Francesco Melchiorri: more than a scientist

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We have gathered this week to celebrate and memorialize the life and work of Francesco Melchiorri, the distinguished academic of the University of Rome. All of us have known him in some combination as friend, colleague, and mentor—and likely all three. Certainly, he was all of these for me.

As a tribute to Francesco’s impact on astrophysics and observational cosmology, beginning this afternoon we will hear many of this community present aspects of their research on a range of topics that represent the broad interests and manifold contributions of Prof. Melchiorri,. For the next few minutes, however, I want to set aside the achievements of that illustrious career to look back over a few of the memorable times I have enjoyed in the company of this most engaging man. In talking less about science and concentrating on the richness of personal encounters with Francesco, I wish to bring forth similar recollections of his warmth and generosity of spirit from your own encounters with this remarkable person.

Not long ago, Francesco and Bianca co-authored an article in Sapere, a respected Italian magazine devoted to the life of the mind. The title is, Chi era Isaac Newton costui? With some help from my Italian dictionary I interpret this to mean: “Who was Isaac Newton, the man—the inner person?”

Just as Francesco and Bianca looked beyond the scientist to the person of Newton, I want to set aside Melchiorri the researcher to dwell on two of many facets of Francesco the man: the compelling appeal of his humor, and his passion for the history of ideas—Francesco, the playfully sardonic, engaging wit, and Francesco, the philosopher, historian, antiquarian who loved to re-discover old ideas in old texts.
Whereas the Sapere article suggests an even darker, sinister and more provocative portrait of Newton than suggested by previous scholars, my goal is quite the opposite—I hardly need to convince those who knew him that Francesco harbored no dark tendencies.

To illustrate the first of these two appealing facets of a life so well lived, I have assembled some photos that remind me of many moments in his presence that are indelibly stamped with the wisdom and humor of Francesco. I call this collection “Le Cronache della Montagna del Serpente Sonagli,”—The Chronicles of Rattlesnake Mountain.

![Rattlesnake Mountain in winter—elevation 1061 meters.](image)

This may seem a puzzling title, but let me establish a context for the events that transpired on Rattlesnake Mountain in the arid, eastern reaches of Washington State in the early to mid-1980s.

At the urging of Remo Ruffini (another story), Francesco and I first met for an hour or so by arranging our world lines approximately to intersect at JFK airport
while traveling on unrelated missions of science. Giorgio Dall’Oglio was with Francesco and recently helped me establish the date—it was 1974.

Francesco, Bianca, Giorgio, and Enzo Natale and their students had already developed a practical cryogenic photometer that cleverly balanced the opposing demands of high throughput and band-pass filtering that make observing the far-infrared sky with high sensitivity so difficult from below the terrestrial atmosphere. Moreover, they were using it at Testa Grigia to measure the CBR at wavelengths short of the peak in the 2.7K spectrum.

I, on the other hand, after leaving Dicke’s group at Princeton for the University of Washington, had just carried out a series of flights with a specially instrumented NASA Learjet to observe that same far-infrared sky with a 90 GHZ, superheterodyne radiometer.

I was immediately intrigued by Francesco’s research, his ideas, and his candor. Despite whatever reservations he might have held about this “crazy American,” he graciously invited me to visit his laboratory at the University of Florence the next summer.

Figure 2. The Battelle Radio Telescope (1983).

So began a life-long friendship, with an ambitious plan to collaborate on a ground-based, fine scale anisotropy measurement of the CMB from the summit of Rattlesnake Mountain in the desert lands beyond the Cascade Range, about 300 km to the east from my university in Seattle.
This was the location of a 9-meter aperture, mm-wave radio telescope that I arranged to modify in preparation for several years of dedicated service to the science goals of our project.

The Italian group first visited the telescope in 1981 after several years of meeting in Florence to plan this project and to design observing strategies and hardware.

Figure 3. Francesco recording data in radio telescope control room 1983.

After moving to Rome in 1981, they had continued to improve the bolometer and FIR filters. UW graduate student, Simon Radford, spent two months in their lab at La Sapienza learning technical and practical details, as indicated below in Fig. 4—filling a bolometer dewar during one of the Roman conquests of the Rattlesnake Observatory.

Figure 4. Radford (now Deputy Project Manager, Cornell-Caltech Atacama Telescope Project) officiating while Boynton, Melchiorri and Dall’Oglio look on.
My group at the University of Washington had undertaken a photo-grammetrically-guided tuning of the figure of the parabola to an rms deviation of a few hundred microns. We also came up with a design for a vibrationless, 10-Hz-beam-switching modulator that the two groups jointly developed and contracted Officine Galileo to build, which they did with great skill.

