

Challenges to Research, Science Writing and Publishing in Russia

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ABSTRACT

Scientists in Russia are increasingly faced with challenging situations that limit their competitiveness on the global arena, not least of which are the linguistic barriers. This paper provides some perspectives as to the rationale and challenges that scientists face in Russia when publishing in international journals of repute, or more generally. The work flow that leads up to the publication of a manuscript usually involves a culturally defined sequence of events that make the challenges faced by Russian scientists unique since they are influenced by culture and structural limitations, whether academic or political. We highlight the work by Mordovia State University to implement such collaborative research and publishing initiatives to internationalize its research projects. This paper represents a microcosm of science in Russia.

“As I am listening to you I start thinking that I should probably fire Education Minister [Andrey Fursenko] or someone else” President Dmitry Medvedev speaking at a meeting with scientists at his Gorky residence, May 23, 2011 (RIA Novosti / Dmitry Astakhov)

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Abbreviations: ASL, Alexander S. Lukatkin; IF, Impact Factor[®]; MSU, Mordovia State University

SOME STAGES IN PREPARATION OF A SCIENTIFIC PAPER

A scientific paper is the result of intellectual work of several researchers over a number of stages. Key among them are the following: 1. Statement of purpose and objectives of the experiment; 2. Carrying out experimental work; 3. Processing results; 4. Description of results; 5. Preparation of a manuscript; 6. Reading (and finishing the manuscript to the level required for a good publication); 7. Submission of an article to a journal and subsequent revisions.

Sometimes it is necessary to add additional experiments (if at stages 3, 4, 5 or 6 will show that a better understanding of the work requires additional experimental data). It is not always possible to define clearly or to know immediately what is needed to obtain convincing evidence of a scientific hypothesis, and this is a serious problem for many researchers. Therefore, stage 6 may consist of a large number of sub-stages, each of which requires the participation of researchers with different competence and scientific knowledge.

A good publication is considered by the Mordovia State University (MSU) as one that is included in one or more data bases, namely Thompson Reuter list, Scopus, Russian Science Citation Index, Higher Certification Commission Russian Federation (RF) List, and some others.

EXPERIENCE IN PREPARATION OF SCIENTIFIC MANUSCRIPTS AND THE PROBLEMS THAT ARISE

In MSU the individuals that usually participate in the preparation of an article include students, doctoral students, teachers and lecturers, and a professor.

They all have different functions in the preparation of the manuscript. Thus, the initial stage (stage 1) involves a professor who creates a basic idea and prepares the scheme of the experiment. Gradually, a young teacher or doctoral

student is brought in to assist in the preparation of methodological and material support of the work. This may include tasks such as preparing guidelines for laboratory training base equipment, reagents, glassware, analysis of the scheme required to carry out research work and prepare a list suitable for the implementation of experimental techniques. A student or graduate student collects primary experimental data and conducts the primary statistical processing of results, and graphics. In the next stage, during the analysis of the results, the professor evaluates the accuracy and reliability of the results, suggests changes to the scheme of the experiment and indicates the need for inclusion of additional data. After completing the experiment, a doctoral student or teacher prepares a draft version of the manuscript. All co-workers participate in the discussion of the manuscript, editing, selection of literature to discuss the results, and preparation to submit the article to a relevant journal.

This scheme of events raises a number of potential ethical issues, especially related to stages 2, 3 and 4.

A) Students, after completing the work, usually leave the university, and therefore do not participate in the writing of the manuscript, although they spent most of their time, effort and work on collecting, processing, construction, and design of a future experimental article. In this sense, in Russia, is their work sufficient to assign them co-authorship in an article, particularly in the light of the fact that they often complete specialist training in different geographic locations and contact with them is often lost.

B) PhD students often only collect and process data received by students without serious experimental work, although they are involved in writing the manuscript. On this basis, in Russia, they are fully entitled to be a co-author.

C) In Russia, teachers and professors are usually involved in manuscript preparation as theoretical consultants only. They develop the theoretical idea of the experiment, methods of research, comment and discuss the results, but usually their primary task is to prepare a manuscript and submit it.

Who then, among all the participating employees, are the real authors of this article? Usually there is no conflict of interest due to the fact that in Russia, we try to include all of the co-workers who participated in the work. At the stage of manuscript preparation and article publication all (except for students who have done their work, received their diplomas and safely forgotten about this scientific work) aim to create and publish a good paper.

