

Guido Fubini-Ghiron

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When he was almost 60, he was expelled from the Polytechnic University of Turin because he was Jewish. Known as one of the sharpest and most intelligent Italian analysts, he decided to continue his brilliant work on differential geometry abroad, hoping for a better future for him and his family¹. He immediately left for Paris, and soon found himself welcomed to Princeton. His two sons, expelled in Italy at the beginning of their academic career, also found their way to the USA and stayed there.

Formative years in Paris

He was born in Venice on 19 January 1879 to Lazzaro Fubini, a mathematics teacher at the machinist school, and to Zoraide Torre. At only nine years old, he was enrolled at Foscarini High School in Venice, achieving, in his eight years of *ginnasio* and *liceo* [junior high school and high school], perfect grades (all 10s) in mathematics². In 1896, at seventeen years old, he enrolled in the Facoltà di Matematica [School of Mathematics] at the Scuola normale superiore of Pisa, «where many scholars became passionate about research in geometry»³. A student of Ulisse Dini, Eugenio Bertini and, above all, Luigi Bianchi, he graduated with honors in 1900 with a thesis titled «Il parallelismo di Clifford negli spazi ellittici» [Clifford's parallelism in elliptical spaces]⁴.

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¹ Letter of 30 October 1938 from Tullio Levi-Civita to Oswald Veblen from the Institute for Advanced Study at Princeton University, translated and reported on the Università Bocconi's website, section *Rubriche* <<http://matematica-old.unibocconi.it>> (accessed 2 February 2019).

² The records of the bimonthly averages only show the exception of one score of 9 in the last two months of the second year in high school <<http://www.liceofoscarini.it>> (accessed 30 January 2019).

³ Guido Fubini, *I fondamenti della geometria proiettivo-differenziale*, «Annali della Scuola normale superiore di Pisa, classe di Scienze», 2, 4, 1935, pp. 219-224.

⁴ Later published in «Annali della Scuola normale superiore di Pisa», 9, 1900, pp. 1-74, cit. in Marta Menghini, *Fubini Ghiron Guido*, in *Dizionario biografico degli italiani*, vol. 50, Rome, Istituto

In Pisa, in 1901, he obtained the *posto di perfezionamento* "Lavagna" in advanced analysis and the appointment as an *assistente volontario* [unpaid assistant] in algebra and analytical geometry. From 1903 to 1906, he taught advanced analysis at the University of Catania as a *professore incaricato* [a professor appointed to teach one course] and in the last year, as a *professore straordinario* [a professor on a three-year track for promotion to full]. Beginning in 1906, he was called to the University of Genoa as a *professore straordinario* in infinitesimal analysis, a position he preferred over that of algebraic analysis and analytical geometry at the University of Cagliari, each time finishing first in their respective *concorsi* [national contests to secure a teaching position at the university].

His career in Turin and reputation abroad

Fubini accepted to transfer to the Polytechnic University of Turin to teach mathematical analysis⁵. At the meeting of the Consiglio didattico [teaching council] of 18 July 1908, where his selection was unanimously approved, the director Enrico D'Ovidio introduced him «as one of the most reputable and promising young scientists»⁶. He became *ordinario* [full professor] in May of 1910 and was also appointed to teach advanced analysis at the University of Turin⁷. On 27 September of the same year, he married Annetta Ghiron. His sons, Gino and Eugenio were born in 1911 and 1913, respectively.

della Enciclopedia Italiana, 1998 (available online at <<http://www.treccani.it>>, accessed 2 February 2019).

⁵ The Corte dei Conti [Court of Audit] rejected the transfer decree of Professor Fubini three times, with the observation that the chair of mathematical analysis could not be considered, as instead supported by the ministry and the Consiglio Didattico of the Polytechnic University, as substantially identical to that of calculus or infinitesimal analysis that Fubini held in Genoa. His promotion to full professor in 1910 was also the subject of a heated confrontation between the president of the Polytechnic University's Consiglio d'amministrazione and the Minister of Education Luigi Rava. See Historical Archive of the Polytechnic University of Turin, f. «Guido Fubini-Ghiron», letters dated 7 September 1908; 11 January 1909; 2 February 1909; 2 October 1909; 11 October 1909 and 28 October 1909.

⁶ Ibid., drawn from the minutes from the Consiglio Didattico of 18 July 1908.

⁷ Università degli studi di Torino, «Annuario», a.y. 1910-11.

During his thirty years of teaching and research in Turin, Fubini dedicated himself particularly to the study of projective differential geometry, of which he is considered one of the founders. He made important contributions to the theory of discontinuous groups and automorphic functions, to the minimum principle, and to the rigorization and application of the foundations of analysis. The theorem which allows for the reduction of a double Lebesgue integration in two consecutive ones (or vice versa) is known as «Fubini's Theorem».