![Figure. 5 Giorgio inspecting beam-switching secondary reflector. Fairings on spider are designed to reduce contamination by ground radiation.](image)

Also, with assistance from the Boeing Airplane Company, in Seattle we fabricated a low-inertia, carbon-fiber secondary mirror.

![Figure. 6 Enzo with carbon fiber reflector still in its mold, 1981.](image)

Of course, this was experimental physics (and engineering)—seldom does every part of such a complicated electron, mechanical and cryogenic system work at
the same moment before it is thoroughly mature. On good days it may approximate that goal, on bad days, nothing works. There were, of course, some bolometer problems.

Figure 7. High-tech \(^3\)He bolometer—sometimes Paul felt it needed a little adjustment.

Perhaps there were some problems with the operation of the telescope as well. Shown below is the humorous (?) response of Francesco and Giorgio—although I always suspected Bianca as the instigator. It was about this time that I discovered a fish wrapped in newspaper in my bunk bed.

Figure 8. Sometimes Francesco felt Paul needed a big adjustment, Italian style.

In actuality, every day that we faced such frustrations, Francesco would patiently, and seemingly effortlessly, provide an encouraging perspective on what otherwise seemed another serious setback. He would always see over the top of adversity and generate in those around him new energy to pursue yet-unconsidered possibilities.
Throughout 1984, except for those few months in Rome, Simon heroically continued to improve telescope reliability. The winter of 84-85 was to be the long awaited triumph over adversity. Finally the equipment was ready.

The weather pattern that winter was a once-in-thirty-years anomaly. Instead of cold, dry arctic air flooding down through Canada, much of the flow was stagnated by warm, wet air from the south—all converging on Washington, Idaho, and Montana.

Figure 9. Francesco: “This reminds me of that first winter at Testa Grigia.”

Weeks went by at the summit of Rattlesnake Mountain. After presiding over the evaporation of hundreds of liters of LHe that were never transferred from a succession of storage dewars, winter ended with no cold, clear, dry nights.

Figure 10 After 4 cm of frost covered the telescope one night, he relented: “No, I was wrong, this is clearly much worse.”

We were in regular contact with Francesco back in Rome. But for him, the path to progress was never obscured—just shown to be more complex than we might have thought. His calm, measured approach lent clarity and restored purpose despite the eventual, regrettable outcome.

In all these adventures, Bianca’s contribution to this “view from higher ground” was unmistakable—the two of them moved together over the world through that same rarefied air of knowing tranquility—never losing sight of life’s larger goals.
Undaunted, Francesco and I went on to plan new experiments and to face new adventures. Balloon-borne radiometers launched from the Mediterranean were more successful and more comfortable.

Figure 11. “The next time we go north for an experiment, we should think to choose the north coast of Sicily.”

Figure 12. Launching a circumpolar balloon mission from Trapani, Sicily: Melchiorri, Castagna, Natale and Partridge. Photo by Boynton.

I find this photo particularly memorable not only because it reminds me of frantic preparations to meet launch schedules and of trips from the launch base into Trapani for espresso (or better yet, gelato con brioche), but also because of my recent use of this picture in a paper commemorating the 40th anniversary of the CMB.

Francesco was not enthusiastic about my including this photo. He felt he appeared awkwardly thin beside his more sturdily constructed colleagues. I immediately responded by adding roughly 20 kg to his frame in a brief Photoshop session on my computer.
His only comment upon seeing the outcome was to illustrate with customary humor (often by dredging up parallel events from history), what he previously had seen become of people who succumb to such revisionist tendencies. He emailed to me the following image in two versions.

![Image of two photographs of Enrico Fermi with mathematical formulas and text]

Figure 13: Not one of his best days.

We don’t know whether Fermi had written what is seen on the chalk board, but those compromising scribblings were not agreeable to the latter-day guardians of this national hero—and they did not wish to leave such a judgment up to the viewer—hence the removal of the seriously flawed fine-structure constant in the second image. Francesco’s comment: “Fermi was called ‘The Pope’ by his friends and clearly the Pope cannot be wrong. I propose to call this new museum [Museo Storico della Fisica] ‘The Italian Photoshop Museum of Science.’”

I now turn to another side of Francesco (of which there were many) that I set out in my introduction—the historian and philosopher intrigued by the ways in which we western peoples have tried to make sense of our experience of the natural world. He often reached back to the post-medieval thoughts of one Marcellus Pallengenius, the pseudonym of the Italian poet and mystic who wrote the once quite popular, now obscure didactic poem entitled, “Zodiacus Vitae.”

