



Asta Pellinen-Wannberg
Umeå University, Department of Physics and
Swedish Institute of Space Physics
S-90187 Umeå, Sweden
Tel: +46 90 786 7492
E-mail: asta.pellinen-wannberg@umu.se

Introduction from the Associate Editor

It must have been in the late 1980s that I heard for the first time from my colleagues at the Swedish Institute of Space Physics about an extremely smart and competent Russian female plasma physicist with whom everybody wanted to collaborate. Her name was Nataly Blagoveshchenskaya and she was from Leningrad. I met sympathetic Nataly for the first time at the 12th EISCAT International Workshop that we organized in Kiruna in 2005. I especially remember the discussions we had in the sauna, to which I invited all the participating female scientists after the meeting. We were sweating inside the dark sauna on the high benches, hitting ourselves with the soft birch whisks, meanwhile dipping in the cold lake, and

then sitting outside in a wooden-fired hot tub admiring the twilight sun for hours. All these rituals were very familiar for Nataly from the banya at her own dacha, outside Sankt Petersburg.

Nataly had a broad experience and unique knowledge of the stimulated plasma processes that she had acquired from the SURA Heating facility in Nizhnii Novgorod. In Nataly the profound theoretical plasma physics competence is united with the ability to do controlled experiments and interpret results from such experiments in our largest plasma laboratory – even though all-the-time variable – the ionosphere. We are greatly thankful for all the results she has contributed to with the work at the EISCAT Heating facility in Northern Scandinavia. A review paper on her scientific work on features in the artificially perturbed ionosphere appears in this issue.

Reflections on a Career in Radio Science

Nataly Blagoveshchenskaya

Arctic and Antarctic Research Institute
Bering 38 str., 199397 St. Petersburg
Russian Federation
Tel: +7 812 337 3191
E-mail: nataly@aari.nw.ru

My way into radio science started in the 1970s at the Polar Space Physic Observatory (PSPO) in Norilsk, a town in northern Siberia beyond the Arctic Circle. After graduating from the Electrotechnical University of Communication in Sankt Petersburg (at that time, Leningrad), I took a position as a junior researcher at the PSPO. I actually followed my husband, Dr. Donat

Blagoveshchensky, to Norilsk. He was invited to the PSPO to lead the newly organized radio wave propagation group. At that time, a brilliant and enthusiastic young scientist, Dr. Geli Zherebtsov, was the head of the PSPO. He organized and led the scientific research in various fields, including the ionosphere, the Earth's magnetic field, visible aurora, and radio wave propagation. The PSPO was a division

of the Institute of Solar Terrestrial Physics, ISTP (former Institute of Earth Magnetism, Ionosphere, and Radio Wave Propagation) of the Siberian Branch of the Russian Academy of Sciences (SB RAS) in Irkutsk. Dr. Zherebtsov later became the Director of ISTP.

I have been fortunate in my career. In the 1970s, my main scientific interest was the propagation of HF radio waves at high latitudes. The main attention was focused on the features and behavior of the HF radio signals depending on the length and the orientation of the radio path, the operating frequency, and the geophysical conditions. Gellii Zherebtsov was my supervisor. My first large conference was the All Russian Conference of radio wave propagation, which was held in 1978 at the Tomsk State University. I defended my PhD thesis in radio physics at the same university in 1979.

From the 1980s, my scientific interest moved to a new field, ionospheric modification by powerful HF radio waves. The heating facility SURA had recently been built in Nizhnii Novgorod (in that time, Gorkii). I was involved in the SURA experiments and was greatly impressed by them. At that time, we returned to Leningrad, and I started to work at the Department of Geophysics at the Arctic and Antarctic Research Institute (AARI) as a senior scientist.

The early 1990s was a hard time for Russian science. We lost many scientists, but managed to maintain the core of our department at AARI. At the same time, the scientists had a new opportunity to join international collaborations, have personal contacts with foreign scientists, and attend conferences and meetings abroad. My first conferences abroad were the COSPAR meeting in Hamburg in 1994, the Heating seminar in Tromsø in 1994, and the EISCAT Workshop in Corsica in 1995. These conferences came to play a key role in my further research, closely related with the EISCAT Scientific Association for the coming 25 years.

Starting out the investigations at EISCAT, I found that there was a lot of potential to improve the use of the HF Heating facility to study the ionosphere-magnetosphere interactions, and I was able to contribute to that field. Studies were carried out at the EISCAT Heating facility (Tromsø, Norway) in the collaboration and with the help of funding support from the Uppsala Division of the Swedish Institute of Space Physics (Prof. Bo Thidé), the Tromsø University (Prof. Asgeir Brekke), and various grants from EISCAT, INTAS, RFBR (Russian Foundation for Basic Research), etc. In the framework of these investigations, it was found that a controlled injection of powerful HF radio waves from the ground into the nightside auroral ionosphere towards

the magnetic-field line can produce a modification of the ionosphere-magnetosphere coupling, a generation of the local field-aligned current system, and can trigger local auroral activation. With warm feelings, I remember fruitful discussions and collaboration with Bo Thidé, A. Brekke, M. Rietveld, and M. Kosch regarding the results obtained and newly planned experiments. I received the DSci (the highest Russian scientific degree, corresponding to Research Professor) in Space Physics at the Sankt Petersburg State University in 2002.

My activity at EISCAT was greatly intensified in the 2000s. After more than 10 years of collaboration with the EISCAT facility, I worked hard at getting an agreement between the EISCAT Scientific Association and the Arctic and Antarctic Research Institute (AARI). In 2008, the agreement was signed. That allowed Russia to become an associate member of the EISCAT on the basis of the AARI. Scientists from AARI got the possibility of carrying out regular experiments (two campaigns per year) at EISCAT. A large number of various EISCAT/Heating experiments were carried out from 2009 to 2016. In the course of these experiments, it was found for the first time that extraordinary-polarized powerful HF radio waves radiated into the F region towards the magnetic field are able to generate extremely strong artificial ionospheric disturbances. Their features and conditions of excitation were investigated. In this step, I am greatly thankful to Prof. T. Yeoman (Leicester University, UK) for support by the CUTLASS radar observations in the course of our EISCAT experiments, and Dr. I. Häggström for help in the spectral processing of the EISCAT UHF incoherent-scatter measurements.

How should I summarize my career after many years in science? I have been happy to do research in fields that are extremely important and interesting for me. I have been lucky to work at the Department of Geophysics at the AARI for more than 30 years with Prof. Oleg Troshichev, who was the Head of Department from 1983 up to 2018. I have been happy to work with clever scientists from my laboratory who have supported me during many years. Actually, we are a team carrying out successful scientific research related to the modification of the high-latitude ionosphere by powerful HF radio waves. I am thankful to my team members, especially to Dr. T. D. Borisova, Dr. A. S. Kalishin, D. D. Rogov, and V. A. Kornienko. Since I became the Head of the Laboratory, I have been able to give several young scientists a chance to try research as a lifestyle. I have been able to attend geographically distributed scientific meetings, workshops, and conferences, kept contact with my colleagues abroad, and to live and work in St. Petersburg, which is the most beautiful city in Russia.