

Arkady Tseytlin / Few recollections about E.S. Fradkin

I first met Efim Samoilovich (ES) in January 1980 after my seminar talk at FIAN. At the time, I had just graduated from the physics department of Moscow State University. Despite earning a diploma with distinction, I was not accepted into the graduate school ("aspirantura") at MSU, so I was exploring other options.

My seminar was arranged with the help of Vladimir Yakovlevich Fainberg, whose lectures on QFT I had attended at MSU, and Renata Ernestovna Kallosh. My talk focused on gravitational instantons, following earlier work by Gibbons and Hawking. The audience, however, was not particularly engaged, likely due to the political climate: the Soviet army had just entered Afghanistan, and Andrei Dmitrievich Sakharov had been exiled to Gorky. These pressing topics overshadowed purely scientific discussions.

Nevertheless, I managed to impress ES enough that after the seminar, he invited me to talk in his office. He suggested that if I could secure a research trainee ("stazher") position somewhere, I could join FIAN as a "seconded trainee" under his supervision, with the goal of entering FIAN's aspirantura in one year. I was fortunate that this plan materialized, allowing me to become part of Fradkin's research school. We actively collaborated for five years (1981–1985), co-authoring over 20 research papers, mostly on quantum gravity, supergravity and string theory.

Quantum gravity and supergravity were familiar subjects for ES. He had already made significant contributions to these fields in collaboration with I.V. Tyutin and G.A. Vilkovisky during the 1970s. However, string theory was not yet a focus of his research until 1981. This shift was motivated by key developments in understanding string theory in connection with gauge theory, particularly the work of Migdal and Polyakov and their inspiring seminars at FIAN. Additionally, the manifestly supersymmetric formulation of superstring theory by Green and Schwarz sparked new interest.

Our first paper on string theory, titled "Quantization of two-dimensional supergravity and critical dimensions for string models," was published in June 1981. In 1983, Edward Witten gave a talk at the V.L. Ginzburg seminar in FIAN, emphasizing the potential importance of superstring theory. Holding J. Schwarz's Physics Reports in hand, he invited the audience to explore the subject. Later, in late 1984, Abdus Salam visited Moscow and delivered a lecture at the Institute of Nuclear Research, reviewing recent work by Candelas et al. on string theory compactifications. ES became deeply interested and had a long discussion with Salam.

ES possessed a remarkable intuition for identifying promising research directions with transformative potential. He adhered to Landau's principle: "Life is too short to work on problems that do not lead to new results." Another outstanding trait of ES was his ability to identify talented young researchers and grant them the freedom to work independently.

I was fortunate to receive such freedom under the condition that my work would lead to useful and forward-looking results. This created both an opportunity and a pressure to produce work that would capture ES's attention. While challenging, this approach proved highly beneficial in retrospect, pushing me to learn and achieve more than I might have done if given a set of concrete and structured problems. As I now know from my own experience, this pattern of interacting with students works only in exceptional cases.

My discussions with ES were frequent, typically in his office or over the phone (sometimes late at night) and occasionally at his apartment near FIAN. His devotion to science and his enthusiasm were unparalleled. If he had a new idea, he would call immediately to discuss it. ES treated his younger colleagues with respect, forgiving occasional mistakes, and always striving to help them, whether navigating bureaucratic hurdles or securing a position in aspirantura or job in FIAN. ES also demonstrated high moral standards and bravery, in particular, in his support he provided to Sakharov and also to Golfand. In 1985 we visited Sakharov in Gorky and ES did not hesitate to carry an "illegal" letter from Sakharov to deliver to his wife in Moscow.

I am profoundly grateful to ES for the opportunity to join his research school, learn from him, and benefit from his guidance and support. He was an exceptional scientist and an extraordinary person. His combination of scientific vision, moral integrity, and mentorship continues to inspire me to this day.