I still have copies of certain pages of this Latin verse given me by Francesco in the mid-seventies. He used this same early-16th-century manuscript as a framework for the introduction to an article he wrote with Bianca and Monique Signore on the occasion of the CMB discovery 40th anniversary celebration at a
recent Enrico Fermi Summer School. He has returned many times to the study of this and other Latin texts, relishing his search for precursors or contrasts to modern thinking. To reveal his passion for this pursuit, below I share excerpts from a portion of our email stream during the fall of 2004:

Monday, Sept. 20

Dear Paul

This is a funny story. While searching for Marcellus Palingenius on the Internet I found a USA bookseller offering the first edition (1540) of this book for 6000 USD. Immediately I wrote to him that I do not have the money but I want the book. I invited the bookseller to read the last page of the book, where it is clearly written “Dear reader when you finish to read this book give it to another person and do not request more money than you paid.” Then follows a long list of terrible events destined to occur if the owner of the book would not respect this rule.

The bookseller immediately answered to me that he was not aware of this “maledizione” and he decided to sell the book to me at the price of 300 USD (what he paid to the previous owner).

But this is only a part of the story. The book is an unusual pocket edition. Perhaps it was printed in this form to escape the custom controls, being a book forbidden in Europe at the time the first owner left Europe to America. It is curious to note that in the year 1540 Christine, the lady-in-waiting of Rene' de France, left France for America after the death of Rene’. It is not impossible that she took his book with herself, Palingenius being the preferred poet of Rene’. Is it not a curious circumstance? The book will arrive next week and I will search for some hint.

Ciao
francesco

Monday Sept. 27

Dear Paul

I got the book! For me it looks beautiful, but for another opinion contact Alessandro who starts to believe that his father is crazy.

It is quite small and difficult to read and there are traces of an old fire on the border.

Ciao
francesco
Friday Oct. 1

Dear Paul,

Happy to know that you received the journal with THE FUNDAMENTAL paper on Newton. Now you provided me with a new insight: was Newton a woman? In such a case it may be that Leonardo anticipated this possibility in his painting La Gioconda...*

OK, to be a bit more serious, if a student wanted to take this Sapere article as a starting point, I think it is essential to recover the biography written by John Conduit. Curiously this biography is no more on the market and even antique libraries do not have it.

My study of Zodiacus Vitae is promising; on the back of the first page someone noted with an old calligraphy "(pag. 348)". So I went to this page and found the phrase "Lucem quam terreni oculi non cernere possent." This is just the only phrase I formerly knew from Zodiacus! Interesting coincidence!

I will send more details in the future.

Ciao

francesco

*[This first paragraph refers to his paper with Bianca: Chi era Isaac Newton costui?. Because of its astounding insights into Newton’s life and person, I had suggested the only surprise remaining would be to re-title his work: Chi era Isaac Newton colei?]

This avid interest in the history of what we now consider esoteric ideas predates our meeting in 1974. I vividly recall our mutual excitement upon my learning from him that his university laboratory then located in the Quaracchi district of Florence was formerly not just a monastery, but that Francesco’s office there was once the monk’s cell of one Marsillio Ficino, a marginally heretical (hence pivotal) figure in the revival of neoplatonic thought during the latter portion of the 16th century. With the enthusiastic support of Cosimo de’ Medici, Ficino established the Florentine Academy—both the wellspring of Renaissance humanism and the link between natural philosophy and ancient mysticism that intrigued and profoundly influenced Newton in the 17th century.
I have already mentioned Francesco’s fascination with Newton, which also had its roots in the mystical traditions of Pallingenius, Ficino, and Pico della Mirandola. These figures may seem curiosities of a bygone age, but they speak of a world crackling with magic and mystery largely forgotten in our time—but not by Francesco, who found their writings a fascinating window to the past and another vision of the world.

So we see a thoroughly modern scientist of the 21st century with interests so broad that they extend back to the age of Renaissance magic—indicative of the complexity of Francesco Melchiorri costui.

I conclude with two images that capture for me the compelling personality of a friend who was able in one moment quietly to consider grand schemes for manipulation of the natural world to best reveal the secrets of the universe, then in the next playfully to engage a friend.

Figure 14a. Many were thoughtful, serious moments.  

Figure 14b. And happily, many that were not.

For a few decades he gave all who came close to him a deeper sense of the dignity, richness and mystery of life. I will always be grateful for that gift.
Addio Francesco. Eravamo simpatici!

Figure 15. Sunset over the Arno from Piazzale Michelangelo.