Obituary

To the memory of Nikolai Markovich Sergienko

With deep sorrow we inform that Nikolai Markovich Sergienko, an outstanding scientist, a corresponding member of NAS and NAMS of Ukraine, Dr. of Sc. (Med.), Professor, Honored Worker of Science and Technology, Laureate of the State Prize in Science and Technology, Professor of Ophthalmology Department of Shupyk National Medical Academy of Postgraduate Education, Vice-President of Association of ophthalmology surgeons, and a scientist who is well-known not only in Ukraine but abroad, passed away on June, 29, 2017. He was 83.

He devoted his scientific and practical activity to issues of the optical system of the eye, nearsightedness, intraocular correction, and eye microsurgery.

N.M. Sergienko was born in the family of craftsmen in a town of Slovyansk, Donetsk region, on October, 4, 1934. The family belonged to the Cossacks. His children's years were spent under the terrible conditions of German occupation and night bombardment. He received secondary education at secondary school for boys No 15 which had an excellent teaching staff, especially in history, geography, mathematics, and physics. Despite the difficult economical conditions of the post-war period, the conditions for children educations were favorable. Kolya Sergienko did sportive gymnastics for two years, and then he became keen on music. He learned to play the accordion and took the first places at the regional competitions, performed Czardas by Monti on the radio, and composed his own music. However, when he was in the eighth form and influenced by physics lessons, he started invention activities.

At first, he constructed a so-called perpetuum mobile, then a steam engine, and, finally, an internal combustion engine. Especially successful was the rotary engine.

His wish to implement a new engine into the practice, particularly in aircraft construction, gave rise to the idea to enter Air Force Academy. But suddenly, there was an obstacle: his vision got worse, both eyes had mild myopia. What military career can be if you have low vision? Impaired vision anxiety impelled to analyze visual phenomena and pictures of unclear perception of the world. So, the schoolboy got an idea to assess the vision according to a degree of blurring of observed objects. Meanwhile, vision got worse month after month. Ophthalmologist's examination did not confirm an increase of myopia, but the schoolboy's own observations had the opposite result. Since then, he did not turn to professional ophthalmologists; he himself registered the myopia growth and selected the glasses. And running ahead, it should be noted that, later, these analytic

observations were the basis for his two dissertations and a number of patents.

In 1952, on graduating school with a silver medal, Nikolai Sergienko went to Kharkiv to enter Air Force Academy. Concerning his impaired vision, his documents were not accepted at first but they agreed later since his willing was to become a military engineer, not a pilot. However, the documents were given back in two weeks. Nikolai Sergienko recellected words of his mother who had advised him for a long time to be a doctor. So, the documents were taken to pediatric department of Kharkiv Medical Institute.

Being on his sixth year of studying and after his student scientific paper on congenital heart disease being published, he returned to the idea of myopia degree assessment with the method he had used in his school years. He consulted with his professors of Ophthalmology Department. The issue was new and unclear but the Head of Department, Professor M.E. Braunstein, allowed him to attend the clinic and to investigate.

After the first failures, he wrote a report on A New Method of Measurements of Refraction, Astigmatism, and Vision Acuity a month before his finishing the Institute. Professor M.E. Braunstein supported his work and gave the opportunity to the six year student to present a twenty minute report at Department and Clinic meeting. Curiously enough, there were no critical comments.

The rumors about the energetic student came to Professor I.I. Merkulov, Director of Hirshman Eye Disease Institute, who proposed Nikolai Sergienko to apply for clinical residency. He was on top of the world; however, in a month, there issued an order of Ministry of Health telling that clinical residency can be applied for only by physicians with two year practical experience. Attending the Ministry of Health in Kyev had no result. M.N. Umovist who that time headed Postgraduate Education and Residency Department, explained that he had to work as a pediatrician by distribution.

Donetsk regional health department insisted him to work as a pediatrician in a town of Khartsizsk but then they agreed to distribute him in a regional center, in Aleksandrovka. The question if he could work as an eye doctor there was answered as, 'There you will work whatever you want'. Indeed, at Aleksandrovka regional hospital, which had never seen an eye doctor, he had to be, apart from an ophthalmologist, a surgeon, an otolaryngologist, a neuropathist, and a therapist.

In spite of his full-time job, N.M. Sergienko continued his scientific investigations, individually worked with literature, studied English and German languages. In May 1960, in Moscow there was a conference of ophthalmology innovations where N.M. Sergienko presented his report on New Methods of Visual Acuity Assessment. The conference information in media highlighted three presentations including the mentioned one. The success resulted in the fact that Professor I.F. Kopp, Head of Ophthalmology Department in Donetsk Medical Institute, sent him a telegram inviting the author to enter the Postgraduate Education Department.