A member of the Società italiana delle scienze detta dei XL, of the Accademia dei Lincei, of the Regio istituto lombardo, and of the Czechoslovakian Mathematical Society, he obtained the Royal Prize in Mathematics in 1919, the highest recognition of the Accademia dei Lincei.

In a typewritten letter from 7 October 1933, kept among the papers of the Ministry of Education, an anonymous writer denounced that

in the Royal University of Turin, School of Mathematics, a few Jewish professors, socialist Masons led by the all-powerful professor Fubini, with an art and a Jesuitism of the worst kind, make every effort to demolish what the Regime is building with heroic endeavors. In this faculty there are also abuses of every sort: the protégés are favored, [that is,] the disciples who must one day continue the infamous work and defeat our Fatherland, whereas those whom they know they cannot attract into their circle are oppressed, boycotted, damaged in any way. A severe and meticulous investigation will bring to light what I have had the honor of exposing to Your Excellency. Old Black Shirt, anonymous in spite of himself for obvious necessity⁸.

In early 1933, when Hitler had taken the first steps in Germany to dismiss Jews, communists and «undesirables» (including about 60 mathematicians), Fubini showed his indignation without hesitation; he proposed to the great mathematician and friend, Tullio Levi-Civita, to have the Italian-Jewish

⁸ ACS, MPI, DGIS, *Fascicoli personali. Professori ordinari (1940-70), 3° versamento*, b. 214, f. «Guido Fubini-Ghiron», cit. in Erika Luciano, *La stagione del consenso forzato: l'insegnamento della Matematica nel Ventennio fascista*, «Annali del Centro Pannunzio», 45, 2015, pp. 181-202.

mathematicians resign en masse from the German Society of Mathematics⁹. A few years later, in June of 1936, he was prevented from attending the International Congress of Mathematics organized in Oslo: Minister De Vecchi «had not considered him appropriate»¹⁰ to participate.

A loss to the university and to the sciences

In October of 1938, Guido Fubini-Ghiron was notified of his expulsion from the Polytechnic University of Turin and the University of Turin, on the basis of the provisions «for the defence of the race». His two sons were also expelled: Gino, an assistant professor, and then professor, of construction carpentry, blacksmithery, and masonry at the Facoltà di Ingegneria [School of Engineering, TN] since 1935, and Eugenio, who, from 1936, was in charge of the specialization course in electrotechnics for the communications section. Aware that the loss of Fubini-Ghiron constituted very serious damage, Director Vallauri tried to get him an exception for merits as was initially established in the *Dichiarazione sulla razza* [Declaration on Race], adopted by the Grand Council of Fascism on 6 October 1938. On 26 October, he wrote to the Ministry of National Education:

I must report that the scientific value of Prof. Fubini has so far made him considered internationally as one of the illustrious living mathematicians and that, in the fulfillment of school duties, he has always shown great commitment, perfect discipline and full understanding of the special needs of teaching mathematics for the engineering students, thus achieving particular pedagogical effectiveness¹¹.

⁹ Pietro Nastasi, *Leggi razziali e presenze ebraiche nella comunità scientifica italiana*, Accademia nazionale delle scienze <<http://media.accademiaxl.it>> (accessed 2 February 2019).

¹⁰ Historical archive of the Polytechnic University of Turin, f. «Guido Fubini-Ghiron», communication with the subject «Journey Abroad» by Director Vallauri to G. Fubini Ghiron, 1 June 1936.

¹¹ Ibid., note from Director Vallauri to the Minister of National Education, 26 October 1938.

He included a letter from Prof. Fubini, dated 25 October. Urged to write it, Fubini said «only [...] the following»:

- 1) I have no military merit [...],
- 2) In what concerns my academic position in Italy and abroad [...] Y[our] E[xcellency] can be a good judge because he is perfectly aware of all the relative details.
- 3) I can only recall that Prof. Lane's (of the University of C[h]icago) review of a treatise [...] summarizing the results of a new branch of geometry, of which I was among the founders, concluded approximately with the following words: «This book will be enough to remind Americans of the need to learn Italian if they want to be aware of the most important scientific progress»¹².

Nevertheless, Fubini was permanently removed from service on 14 December 1938. How to replace him? The Council of the School of Engineering, in the session of 22 April 1939, resolved by majority to recommend Carlo Miranda, professor *straordinario* of mathematical analysis in Genoa, to the ministry¹³. Regarding Fubini's course on advanced analysis at the University of Turin, the open position was taken, with no additional pay, by the full professor Francesco Tricomi.