Contradictions may arise later, after the journal article has been published. This is because conventionally, all co-authors of scientific articles have equal rights to the data presented in it, and all doctoral and post-doctoral students believe their results and try to include them fully in their dissertations. However, this is prohibitive by virtue of the fact that the thesis should contain only original experimental data and should not borrow from other dissertations. So here, to prevent such a conflict of interest, especially high leadership – the professor – must solve this problem either at the stage of manuscript preparation (excluding co-authors and co-workers who are not directly involved in key stages of work, or those whose contribution to manuscript preparation was less significant), or after the article was published by resorting to "forced methods", i.e. solutions of conflict that would prohibit certain employees from including data in their theses. This second way is very dangerous from an ethical point of view and based exclusively on the authority of a professor and respect for that professor by co-workers in a team.

PECULIARITIES OF PREPARATION OF SCIENTIFIC PAPERS IN RUSSIA

In Russia, traditionally researchers write articles in Russian. This is due to historical and mental characteristics of a culture of scientific research. For a long time, science in Russia (formerly the USSR) was cut off from the world's science. This was facilitated by the "cold war" and "iron curtain", ideological beliefs, the closure of many investigations (related to the creation of new weapons and researches, even indirectly, which could become the basis for new sources of weapons). As a consequence, difficulties with the supply of good reagents and equipment, the inability of simple contacts with foreigners, the long procedure of approval of publications in foreign press, the difficulties in postal correspondence with foreign institutes and journals, among other limiting factors, were common place. These difficulties are aptly summarized in one sentence by Dezhina (2011): "Research has never been a competitive advantage of Russian Universities".

With the collapse of the USSR and the development of democratic institutions in Russia, many problems have been eliminated, although not completely. Some improvements include introduction of scientific and technological progress, facilitated means to obtain information (collection in the Soviet Union took years), and contacts with other researchers. Moreover, to clarify issues related to an article does not require a long time for correspondence, simply several hours or even minutes. However, Russian language-based papers continue to be the dominant form of expression by researchers in Russia, and this has a logical explanation. Below we list 8 possible reasons for this continuing trend:

1. Tradition of scientific research in Russia: the representation of research work to the scientific community in Russia is often a self-contained character. That is, publication of the experimental results are considered to be presentable if they can be accepted in any article (journal, book of collected articles, proceedings, or conference thesis) because Russian authors (generalization) believe that this method allows them to report their results to the wider scientific community. For example, the second author (ASL), despite having 450 publications, he personally only considers 40-50 of them to be "serious" articles (either in Impact Factor® (IF) journals or books). Conference proceedings in Russian hold low scientific merit since con-

ference papers are rarely reviewed, so they do not carry much weight in Russia. In addition, in recent years (the past 10-15 years), despite a huge number of "international conferences", only a dozen or so participants come from several regions of Russia. Moreover, it is generally unimportant to the author if the proceedings or conference thesis or a small article in book is not read by almost anybody. This "I don't care" attitude stems from the fact that the Russian academic system demands of scientists quarterly, half-yearly and yearly activity reports. Under such pressure, Russian scientists tend to write one paper (with the most interesting data set) in a leading Russian journal, in Russia, because it is much easier than to attempt to publish the same paper in an English-based journal. Also, as a consequence of the lax system, many papers are sent to journals with a low quality of review or with no peer review (instant acceptance journals). However, despite this controversial stance in Russia, this is often sufficient for researchers and for heads of laboratories, departments, institutions and ministries, as this publication provides some points in calculating scientific productivity. The Russian Ministry of Education does not currently have – shockingly – any scale or system that would quantify productivity based on the publisher, journal parameters, or other factors. Moreover, these small publications require little effort to prepare, unlike a more "serious" article in a journal with an IF. Despite the lack of a point system, the Russian Ministry of Education and Science has increasingly emphasized the importance of publishing in journals with a high IF, and some scientists are interested in enhancing their citation index, as well as personal reputation index. Generally, there are many requirements for higher education institutions and scientific institutions, among them, an increase in the number of articles in journals with a high IF, a high citation index of researchers, etc. Journals from the list of the Higher Attestation Commission, Certification Commission, list of Russian Index of Scientific Citation, as well as Citation Indexes (Russian, SCI, Scopus), or Hirsh Index, are often taken into consideration.

2. Poor knowledge of English. Traditional training in Russia is aimed to obtain a final result, and the main principle of pedagogy here is the learning process, i.e., obtaining a sum of knowledge. In addition, there is a very small base for which the English language is applicable. This limited use of English within Russia and by Russian scientists is linked to a variety of reasons related to the former Soviet Union or USSR's period of development, when scientists did not contribute to the development of contacts with foreigners. In the Soviet period, all science in the USSR was separated from the world's science. Despite many Russian scientists being able to read articles in leading scientific journals, they could not publish their results in these and other foreign scientific publications. Even though English in the former Soviet system was taught in school and universities, the opportunity to use English in every day life was minimal, reducing the emphasis on English. Although the education system has not changed that much, the opportunities to use English, particularly in a professional setting, have increased. Even when Soviet scientists tried to send their results to foreign journals, this required official censorship permission. In other words, the former Soviet government forced scientists to publish in Russian (language) in Russian journals or forced Russian scientists not to publish in foreign journals. In order to send a manuscript to a foreign journal, it was necessary to obtain permission of supervisors and censorship organizations which required a very large effort and tended to promote only the most advanced research institutes. These efforts to publish abroad were so complicated and dangerous that almost all scientists did not attempt to publish their results in English or in foreign journals. In the modern period (i.e., since the 1990's), despite the lack of the "Iron Curtain", one serious limiting factor is the abject poverty of the majority of the population (which is ironically accompanied by continuous strengthening of

