Francesco Mattiotti

Curriculum vitae et studiorum

Education

2016 **Master's degree in Physics**, *cum laude*, February 16th, 2016, at Facoltà di Scienze Matematiche, Fisiche e Naturali - Università Cattolica del Sacro Cuore (Brescia, Italy).

With a thesis on the interplay of cooperativity and noise, from light-harvesting complexes to quantum transport. Advisor: Giuseppe Luca Celardo. Co-advisor: Fausto Borgonovi.

2013 **Bachelor's degree in Physics**, *cum laude*, December 16th, 2013, at Facoltà di Scienze Matematiche, Fisiche e Naturali - Università Cattolica del Sacro Cuore (Brescia, Italy).

With a thesis on the non-Hermitian Hamiltonian approach to quantum transport. Advisor: Giuseppe Luca Celardo. Co-advisor: Giulio Giuseppe Giusteri.

2010 **High school diploma**, *(classical studies)*, at Liceo "G. Bagatta", Desenzano del Garda (Brescia, Italy).

Employments

2017-now **PhD Student with scholarship**, *International PhD in Science*, on a joint research project between Università Cattolica del Sacro Cuore and University of Notre Dame du Lac.

The research project is about Cooperative Effects in quantum systems, supervised by Prof. Fausto Borgonovi, Prof. Giuseppe Luca Celardo and Prof. Boldizsár Jankó.

2017 **Teaching Assistant**, *Quantum Mechanics*, 20 hours of exercises at Università Cattolica del Sacro Cuore (Brescia, Italy).

2016 **Research Assistant**, at Facoltà di Scienze Matematiche, Fisiche e Naturali - Università Cattolica del Sacro Cuore (Brescia, Italy).

On a project about quantum transport in nanostructured systems with applications to biosystems, coordinated by Prof. Fausto Borgonovi. The project is financed by Fondazione EULO.

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Attended Scientific Workshops, Schools and Courses

November 4th - 8th, 2019 — **Workshop**, Non-Hermitian Quantum Systems, at Centro Internacional de Ciencias (Cuernavaca, Morelos, Mexico).

October 27th - 31st, 2019 — **Workshop**, Quantum Effects in Biological Systems (QuEBS), at Benemérita Universitád Autónoma de Puebla (Puebla, Mexico).

October 22nd - 26th, 2018 — **Workshop**, Quantum Biology, at Centro Internacional de Ciencias (Cuernavaca, Morelos, Mexico).

June 4th - 22nd, 2018 — **Workshop**, Chaos, quantum chaos and more, at Centro Internacional de Ciencias (Cuernavaca, Morelos, Mexico).

February 13th, 2018 — **PhD Course**, Materials and technologies for high-efficiency solar cells: from standards to nanostructures. Course held by By Prof. Antonio Terrasi (from Università degli Studi di Catania, Catania, Italy) at Facoltà di Scienze Matematiche, Fisiche e Naturali - Università Cattolica del Sacro Cuore (Brescia, Italy).

February 5th - 8th, 2018 — **PhD Course**, Methods of numerical resolution of ODE systems: theory, implementation and applications. Course held by Prof. Adolfo Avella (from Università degli Studi di Salerno, Salerno, Italy) at Facoltà di Scienze Matematiche, Fisiche e Naturali - Università Cattolica del Sacro Cuore (Brescia, Italy).

January 11th - 12th, 2018 — **PhD Course**, Understanding materials by molecular dynamics simulations. Course held by Claudia Caddeo, PhD (from IOM-CNR, Cagliari, Italy) at Facoltà di Scienze Matematiche, Fisiche e Naturali - Università Cattolica del Sacro Cuore (Brescia, Italy).

September 18th - October 7th, 2017 — **Workshop**, Transport at the Nanoscale: Molecules, Graphene and more, at Centro Internacional de Ciencias (Cuernavaca, Morelos, Mexico).

August 7th - October 30th, 2017 — **PhD Course**, Introduction to Classical and Quantum Chaos. Course held by Prof. Felix M. Izrailev at Instituto de Física, Benemérita Universitád Autónoma de Puebla (Puebla, Mexico).

June 28th - 30th, 2017 — **Workshop**, XXII National Conference on Statistical Physics and Complex Systems at Università degli Studi di Parma (Parma, Italy).

June 8th - 22nd, 2017 — **PhD Course**, Wave processes in random media: physical principles, mathematical methods, and applications. Course held by Prof. Valentin Freilikher (from Bar-Ilan University Ramat-Gan, Israel) at Facoltà di Scienze Matematiche, Fisiche e Naturali - Università Cattolica del Sacro Cuore (Brescia, Italy).

June 27th - July 1st, 2016 — **Workshop**, IWDS10 - International Workshop on Disordered Systems, at Facoltà di Scienze Matematiche, Fisiche e Naturali - Università Cattolica del Sacro Cuore (Brescia, Italy).

