

The Białowieża Meetings on Geometric Methods in Physics: Thirty Years of Success and Inspiration

S. Twareque Ali and Theodore Voronov; Photos: Tomasz Goliński

Introduction

The Białowieża meetings, held under the general theme, “**Workshop on Geometric Methods in Physics**”, have been organized every year since 1982. The meetings are organized through the **University of Białystok** and currently by the Department of Mathematical Physics of the university. From their inception, the main organizer of the workshops has been Professor **Anatol Odziejewicz** of Białystok. The meetings themselves are held in the primeval **Białowieża Forest**. As a rule, the workshops last a week (from a Sunday to a Saturday), coming either at the end of June or the beginning of July. The beginning or the end of each meeting coincides with the night of the regional folk festival of “Kupala”, an event that has lent the colour of legend to the meetings. The first meeting, in 1982, was attended by about 15 physicists and mathematicians from several universities and institutes in Poland. Over the years, the annual meetings have grown, both in the number of participants and in the number of countries represented, and have become significant international events. Currently nearly a hundred participants from over 20 countries of Europe, North and South America, Asia, Australia and Africa participate each year. Created initially as a meeting place for researchers from the East and the West (in the times of the cold war), the Białowieża meetings are now a meeting ground for mathematicians and physicists from all over the globe. The participants have included some of the most established mathematicians and physicists of the world, as well as younger researchers and graduate students.

In fact the participation of (post)graduate students is among the main objectives of the workshops. Proceedings of the meetings have been published for nearly all the workshops, starting from 1992. The Białowieża series of meetings is presently considered by professionals in the field, in terms of scientific quality and pedagogical content, to be one of the most serious of its kind. Held on the eastern border of the EU (the town of Białowieża is but a few kilometres from the Polish-Byelorussian borderline), these meetings have a distinct ‘European flavour’ and this is another aspect that makes them so attractive. While inside the lecture hall the official language is English, outside of it the language could easily move from German to French to Italian or even to Farsi or Bengali and of course, one also hears lots of Polish and Russian, as well as Czech and Slovak. Indeed, one can hear an entire Babel of languages that unites today’s international scientific set.

There is a permanent **website** of the conference: <http://wgmp.uwb.edu.pl/>. It contains information about the current meeting, as well as links to pages with information on previous meetings (dating back to 1994).

Format of lectures

The lectures at each workshop are generally organized around a number of specific topics. The choice of topics depends mainly on the choice of each year’s key speakers. About a dozen or more (it can be up to 20 but 15 or so is more usual) plenary talks are given each year by prominent, internationally recognized mathematicians and



One of the general photos of the participants.

physicists, covering the topics that form the focal point for that year. These lectures are usually held during the mornings. The lengths of the lectures are tailored to allow for a pedagogically oriented coverage of the topic. Apart from the plenary talks, a large number of contributed lectures of various lengths are also scheduled, with a significant number of contributions from graduate students.



In the lecture hall.

The participants are all housed in nearby hotels and guest houses. Meals are usually taken together and a good number of social events are organized, mainly during the evenings. These allow for a week-long shared scientific, academic and social experience.



At the campfire.

A large number of scientific collaborations, joint publications and exchanges have come out of the meetings. The accessibility of the lecturers to the other participants, in particular the students, is one of the most valuable aspects of this shared experience.

