Francesco Esposito, Ph.D.

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Employment History

Feb. 1st 2022 – ····	🔖 **Research fellow** in Mathematical Analysis, University of Basilicata, (Potenza, Italy).
Oct. 1st 2021 – Jan. 31st 2022	🔖 **Lecturer.** University of Basilicata, (Potenza and Matera, Italy).
Sept. $1^{st} - 30^{th}$ 2021	🔖 **High School teacher**, IISS "G. Salvemini" Alessano (LE) (Italy).

Education

July 19th 2021	🔖 **Ph.D. in Mathematics and Informatics** (with honors), Joint doctoral school of University of Salento (Lecce, Italy) and University of Basilicata (Potenza, Italy). Thesis topic: Differential geometry. Thesis title: *Harmonic maps in Cauchy-Riemann geometry.* Supervisors: Prof. Giovanni Calvaruso & Prof. Sorin Dragomir.
A.y. $2017 - 2018$	🔖 **"Percorso formativo PF24"**, University of Salento (Lecce, Italy), (24 University credits in anthropo-psycho-pedagogical disciplines and teaching methodologies and technologies).
July 24th 2017	🔖 **M.Sc. in Mathematics** (with honors), University of Salento (Lecce, Italy). Thesis topic: Differential geometry. Thesis title: *Magnetic curves on a three-dimensional Riemannian manifold.* Supervisors: Prof. Domenico Perrone.
Dec. 12th 2014	🔖 **B.Sc. in Mathematics** University of Salento (Lecce, Italy). Thesis topic: Differential geometry. Thesis title: *Geometria Differenziale delle curve nello spazio di Minkowski $\mathbb{E}^3_1$.* Supervisors: Prof. Domenico Perrone.

Research Publications

Journal Articles

1. Dragomir, S. & **Esposito, F.** Exponentially Harmonic Maps into Spheres. *Axioms* **7,** 88 (2018).

2. Chiang, Y.-J., Dragomir, S. & **Esposito, F.** Exponentially subelliptic harmonic maps from the Heisenberg group into a sphere. *Calculus of Variations and Partial Differential Equations* **58,** 1–45 (2019).

3. Barletta, E., Dragomir, S. & **Esposito, F.** On Schwarzschild's interior solution and perfect fluid star model. *Symmetry* **12,** 1669 (2020).

4. Barletta, E., Dragomir, S. & **Esposito, F.** Weighted Bergman kernels and mathematical physics. *Axioms* **9,** 48 (2020).

5. Calvaruso, G., **Esposito, F.** & Perrone, D. Levi flat CR structures on 3D Lie algebras. *Annali di Matematica Pura ed Applicata (1923-)* **199,** 2521–2542 (2020).

6. Chiang, Y.-J., Dragomir, S. & **Esposito, F.** Second Variation Formula and Stability of Exponentially Subelliptic Harmonic Maps. *Complex Analysis and Operator Theory* **14,** 55 (2020).

7. Barletta, E., Dragomir, S. & **Esposito, F.** On the Canonical Foliation of an Indefinite Locally Conformal Kähler Manifold with a Parallel Lee Form. *Mathematics* **9,** 333 (2021).

8. Barletta, E., Dragomir, S. & **Esposito, F.** Beltrami Equations on Rossi Spheres. *Mathematics* **10,** 371 (2022).

9. Barletta, E., Dragomir, S. & **Esposito, F.** Kostant-Souriau-Odzijewicz quantization of a mechanical system whose classical phase space is a Siegel domain. *International Journal of Reproducing Kernels* **1** (2022).

10. Barletta, E., Dragomir, S. & **Esposito, F.** CR Immersions and Sub-Riemannian Geometry. *Axioms* **12,** 329 (2023).

11. Barletta, E., Dragomir, S., **Esposito, F.** & Platis, I. D. On Nirenberg's non-embeddable CR structure. *Complex Variables and Elliptic Equations* **68,** 237–254 (2023).

Preprints

1. Barletta, E., Dragomir, S. & **Esposito, F.** *On the Kohn-Rossi cohomology of a 5-dimensional CR manifold* 2020.

2. Barletta, E., Bonsignorio, F., Dragomir, S., **Esposito, F.** & Zereik, E. *Holomorphic L^2 signals of several complex variables* 2023.

3. Dragomir, S., **Esposito, F.** & Loubeau, E. *Harmonic morphisms from Fefferman spaces* 2023.

Teaching activities

A.y. 2023 − 2024
- **Functional Analysis,** (24 hours), postgraduate degree in Mathematics, University of Basilicata (Potenza, Italy).
- **Activities in Computer Science,** (8 hours), undergraduate degree in Mathematics, University of Basilicata (Potenza, Italy).
- **Mathematics,** (60 hours), undergraduate degree in Forest and Environmental Sciences, University of Basilicata (Potenza, Italy).

A.y. 2022 − 2023
- **Activities in Computer Science,** (8 hours), undergraduate degree in Mathematics, University of Basilicata (Potenza, Italy).
- **Mathematics,** (60 hours), undergraduate degree in Forest and Environmental Sciences, University of Basilicata (Potenza, Italy).
- **Mathematics,** (48 hours), undergraduate degree in Landscape, Environment and Urban Green, University of Basilicata (Matera, Italy).