N.M. Sergienko defended his Candidate dissertation on Effect of Image Quality on the Ocular Fundus on the Visual Acuity in 1964 and Doctorate dissertation on Studying to a Theory of Clinical Refraction of the Human Eye. The both works were the development of the myopic eye observations, which had been made during his school years. Meanwhile, Nikolai Markovich settled down to married life. His wonderful wife gave birth to a son, Andrei.

Youthful Doctor of Medical Sciences, who had not even become an associate professor, was not taken as a head of department. He had to apply on a competitive basis for a position in farther regions. At once, he was selected as Department Head in Novosibirsk and Makhachkala, the capital of Dagestan. Taking into account his interest in underwater hunting, he chose Makhachkala which is situated by the Caspian Sea.

In Makhachkala he could continue his individual work and, there, he succeeded in mastering microsurgical equipment on an operating microscope which had to be repaired and reconstructed. Those years, he had an opportunity to communicate with Svyatoslav Fedorov, a legendary ophthalmologist, to get acquainted with his pioneer works on intraocular lenses and tendencies in the modern ophthalmic surgery. Those were very useful meetings and talks which helped to successfully develop the eye surgery in Ukraine.

In 1977, there was a chance to return to Ukraine since he was selected on the competitive basis as a Professor of Ophthalmology Department at Kyiv Advanced Training Institute. According to the rules, Professor M.N. Umivist, Institute Principal, had to introduce him to the minister. On their way to the ministry, in a car, there was a conversation. 'Was it you who worked in Postgraduate Education and Residency Department in 1958?' he asked the principal. 'Yes', he answered. They had a laugh: it turned out that they had known each other for 19 years.

With his new chief, Professor V. E. Shevalyov, an outstanding world-renowned ophthalmologist and a disciple of academician V.P. Filatov, he worked only for a year. After his death, N.M. Sergienko became a Head of Ophthalmology Department and a chief ophthalmologist of Ministry of Health of Ukraine.

In his scientific and practical work, he focused on intraocular correction and eye microsurgery in general. Innovative activity was oriented to designing a successful construction of the intraocular lens. In 1978, there already were three new type intraocular lenses implanted. They performed 13 implantations in 1979 and 47 ones in 1980. Rehabilitation of cataract patients was a great success. It is important that the developed model of the artificial lens was more secure and simpler than a known model of Svyatoslav Fedorov. The artificial lenses were manufactured by the author himself in a home laboratory, using lenses made in contact correction laboratory. In 1981, Yu. M. Kondratenko and O.Z. Stavnichuk, clinic residents mastered the implantation technique. Artificial lens manufacturing was moved to two institutions of medical equipment. In five years, there were 20 000 intraocular lenses made and implanted every year. Suffice to say that intraocular lens implantation was made occasionally in the Eastern Europe at that time, and only in single centers in the Western Europe. In Ukraine, thanks to activity of Ophthalmology Department of Kiev Advanced Training Institute, eye microsurgery with intraocular lens implantation was spread in the regions. Implantation of the intraocular lenses started to be performed in regional hospitals. Of great importance was Eye Microsurgery Department, headed by Z.F. Veselovskaia, which was organized with academician A.O.Shalimov's blessing in his institute of surgery.

Success in the field of intraocular correction in Ukraine became known in USSR republics and far abroad. N.M. Sergienko performed exhibition surgeries in Leningrad, Tomsk, Zagreb in Croatia, Belgrade in Serbia, Banja Luka in Bosnia and Herzegovina, and Budapest in Hungary. In 1986 there was an industrial exhibition of

the USSR in Buenos Aires where developments of Kiev Ophthalmology Department dominated in the field of ophthalmology. N.M. Sergienko presented a lecture on the issues of intraocular correction at the local university. After the exhibition, Sergienko's artificial lenses, which had been patented so far in the USA, Italy, Poland, and Czechoslovakia, were allowed by Licensintorg for export.

Statistical data demonstrated a significant decrease in cataract incapability in the Ukrainian republic, which gave an evidence of essential social effect of using intraocular correction of aphakia. In 1988, a team of specialists, headed by N.M. Sergienko and engaged in wide implementing intraocular lens implantation, was awarded the state prize in the field of science and technology.