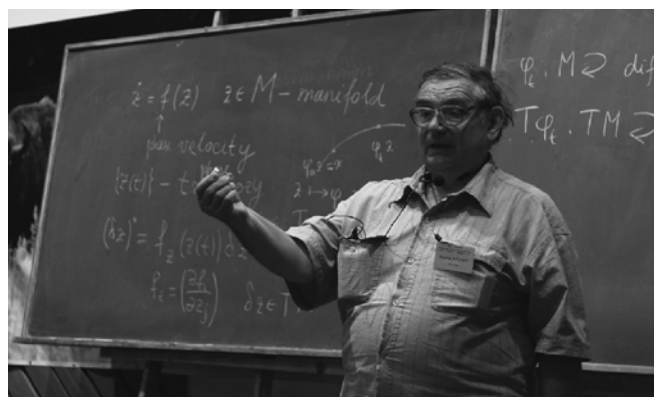
Topics in focus

Within the general theme of geometric methods in physics, the meetings focus on a number of specific topics each year. Among some of the major topics discussed in the workshops are quantization techniques, coherent states methods, Poisson and symplectic geometry, infinite-dimensional systems, harmonic analysis, non-commutative geometry, integrable systems, field theory and theoretical quantum optics. The organizers depend on an international advisory committee to suggest topics and speakers and to help contacting them each year. Consequently, the workshops deal with areas of mathematics and theoretic

cal physics that are at the frontiers of current research, with the lectures being given by experts in the field.

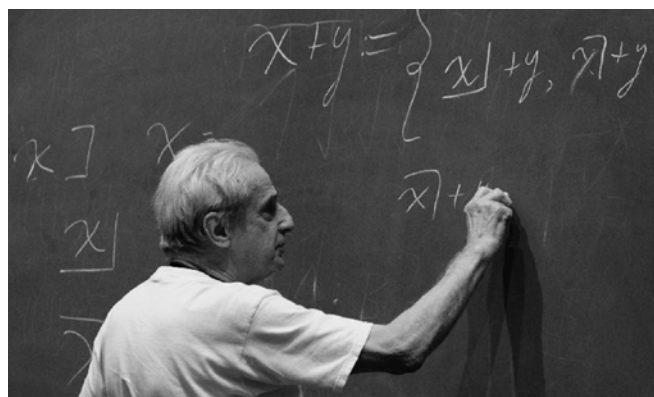
Profile of lecturers

The plenary speakers at the workshops have included Nobel laureates and other high profile mathematicians and physicists, including **D. Anosov**, **V. Buchstaber**, **F. Calogero**, **A. Cattaneo**, **D. Elworthy**, **G. Emch**, **B. Fedosov**, **R. J. Glauber**, **M. Kruskal**, **K. C. H. Mackenzie**, **G. W. Mackey**, **V. Mathai**, **M. Shubin**, **A. Veselov**, **Cecile DeWitt-Morette**, **Bryce DeWitt** and **S.L. Woronowicz**. (M. A. Shubin also played a substantial role in the organizing committee of the meetings over a period of years.)



A lecture by Dmitri Anosov.

Although a majority of speakers have been European (with a large proportion coming from Poland and Russia), there has been participation from a significant number of US, Canadian, Japanese and Latin American scientists. Additionally, participants have also come from Africa (Benin and Rwanda) and Asia (India, Bangladesh, Iran and South Korea).



A lecture by Martin Kruskal.

Organization of the meetings

Since the early times of the Białowieża meetings, they have gradually developed into a sort of 'informal **international research institute**' based on the participants of the meetings. As a rule, those who have attended the meeting once wish to come again and do indeed come when there is an opportunity. In the meantime, there are contacts and exchanges between the meetings, with an anticipation to meet 'next time in Białowieża', often culminating in some joint work conceived in the hospitable and inspiring

Białowieża atmosphere. Participants and organizers of the meetings, including those who serve on the scientific advisory board, act as editors for the proceedings, referees for the texts, etc., all making for an ever-growing network of mathematicians and physicists who see the Białowieża meetings as an important part of their research life and are dedicated to helping them continue.