Paris and New York: “squaring the circle”

Guido immediately started looking for accommodations for himself and his children. By the end of October, he emigrated to France. He stayed in Paris until early March of 1939, in a room at the Albany Hotel, 202 Rue de Rivoli. Here came the good news: the appeal in his favor, addressed by Tullio Levi-Civita to Professor Oswald Veblen of Princeton, was successful. On 30 October 1938, Levi-Civita had updated his American colleague on the anti-Semitic regulations ordered by Mussolini:

¹² Ibid., letter from Fubini-Ghiron to Vallauri, 25 October 1938, in response to the ministerial telegram of 19 October.

¹³ Historical archive of the Polytechnic University of Turin, minutes from the Faculty Senate, vol. I, 1935-1946.

I remember you once told me that, unfortunately, there is no longer any place in America (or rather, in the U.S.) for European mathematicians, except perhaps for those of international recognition. Such is certainly the case with my dear friend, Professor Guido Fubini. [...] He is a lively man of profound and quick intelligence, and has been considered, among Italian scientists, as a model for his clear and brilliant explanations. Of course, should it be possible to offer him a satisfactory and stable position, nothing would be better; but in any case it would be an objectively desirable choice for the Institute of Advanced Study to invite him as a temporary member. Professor Fubini, who is currently in Paris, [...] would accept such an invitation with great pleasure and gratitude, not only as a distinguished honor, but also as a precious opportunity to have the possibility to move his family (wife and two children) to America. [...] Please receive my best thanks and greetings, and my apologies if I dare invoke on the Institute's scientific and humanitarian mission through your enlightened protection¹⁴.

In early December 1938, Fubini sent the Polytechnic University an «immediate and urgent» request for some certificates, necessary for his transfer to Princeton University, where he intended to arrive by mid-January¹⁵. It was more complicated than expected. Due to delays in the legalization of certificates by the ministry, he was in fact «going crazy to collect the necessary [...] documents»¹⁶. He kept his friend and colleague constantly updated:

Dear Levi Civita, [...] I cannot find the words to thank you for such continuous kindness, which is truly incomparable. The moment is approaching for when (I hope only on a temporary basis) I will separate from my children: what unexpected events in life! Although they have found something in South America, they are now working on coming to the U.S., where they would prefer to remain. I saw many

¹⁴ Letter from Tullio Levi-Civita to Oswald Veblen of Princeton's Institute for Advanced Study, dated 30 October 1938, translated and reported on Università Bocconi's website, section *Rubriche* <<http://matematica-old.unibocconi.it>> (accessed 2 February 2019).

¹⁵ Historical archive of the Polytechnic University of Turin, f. «Guido Fubini-Ghiron», letter from Fubini to the director of the Secretariat, Nicola Vigna, Paris, undated but received on 10 December 1938.

¹⁶ *Ibid.*, letter from Fubini-Ghiron, Paris, 13 January 1939.

compatriots passing through looking for some accommodation here: among them, the children of our colleagues, Fano and Castelnuovo¹⁷.

He set sail with his wife and children, all four of them together, from Le Havre on 8 March 1939, with permits issued in Paris¹⁸. And having just arrived on dry land, he wrote:

Today, 15 of March, I disembarked the *Ile de France* in N.Y. On the *pier*, I found, in addition to the son of Prof. Foa and other friends, the Buseman [*sic*] to be very courteous and affable. You will ask me why I haven't written to you before, and why I write so late. I must tell you: I have been sick, the doctor says of bronchitis, but I make another diagnosis relating to more moral rather than physical things. Anyway, I have the joy of being here with my whole family. And I hope to study. [...] I'm looking for a small accommodation: I'm afraid that this month, it is a problem similar to that of squaring the circle¹⁹.

In August of the same year, he wanted to reassure his friend: «My Eugenio has a job in New York; it seems that Gino is also on the right track. And that's what I care about most. We have a little house surrounded by greenery, in an area of woods and small villas: I don't know if I live in a town or in the countryside»²⁰. Between 1939 and 1943, he wrote fifteen articles on differential geometry, analysis and ballistics; he became passionate about American history and won the esteem of his colleagues from the Institute for Advanced Study at Princeton and of Columbia University in New York, where he was nicknamed "Little Giant", to underline the contrast between his small stature (for which he

¹⁷ Letter from Guido Fubini-Ghiron to Tullio Levi-Civita, sent from Paris on 10 January 1939, on Università Bocconi's site, section *Rubriche* <<http://matematica-old.unibocconi.it>> (accessed 2 February 2019).