There was another direction which was actively developed in Kiev: that was a surgical method for myopia correction, or radial keratotomy. The thing is that Professor Svyatoslav Fedorov made radial keratotomy so popular that Ministry of Health of Ukraine received plenty of letters asking to refer them for surgical correction in Moscow. There was a demand to implement this correction in Kiev. Professor N.M. Sergienko designed an original construction of a diamond knife and a new technique for surgical correction of myopia and astigmatism. At a specialized ophthalmic policlinic, a team of specialists performed outpatiently about 2 000 surgeries every year, which almost stopped the flow of those who wanted to correct myopia out of Ukraine.

Nikolai Solodkii, a disciple of Nikolai Markovich, defended with excellence the dissertation on this topic and the method itself spread even in Paris. That was the Kiev technique that was only used in the 80s; five scientific papers were published in France; and Switzerland started to manufacture the Sergienko's diamond knife. Science was developing and changing very fast, and radial keratotomy started to disappear in the beginning of 90s, giving the place to effective eximer-laser technologies.

Nikolai Markovich believed that the most significant achievement in his life was creating Eye Microsurgery Center in 1988. Its history started in the early 1988s. Professor V.E. Shevalev left a then-good clinic with 120 beds behind him. A mean bed-day was 20 days so the clinic capacity was not very big. However, when surgical technology progress was put into operation, the number of patients started growing. There was a need to found a specialized policlinic. There was a good luck. The first level of the apartment house was available across the street there. The authority of the ophthalmic clinic helped to convince the district administration to put up money for renovating and to open the ophthalmic policlinic with out-patient surgery block, where later, by the way, center of surgical correction of myopia functioned. District party committee guaranteed to open the consultative ophthalmic policlinic to the V.I. Lenin's birth anniversary in 1982.

Later on, there was another lucky chance. N.M Sergienko as a chief ophthalmologist of Ministry of Health had to perform treatment and surgeries to influential persons and politicians. He successfully operated on V.V. Shcherbitskii's mother and, later, a sister of A.A. Titarenko, the second person in the party hierarchy, who very much appreciated work of medical professionals of Ukraine. When his sister was released from hospital, A.A. Titarenko, standing in the corridor, asked him how he could help ophthalmology service. Nikolai Markovich even gave an example of how Fyodorov Eye Microsurgery Complex, where a huge ophthalmic complex was being built, was financed. Not like that but something had to be done in Kiev. A.A. Titarenko scratched his head and said than building a new complex was a very complicated thing. 'Why a new complex?' replied Nikolai Markovich. They were standing at the window just opposite the building of the obstetrical clinic, which was always closing down because of insanitation. And quite near, there was close-to-finish building work of a new obstetric and gynecological clinic. 'Why shouldn't we reconstruct the obstetrical clinic?' The guest pointed that that was a good idea and left. In a week, Nikolai Markovich was telephoned and invited to attend the meeting at City Executive Committee. He came and saw about hundred people, among them there were military and militia men. There were no physicians at all. 'Didn't he get lost and attend the wrong meeting?' 'No', he was explained, 'this is where you should be.' The matter was that a new construction project required confirmation of a number of authorities, which took the whole year. A.A.Titarenko invited all the authorities to City Executive Committee where they signed all necessary documents. The reconstruction of the obstetric clinic and foundation of the ophthalmic clinic started immediately. The necessary financing and purchasing modern technical equipment was allocated from the budget. In 1988, Eye Microsurgery Center with 180 beds was put into operation.

Eye Microsurgery Center became a leader in ophthalmic surgery in Ukraine. The number of surgeries increased to 18 000 a year. Introducing the new techniques made it possible to decrease the mean bed-day to 2.3 (6.8 throughout the country), a department of out-patient surgery as an example of ophthalmic surgery organization in the future was put into operation. Over 500 patients a week were operated on in the clinic, of them, only a half was Kiev residents. The cataract surgery level grew as high as the world's one. Live surgery master classes helding with participation of the best world ophthalmic surgeons, for instance, Dr. Ph. Cruzafon (France), Akahoshi (Japan), showed that our Ukrainian specialists were up to the world standards.

Eye Microsurgery Center became a basis for Ophthalmology Department of Shupyk National Medical Academy of Postgraduate Education. On the basis of Eye Microsurgery Center, Specialized Council of Candidate dissertation defense worked from 2002, and Specialized Council of Candidate and Doctorate dissertation defense of 14.01.18 specialty "Ophthalmology" has worked since 2015. 14 Candidate and two Doctorate dissertations have been planned and are carrying out.