Each year, typically on the third or fourth day of the conference, in the evening after the lectures have finished, a meeting of the informal advisory board is convened. The board does not have a fixed membership; some people involved with the conference for many years have a seat there but the rule is that each year's plenary speakers are asked to attend and they make up the majority of the advisory board for the coming year. The main task of this annual advisory board meeting is to discuss the list of invited speakers for the next conference. Each participant of the advisory board can suggest candidates, who are then discussed together. Typically the initial list consists of too many candidates and some "preference order" is assigned to them. After that, the job of each board member consists of contacting the candidates proposed by them (commonly approved by the advisory board and with a certain order of preference) and to recruit them as the next conference plenary speakers at Białowieża. When an informal acceptance is obtained, the formal side is taken up by the local organizers at the University of Białystok, who send out the official invitations. Two objectives are achieved by such an arrangement: (1) under the assumption that the conference plenary speakers in year N are truly brilliant, they (in their capacity as members of the advisory board) suggest no less brilliant *different* mathematicians or physicists as potential plenary speakers for the year $N+1$, so the high level is maintained together with the continuity of the principal topics; and (2) at the same time, since the advisers cannot obviously invite themselves, there is always a flow of new people invited to speak, who thus join the 'Białowieża community', while many of the invited plenary speakers of year N or one of the previous years come again to the meeting in year $N+1$ (at their own expense).

Proceedings of the meetings

The proceedings of the meetings have been published, more or less continuously, since 1992. The proceedings volumes have appeared through major publication houses, such as World Scientific, the AMS, Kluwer and Polish Scientific Publishers, and also in journals, such as the *Journal of Nonlinear Mathematical Physics* and *Reports on Mathematical Physics*. A special volume consisting of invited articles was brought out through World Scientific to commemorate the 20th anniversary meeting in 2002. Since 2007, the proceedings volumes have been published by the AIP (American Institute of Physics). It is worth mentioning that the editors of the proceedings have taken special care to ensure that all the papers appearing in the Białowieża proceedings volumes are properly peer-refereed. This is important for maintaining the high standard of this publication and also because it makes such papers "count" towards research profiles (something that younger researchers have to take into account).

Meeting location and history

Białowieża (pronounced "bye-lah-VYE-zhah", the name meaning "White Tower") is a village on the border of Poland and Byelorussia, some 60 km from the regional capital Białystok and about 260 km from Warsaw. This region of Poland, called **Podlasie**, has a distinct character due to its sizeable Russian minority (Eastern Orthodox in religion). One can see typical Orthodox churches with their cupola and eight-ended crosses. In the village of Białowieża there is one such church dedicated to St Nicholas and built by the last Russian Emperor Nicholas II.



Białowieża: St Nicholas Orthodox Church. Photo from Wikimedia Commons

For centuries, the village used to be the centre of a royal hunting reserve for Lithuanian grand princes, Polish kings and Russian Emperors in succession. In a beautiful park, actually on the pathway from the conference accommodation to the conference hall where the lectures take place, the participants can see an obelisk in memory of the particularly outstanding hunting of the Polish King Augustus III in 1752. The hotel containing the conference hall stands on the site of the former Tsar's palace built in 1894. It was damaged by a German shell during the last war and was completely demolished in the 1960s. There is an exposition available where visitors to Białowieża can see pictures of the palace; the surrounding park (the Palace Park) and the surrounding buildings that remain recall the beauty of the palace.

Białowieża is located inside a gigantic **primeval forest**, the **Białowieża Forest**, now within the borders of two countries, Byelorussia and Poland (possessing about two thirds and one third of the forest respectively). On the Polish part the ancient forest is partly protected by the Białowieża National Park. The social program of the Białowieża conferences has always included an excursion to the forest and the open air zoo where visitors can see various local animals including the famous Białowieża "**żubr**", i.e. *wisent* or *European bison* (a cousin of the American bison). The żubr remains the symbol of Białowieża. Wisents used to be regarded as extinct but were reintroduced back into nature in the course of the 20th century. The Białowieża Forest is one of the very few places in Europe where one can see wisents in their natural environment.

Currently the village of Białowieża is one of the well-known Polish country resorts. It is still very quiet there.