June 20th - 24th, 2016 — **School**, 2nd School on Scientific Data Analytics and Visualization, at CINECA (Bologna, Italy).

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Scientific communications

November 7th, 2019 — **Talk**, titled "Interplay of cooperativity and functionality: from light-harvesting nanotubes to efficient photon-sensors" at the conference "Non-Hermitian Quantum Systems", at Centro Internacional de Ciencias (Cuernavaca, Morelos, Mexico).

October 29th, 2019 — **Poster**, titled "Efficient photo-detection and light harvesting via engineered cooperative effects" at the conference "Quantum Effects in Biological Systems (QuEBS)", at Benemérita Universitád Autónoma de Puebla (Puebla, Mexico).

October 29th, 2019 — **Talk**, titled "Macroscopic coherence as an emergent property in molecular nanotubes" at the conference "Quantum Effects in Biological Systems (QuEBS)", at Benemérita Universitád Autónoma de Puebla (Puebla, Mexico).

October 23rd, 2018 — **Talk**, titled "Non-Hermitian Hamiltonian approach to quantum transport in disordered networks with sinks: Validity and effectiveness" at the conference "Quantum Biology", at Centro Internacional de Ciencias (Cuernavaca, Morelos, Mexico).

June 12th, 2018 — **Poster**, titled "Temperature of a single chaotic eigenstate" at the conference "Chaos, quantum chaos and more", at Centro Internacional de Ciencias (Cuernavaca, Morelos, Mexico).

March 27th, 2018 — **Talk**, titled "Superabsorption of light: from Dicke to quantum engineering" at Facoltà di Scienze Matematiche, Fisiche e Naturali - Università Cattolica del Sacro Cuore (Brescia, Italy).

December 12th, 2017 — **Talk**, titled "Cooperative effects in light-harvesting systems" at Facoltà di Scienze Matematiche, Fisiche e Naturali - Università Cattolica del Sacro Cuore (Brescia, Italy).

September 27th, 2017 — **Poster**, titled "Cooperativity and scalability of light-harvesting devices by separating absorption from transmission" at the conference "Transport at the Nanoscale: Molecules, Graphene and more", at Centro Internacional de Ciencias (Cuernavaca, Morelos, Mexico).

September 21th, 2017 — **Talk**, titled "Cooperativity and scalability of light-harvesting devices by separating absorption from transmission" at the conference "Transport at the Nanoscale: Molecules, Graphene and more", at Centro Internacional de Ciencias (Cuernavaca, Morelos, Mexico).

September 12th, 2017 — **Talk**, titled "Cooperativity and scalability of light-harvesting devices by separating absorption from transmission" at Instituto de Física, Benemérita Universitád Autónoma de Puebla (Puebla, Mexico).

June 29th, 2017 — **Poster**, titled "Decoupling absorption from transmission in light-harvesting devices" at the conference "XXII National Conference on Statistical Physics and Complex Systems", at Università degli Studi di Parma (Parma, Italy).

Language skills

Italian — native speaker.

English — professional working proficiency; *IELTS - Academic score: 7.0/9 (CEFR level: C1).*

Spanish — basic proficiency.

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Computer skills

Operating systems	Good knowledge of GNU/Linux and Microsoft Windows environments.
Programming	I currently use FORTRAN77 (good knowledge) and Python (basic knowledge) for scientific computing.
Other applications	I use Grace and Gnuplot for data visualization, LaTeX for scientific typing.

Publications and preprints

[5] Nahum C. Chávez, Francesco Mattiotti, J. A. Méndez-Bermúdez, Fausto Borgonovi, and G. Luca Celardo. Real and imaginary energy gaps: a comparison between single excitation superradiance and superconductivity and robustness to disorder. *The European Physical Journal B*, 92(7):144, Jul 2019.

[4] Marco Gullì, Alessia Valzelli, Francesco Mattiotti, Mattia Angeli, Fausto Borgonovi, and Giuseppe Luca Celardo. Macroscopic coherence as an emergent property in molecular nanotubes. *New Journal of Physics*, 21(1):013019, 2019.

[3] Fausto Borgonovi, Francesco Mattiotti, and Felix M. Izrailev. Temperature of a single chaotic eigenstate. *Phys. Rev. E*, 95:042135, Apr 2017.

[2] Giulio G. Giusteri, Francesco Mattiotti, and G. Luca Celardo. Non-hermitian hamiltonian approach to quantum transport in disordered networks with sinks: Validity and effectiveness. *Phys. Rev. B*, 91:094301, Mar 2015.

[1] G. L. Celardo, A. Biella, G. G. Giusteri, F. Mattiotti, Y. Zhang, and L. Kaplan. Superradiance, disorder, and the non-hermitian hamiltonian in open quantum systems. *AIP Conference Proceedings*, 1619(1):64–72, 2014.

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