¹⁸ Ellis Island Foundation, *Passenger Search, ad nomen* <<https://www.libertyellisfoundation.org>> (accessed upon registration 10 January 2019).

¹⁹ Letter from Fubini-Ghiron to Tullio Levi-Civita from Princeton, 15 March 1939 on Università Bocconi's website, section *Rubriche* <<http://matematica-old.unibocconi.it>> (accessed 2 February 2019).

²⁰ *Ibid.*, letter from Fubini-Ghiron to Tullio Levi-Civita from Princeton, 21 August 1939.

had, back in time, obtained an exemption from military service)²¹ and his strong personality.

His latest works include *La matematica per gli ingegneri*, in collaboration with Giuseppe Albenga, and the study *On the Asymptotic Lines of a Ruled Surface*, in which he reversed the theorem according to which the asymptotic lines of a ruled surface belonging to a linear complex are projective with each other. All in all, Fubini's scientific body of work amounted to approximately 300 publications.

Lamented colleague and teacher

At the inauguration of the 1946-47 academic year, the director of the Politecnico Pietro Brunelli offered an

affectionate and cordial greeting to the young people who have returned to us [...] from the trenches, from the mountains on which many continued to fight in the war for liberation, from the concentration and prison camps, from exile. [...] Unfortunately, we must lament the loss of several dear and talented colleagues. Prof. Guido Fubini-Ghiron passed away in Princeton in 1943 and was unable to welcome the day when he would be called to resume his professorship, which he had honored but had been taken away from him for racial reasons²².

He died in New York on 6 June 1943, at the age of 64.

In 1950, the Italian Mathematical Union established an international prize in his name²³.

His sons, Gino and Eugene, made their own careers and did not return to Italy.

In February 1968, the family lawyer, Pietro Calliano, in need of some

²¹ Historical archive of the Polytechnic University of Turin, f. «Guido Fubini-Ghiron», record of service.

²² Historical archive of the Polytechnic University of Turin, «Annuario» for the 1941-42 through 1947-48 academic years.

²³ Ibid., f. «Guido Fubini-Ghiron», letter from the president of the Unione matematica italiana (UMI), Enrico Bompiani, to the director of the Polytechnic University of Turin, Eligio Perrucca, 28 November 1950.

documents, wrote to the rector of the Polytechnic University that his widow, Annetta Fubini-Ghiron, and his sons were residents of America²⁴.

Major publications

- *Il parallelismo di Clifford negli spazi ellittici*, «Annali della Scuola normale superiore di Pisa», 9, 1900, pp. 1-74.
- *Sopra una classe di equazioni che ammettono come caso particolare le equazioni delle membrane e delle piastre sonore nota*, «Rendiconti del Reale Istituto lombardo di scienze e lettere», 2, 35, 1902, pp. 779-798.
- *Sui gruppi di proiettività*, «Rendiconti dell'Accademia nazionale dei Lincei, Classe di scienze fisiche, matematiche e naturali», 12, 1903, pp. 83-86, 258-260.
- *Una questione fondamentale per la teoria dei gruppi e delle funzioni automorfe*, «Rendiconti dell'Accademia nazionale dei Lincei, Classe di scienze fisiche, matematiche e naturali», 13, 1904, pp. 591-595.
- *Sugli integrali multipli*, «Rendiconti dell'Accademia nazionale dei Lincei, Classe di scienze fisiche, matematiche e naturali», 17, 1907, pp. 608-614.
- *Il principio di minimo e i teoremi di esistenza per i problemi al contorno relativi alle equazioni alle derivate parziali di ordini pari*, «Rendiconti del Circolo matematico di Palermo», 23, 1907, pp. 87-99.
- *Introduzione alla teoria dei gruppi discontinui e delle funzioni automorfe*, Pisa, Spoerri, 1908.
- *Applicazioni della teoria dei gruppi continui alla geometria differenziale ed alle equazioni di Lagrange*, «Mathematische Annalen », 64, 1908, pp. 202-214.
- *Definizione proiettivo-differenziale di una superficie*, «Atti della Reale

²⁴ Ibid., letter from the lawyer Pietro Calliano to the rector of the Polytechnic University of Turin, 28 February 1968.

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 - *On the Asymptotic Lines of a Ruled Surface*, «Bulletin of the American Mathematical Society», 67, 1941, pp. 448-451
 - With Giuseppe Albenga, *La matematica dell'ingegnere e le sue applicazioni*, 2 vols, Bologna, Zanichelli, 1949-1954, published posthumously.
 - *Il teorema di riduzione degli integrali doppi*, «Rendiconti del Seminario matematico dell'Università e Politecnico di Torino», 9, 1949, pp. 125-133, published posthumously.

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