During the conference, the participants live in several of the numerous Białowieża hotels and guest houses, all located very close to where the lectures are held. The participants are immersed in a homely rural atmosphere with excellent food and outstandingly friendly service. The hotels are quite simple but comfortable. The insides of the hotels, which are decorated with hunting trophies, vividly recall past times. Part of the social program of the conference is related to the private open air **Museum of Wooden Architecture and Domestic Life of the Russian People in Podlasie Region** (known as the “Białowieża Skansen”), which was founded by Professor Odziejewicz about the same time as the Białowieża conference. The museum has developed over time and currently includes several large wooden peasant houses suitable for living (and actually used as free accommodation for students coming from Białystok) and two windmills, all brought to the museum from their original locations in various Podlasie villages and re-assembled. The conference campfire takes place on the territory of the museum.

The conference hall, situated in the middle of the Palace Park, is very spacious and equipped with all modern presentation facilities, as well as (for the time of the conference) with the traditional blackboards that are preferred by some participants”. The blackboards are brought from the University of Białystok.

Funding of the meeting

The University of Białystok has provided generous funding over the years for these meetings. Additionally, at different times, partial funding has been made available by the Embassy of France in Warsaw, the Stiftung für Deutsch-Polnische Zusammenarbeit and the Polish Ministry of Education.

It should be emphasized that over the years, a lot of work that has made these meetings possible has been done on a voluntary basis, including the skilful work of the editors of the proceedings and the work of maintaining the meeting **homepage** on the Internet. A huge share of the organizational and technical help, especially during the meetings, has been done by the young mathematicians and physicists (PhD students and postdocs) from the University of Białystok. Booking rooms almost a year in advance with the local guest-house owners has also helped to keep the costs lower. Some of the participants are housed in the museum (“Skansen”) for free. That is how the museum sponsors the meeting. Occasionally there are larger and smaller donations from local businessmen who view these annual meetings as an important part of Białowieża life and take pride that their little town once a year becomes a prominent international scientific centre. The local organizers work very hard to keep the costs of the meetings low (never at the expense of the quality).

All that said, with prices in Eastern Europe steadily going up and approaching those of elsewhere, maintaining the conference without financial help from any “external” funding bodies becomes increasingly difficult. The organizers have already had to increase the registration fee for the participants to the present €450 (the invited speakers

are exempt). The fee includes full board and lodging for the duration of the conference (7½ days including arrival and departure), as well as transportation from Warsaw and back, so it still looks low by average European standards. The organizers typically offer some support to students. However, any further increase of the registration fee may negatively affect that, as well as the participation of mathematicians and physicists from Eastern Europe. Lack of external funds also puts a severe restriction on the number of plenary speakers that the organizers can afford to invite. Sometimes most attractive suggestions for a speaker have to be put aside because of the impossibility of funding more in a given year. Obviously, getting regular funding from European sources can substantially change the situation. There is a unique opportunity to help this remarkable European scientific initiative that has been run by volunteers and abundantly proved itself over almost thirty years, and to allow it to continue with the same success, as a focus of inspiration and an informal research centre for a great number of mathematicians and physicists for many more years to come.



Syed Twareque Ali [stali@mathstat.concordia.ca] is a professor at the Department of Mathematics and Statistics at Concordia University, Montreal, Quebec, Canada. He received his PhD in mathematical physics (1973) from the University of Rochester. His areas of research include square integrable group representations, quantization theory, coherent states and wavelets. He is an author of three books, editor or co-editor of 15 volumes and author of over 100 research articles.



Theodore Voronov [theodore.voronov@manchester.ac.uk] is a Reader in pure mathematics at the School of Mathematics of the University of Manchester, UK. He was born in Moscow and received his undergraduate and graduate degrees from the Department of Mathematics of Moscow State University (MA in 1984 and PhD in 1989). He has worked at Moscow State University (1991–1996), the University of California at Berkeley (1997) and the University of California at San Diego (1998) and has held a position in Manchester since 1999. His areas of research include geometry, topology and mathematical physics, in particular supermanifolds, bracket geometry, quantization, index theorem, super linear algebra and integral geometry.



Tomasz Goliński [tomaszg@alpha.uwb.edu.pl] received his MSc from the University of Białystok. He is a researcher at the Department of Mathematical Physics of the University of Białystok, Poland. Besides mathematical physics, his interests include artistic photography.