A.y. 2021 − 2022
- **Activities in Computer Science,** (8 hours), undergraduate degree in Mathematics, University of Basilicata (Potenza, Italy).
- **Activities in Computer Science,** (14 hours), undergraduate degree in Economics, University of Basilicata (Potenza, Italy).
- **Supplementary Activities in Calculus,** (24 hours), undergraduate degree in Informatics, University of Basilicata (Potenza, Italy).
- **Mathematics,** (48 hours), undergraduate degree in Landscape, Environment and Urban Green, University of Basilicata (Matera, Italy).

Teaching activities (continued)

A.y. 2020 − 2021 ▮ **Supplementary Activities in Geometry (mod 1),** (10 hours), undergraduate degree in Mathematics, University of Salento (Lecce, Italy).

A.y. 2019 − 2020 ▮ **Supplementary Activities in Geometry (mod 3),** (10 hours), undergraduate degree in Mathematics, University of Salento (Lecce, Italy).

A.y. 2018 − 2019 ▮ **Supplementary Activities in Geometry (mod 2),** (10 hours), undergraduate degree in Mathematics, University of Salento (Lecce, Italy).

Skills

Languages ▮ Strong reading, writing and speaking competencies for English and Italian (native language).

Coding ▮ C, Matlab, LaTeX.

Miscellaneous Experience

Activities as Visiting Scholar

April 17th – July 21st 2023 ▮ **Heron@CNR Joint lab,** Genova, (Italy), in collaboration with prof. Fabio Bonsignorio and dr. Erika Zereik.

Sep. 1st – Oct. 31st 2020 ▮ **Laboratoire de Mathematiques de Bretagne Atlantique (LMBA),** Brest, (France), under the supervision of prof. Eric Loubeau.

March 14th – June 30st 2019 ▮ **Rutgers University,** Camden, NJ (USA), under the supervision of prof. Siqi Fu and prof. Howard Jacobowitz.

Attended conferences and workshops as a Speaker

2023 ▮ SIMAI 2023, title "Real kernel methods *vs.* complex kernel methods in machine learning and signal theory", 26th August - 1st September, Matera (Italy).

▮ Differential Geometry Workshop 2023, title "Harmonic morphisms from Fefferman spaces", $6^{th} − 9^{th}$ September, Iaşi (Romania).

Attended conferences and workshops as an Organizer

▮ SIMAI 2023, organizer of the minisimposium *Mathematics for Machine Learning*,$26^{t}h$ August - 1st September, Matera (Italy).

Other attended conferences, workshops and Schools

Nov. $24^{th} − 25^{th}$ 2022 ▮ *Matematica per l'Intelligenza Artificiale e il Machine Learning: Giovani Ricercatori*, Torino, (Italy).

July $5^{th} − 8^{th}$ 2022 ▮ *Functional Analysis, Approximation Theory and Numerical Analysis*, Matera, (Italy).

June 27th - July 1st 2022 ▮ *Geometric and analytic aspects of functional variational principles*, CIME Foundation School, Cetraro (CS), (Italy).
Courses taught by prof. R. Frank, prof. G. Mingione, prof. L. Pick, prof. O. Savin and prof. J. Van Schaftingen.

Miscellaneous Experience (continued)

Jan. $4^{th} - 7^{th}$ 2021   *Current topics in several complex variables and PDEs*, Virtual Winter School.
Courses taught by prof. S. Berhanu, prof. G. Della Sala, prof. B. Lamel and prof. N. Mir.

Feb. $3^{rd} - 7^{th}$ 2020   *General Relativity and Beyond*, SIGRAV International School, Vietri sul Mare (SA) (Italy).
Courses taught by prof. T. Baker, prof. S. Capozziello, prof. S. Matarrese and prof. P. Pani.

June $18^{th} - 22^{nd}$ 2018   *Geometric Analysis*, CIME Foundation School, Cetraro (CS), (Italy).
Courses taught by prof. A. Fraser, prof. A. Neves, prof. P. Topping and prof. P. Yang.

May $13^{th} - 18^{th}$ 2018   *Conformal geometry, Cartan connection and locally conformal Kähler structures*, SMI School, Cortona (AR) (Italy).
Course taught by prof. P. Gauduchon.

Affiliations

Member of INdAM - GNSAGA

Member of UMI and UMI group "MATEMATICA AI & ML"

Member of SIMAI

Reviewer for AMS Mathematical Reviews

Popularization of Science

2016   *Topology, when Mathematics can be fun*, on Tom's Hardware (in Italian, layman language).

Pitagora's Theorem does not hold on Earth, that's why, on Tom's Hardware (in Italian).

How to count till 1023 with two hands, on Tom's Hardware (in Italian).

Pi rational by law, a tragicomic story, on Tom's Hardware (in Italian).

2017   *Propbability theory, monkeys and goats*, on Tom's Hardware (in Italian).

Final Exam 2017, the squared wheels bike riddle, on Tom's Hardware (in Italian).

Spheres and topological groups, Ithaca, N. X-2017, (in Italian).

a.y. 2018-19   Non-Euclidean Geometry laboratory activities for High Schools students in Brindisi(Italy) and Taranto (Italy) during "Piano Nazionale Lauree Scientifiche per la Matematica".