


MEETING ANDRZEJ BIAŁAS

ANDRZEJ J. BURAS 

TUM Institute for Advanced Study
Lichtenbergstraße 2a, 85748 Garching, Germany
and

Physik Department, TUM School of Natural Sciences, TU München
James-Franck-Straße, 85748 Garching, Germany

*Received 19 March 2026, accepted 22 March 2026,
published online 28 May 2026*

DOI:10.5506/APhysPolB.57.6-A1

I saw Andrzej for the first time in the Physics Department in Warsaw. It must have been around 1967. I was in the third year of my physics studies. There was a colloquium given by someone else. In the first row, two physicists were sitting whom I had never seen before. I asked my father, Bronisław Buras, a professor in this department, who they were. He told me it was Andrzej Białas and Kacper Zalewski, two brilliant particle physicists from Cracow. They were on their way to CERN.

I spoke to Andrzej and his wife, Elżbieta, five years later at the Winter School in Schladming. Andrzej gave a very nice talk, and we had a brief conversation — I believe about the Veneziano model, which was the subject of my Ph.D. Thesis at the Niels Bohr Institute in Copenhagen. There was also a minor drama involving their hotel room. Since my German was considerably better than theirs, I appointed myself an unofficial diplomatic representative, explained the matter to the hotel owner, and the crisis was peacefully resolved.

Our next encounter was, so to speak, on paper. Together with Ziro Koba, I had written a paper presenting an explicit model exhibiting KNO scaling [1]. Andrzej and Elżbieta later published another paper in which they made several very kind comments about our work [2].

We met again in person at Fermilab in 1978, where Andrzej and his family were spending a year. I was also a visitor at the time and, a few years later, joined the Fermilab staff, remaining there until 1982.

The Fermilab post office, however, was not prepared for two Andrzej's with suspiciously similar surnames. Letters addressed to Andrzej Białas regularly found their way into my mailbox, and mine just as faithfully migrated to his. At the beginning, we did not even realize the confusion and opened each other's correspondence. Only after some mutual surprise did we understand that Fermilab had inadvertently created a joint Polish correspondence exchange program. Thereafter we exercised greater caution — though I suspect the post office never entirely recovered.

In 1978, at Fermilab, I performed, together with William A. Bardeen, David W. Duke, and Taizo Muta, the first complete NLO QCD calculation of deep-inelastic structure functions. This work led to the so-called $\overline{\text{MS}}$ scheme, which has been used by everybody ever since [3].

A year earlier, in 1977, at CERN, Karel Gaemers and I had derived analytic expressions for the Q^2 dependence of parton distributions. At the time, these became known as the Buras–Gaemers parametrizations [4]. The Q^2 dependence in that paper was, of course, only at leading order — that was simply the state of the art in 1977.

I believe it was Andrzej who, in the spring of 1979, suggested that we generalize these distributions to the NLO level. I immediately thought it was an excellent idea — after all, once one has opened Pandora's box with NLO calculations, one may as well continue.

As far as the analytic derivations were concerned, I was probably leading the effort. The numerical work, however, was entirely in Andrzej's hands — and in those days that was no small task. It was a very pleasant and productive collaboration. Soon after we completed the paper, Andrzej returned to Cracow. Our joint work was eventually published in *Phys. Rev. D* [5]. It is seldom that I am not the first author but, in this case, I was second. Possibly, if the Fermilab post office was responsible for ordering, I could have been first by accident.

In the 1980s, after I had moved to Munich, I met Andrzej several times at the Max Planck Institute for Physics, where I worked from 1982 until 1988. We also met a few times at CERN, in particular in 1993. On that occasion, I gave a seminar on the ratio ε'/ε , and a few theorists in the audience were attacking me rather energetically. Andrzej was present, and after the seminar, he praised my defense — which I appreciated very much.

Another highlight was the 60th birthday celebration of Kacper Zalewski in 1995, where I met Andrzej and Elżbieta again. It was a very warm and pleasant gathering.

We met again at the Zakopane School in 2003 and 2010 — both very enjoyable occasions.

In 2011, I became a foreign member of the Polish Academy of Arts and Sciences (PAU), and Andrzej, who was then the president of the Academy, handed me the diploma. I continued to visit Cracow from time to time and would meet him on these occasions.

Last year, while sorting through my books, I came across a copy of «W Puszczy» by Julian Ejsmond. It had been presented to Andrzej's son, Piotr Białas by the General Polish Consulate in Chicago on the occasion of his graduation from grammar school there, with best wishes for the future and for further success in his studies. Finding it was a small but touching reminder of how lives and histories intertwine across places and generations.

Except for my paper on KNO scaling with Koba and our single joint paper, my field of flavour physics had no overlap with his. Yet, I know from various conferences that he made very important contributions in the context of rapidity distributions and multiplicity distributions in high-energy collisions. Let me just mention three very highly cited papers [6–8] which surely are described by other contributors to this volume, who know this field much better than me.

Reaching 90 years and being as fit as Andrzej is a real achievement. In 2036, I will be approaching 90 but I hope that I will be able to travel to Cracow to celebrate his 100th birthday. I wish him all the best for the next ten years and beyond.

REFERENCES

- [1] A.J. Buras, Z. Koba, «Scaling behaviour of charged-prong multiplicity distributions in high-energy hadronic collisions and local excitation model», *Lett. Nuovo Cim.* **6S2**, 629 (1973).
- [2] A. Białas, E. Białas, «Impact Parameter Analysis of Multiplicity Distribution in High Energy pp Collisions», *Acta Phys. Pol. B* **5**, 373 (1974).
- [3] W.A. Bardeen, A.J. Buras, D.W. Duke, T. Muta, «Deep Inelastic Scattering Beyond the Leading Order in Asymptotically Free Gauge Theories», *Phys. Rev. D* **18**, 3998 (1978).
- [4] A.J. Buras, K.J.F. Gaemers, «Simple parametrizations of parton distributions with Q^2 dependence given by asymptotic freedom», *Nucl. Phys. B* **132**, 249 (1978).
- [5] A. Białas, A.J. Buras, «Simple quantum-chromodynamic parametrizations of parton distributions beyond the leading order of asymptotic freedom», *Phys. Rev. D* **21**, 1825 (1980).
- [6] A. Białas, M. Błaszyński, W. Czyż, «Multiplicity distributions in nucleus–nucleus collisions at high-energies», *Nucl. Phys. B* **111**, 461 (1976).

- [7] A. Bialas, R.B. Peschanski, «Moments of rapidity distributions as a measure of short-range fluctuations in high-energy collisions», *Nucl. Phys. B* **273**, 703 (1986).
- [8] A. Bialas, R.B. Peschanski, «Intermittency in multiparticle production at high energy», *Nucl. Phys. B* **308**, 857 (1988).