellence* given by the Institute for Advanced Studies in Communications (IECOM) and Datashop, Federal University of Campina Grande
	08/2010–07/2013	Scholarship for undergraduate research provided by the Brazilian government through CNPq

Services

Journal Reviewer: *IEEE Transaction on Information Theory*, *IEEE Transaction on Communications*, *Quantum Information Processing*, *Quantum Information & Computation*, *International Journal of Quantum Information*

Event Organizer: V Workshop-School in Quantum Computation and Information, 2015. Federal University of Campina Grande, Para´ıba, Brazil

Graduate Coursework

- ❑ Information Theory
- ❑ Error Correcting Codes
- ❑ Algebra and Discrete Mathematics
- ❑ Quantum Mechanics
- ❑ Quantum Information Theory
- ❑ Digital Communication Theory
- ❑ Network Coding
- ❑ Stochastic Process

Relevant Skills

Languages: English (fluent), Portuguese (mother tongue)

Computer Skills: C, C++, MATLAB, Python, Magma, SageMath, and LaTeX