Nikolai Markovich's Doctoral dissertation was based on the measurement of very small optic defects of the eye using an original unit. Only two other scientists, physicists Smirnov from Russia (1961) and Van den Brink from Holland (1962), managed to perform such work. Those were clear scientific investigations which got their development in the 90s. An internationally granted team of the former defense industry workers (418 USTC, 1996-1998) was created in Kiev in order to measure so-called wave aberrations of the optic system of the eye. The team was headed by V.V. Molebnyi, a laser weapon specialist; Professor N.M. Sergienko was a medical consultant and theorist of the development. In 1998, the first aberrometer which got the name of Tracey was designed and, afterwards, this direction in the world science got the global avalanche-like character. Now, Tracey aberrometer is manufactured in the USA according to Ukrainian patents, but a half of details were produced in Cherkasy. A producing company presented one Tracey unit (60 000 dollars) to its theorist, Professor N.M. Sergienko.

N.M. Sergienko always paid much attention to education of young scientists. He supervised carrying out 45 Candidate and 8 Doctorate dissertations. Among his disciples are professor G.Aliev, Head of Ophthalmology Department in Makhachkala, one of the Russian prominent specialists in eye's refraction; Professor K.P.Pavlyuchenko, Head of Ophthalmology Department in Donetsk Medical University; Professor Z.F. Veselovska, Head of Iris Diagnostic Ophthalmology Course of Surgical disease department of KMI of UAFM; Professor N. V. Pasyechnikova, Director of Filatov Eye Diseases and Tissue Therapy Institute; Professor S.A. Rykov, Head of Ophthalmology Department of Shupyk National Medical Academy of Postgraduate Education; Yu. M. Kondratenko, a professor of Ophthalmology Department at Shupyk National Medical Academy of Postgraduate Education, a leading ophthalmic surgeon of Ukraine; I. V. Shargorodska, an associate professor of Ophthalmology Department at Shupyk National Medical Academy of Postgraduate Education. The son of Nikolai Markovich, Andrii, is Doctor of Medical Science, Professor, heads Medical Center "Ophthalmic Clinic of Professor Sergienko", is a professor of Eye Disease Deartment at National Pirogov Memorial Medical University, Vinnytsya.

Professor N.M. Sergienko is an author of more than 500 scientific papers including seven monographs, one textbook, 54 scientific methodological publications, about 50 patents and author's certificates, the most famous of which are Clinical refraction of the Human Eye (1975), Intraocular Correction (1990), Ophthalmic Optics (1991), The Scleral Rigidity of the Eyes with Different Refractions (2012), Ophthalmic Optics (2015).

Nikolai Markovich Sergienko's scientific school has been created and is successfully functioning at Shupyk National Medical Academy of Postgraduate Education.

N.M. Sergienko's significant achievements in the field of physiological optics found their logical conclusion and were dignified in the late 90's of the last century. Using the idea of Professor Sergienko, the Kiev team of physicists and engineers created the world's first wave spectral aberrometer that set the world alight in the field of vision correction and that even today is still beyond competition. In 1988, N.M. Sergienko was awarded State Prize in Science and Technology.

Innovative activity of N.M. Sergienko was not unnoticed. Professor N.M.Sergienko was elected as a corresponding member of National Academy of Sciences (1991) and National Academy of Medical Sciences (1993).

Professor N.M.Sergienko was Honored Worker of Science and Technology (1995), awarded the Order of Peoples' Friendship (1982), and Third (1998) and Second (2004) Class Orders of Merit.

Professor N.M. was a Vice-President of Association of Ophthalmology Surgeons, an Honored member of Polish Society of Ophthalmologists, a member of Editorial board of "Archive of ophthalmology of Ukraine", "Journal of Ophthalmology (Ukraine)" and of Advisory Boards of journals: «Vestnik oftalmologii» (Russia), «International Medical Journal», «Gavin Publishers. Ophthalmology Research and Reports» (USA), «Clinical Ophthalmology and Vision Science» (United Kingdom), «Ocular Infection and Hygiene» (USA-Germany), «Medychnyi vsesvit».

Nikolai Markovich was an excellent clinician, gifted scientist, and talented educator. Love to work and respect to people, sensitive heart and clear mind, rich knowledge and workability were combined in this person, what his colleagues, disciples, students, and patients are grateful for.

A collective that was created by him expresses condolences to his family and relatives in connection with such a heavy loss.

We will always cherish the memory of Nikolai Markovich Sergienko in our hearts.

Shupyk National Medical Academy of Postgraduate Education
Ophthalmology Department
Eye Microsurgery Center
Association of Ophthalmology Surgeons
Association of Pediatric Ophthalmologists and Optometrists of Ukraine
All Ukrainian Alliance of Cataract and Refractive Surgeons
Kiev Society of Ophthalmologists