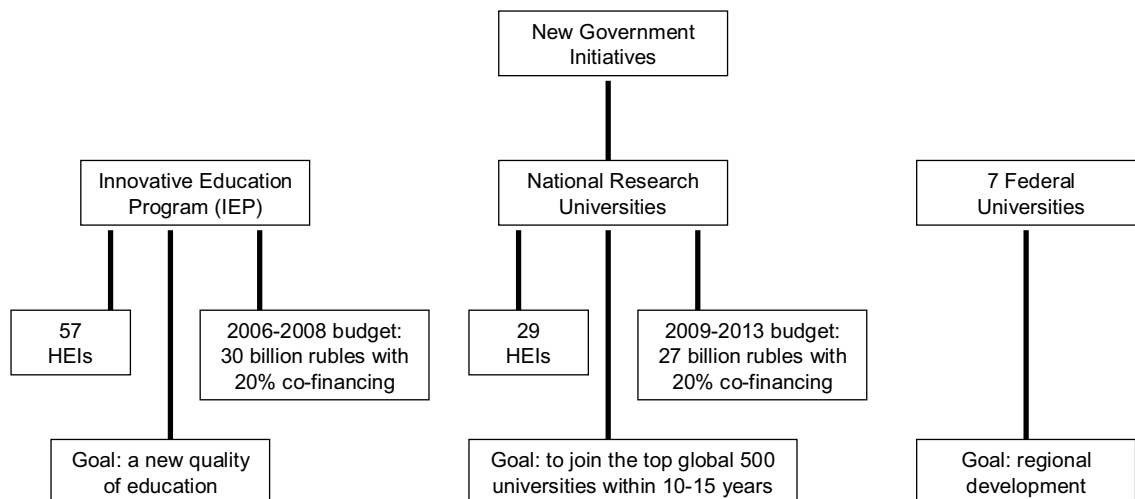


Fig. 1 Organogramme of Russian universities, highlighting a new structure that defines funding and objectives. Based on Dezhina (2011), with modifications. HEI = Higher Education Institute.

the growing number of millionaires and billionaires), limiting the possibility of travel abroad. For these reasons, poor knowledge of English among Russian scientists has become a broad and serious problem, unlike researchers in most developed countries. Of interest, in 2010, the number of US\$ millionaires in Russia grew by 13.6% from 117,700 to 133,700 (according to Capgemini and Merrill Lynch Global Wealth Management). Moreover, on May 1, 2012, it was revealed that the Russian population grew by 41,800 people (from a year earlier) and is already 143.1 million, with scientists from any field numbering nearly 400,000.

3. Due to ignorance or poor English language skills, as well as the sorry state of most academic libraries, many heads of departments, institutes and universities, governing bodies can not learn if the results of scientific work of their subordinates are published in English, feeding a vicious cycle of publishing experimental work in Russian language-based journals.

4. A Russian International Academic Publishing Company, “Nauka/Interperiodica” translates work conducted by Russian scientists into English, so that scientists of the world community can familiarize themselves with the leading works of Russian scientists in the relevant field of study. Often this is enough for Russian scientists to consider their mission accomplished in full. Therefore, one will find The Russian Journal of Plant Physiology will publish the same data-set in Russian in «Физиология растений» (literally Plant Physiology) and in English in The Russian Journal of Plant Physiology (MAIK Nauka/Interperiodica).

5. To publish an article in a journal with a high IF, it is necessary that the study be carried out using good material resources (equipment, reagents, experimental material). Shortcomings in preparing and conducting the experiment, the inherent science in Russia (due to a miserable state for many years), has deterred many researchers from attempting to write articles in leading journals.

6. Enormous problems arise at the stage of submitting the articles in a “serious” (i.e., included in leading data-bases) journal, especially one with a high IF (this case is discussed in detail later).

7. Lack of high material (i.e., monetary/financial) interest in publishing their own results in leading international journals. Work costs are very high, but other than the desire to show themselves and gain dividends in the future (for example, in the form of grants for research), these publications very rarely receive the equivalent in monetary terms.

It is easier to write 3 articles in Russian journals than 1 in a leading international journal.

8. Unwillingness of the majority of leaders at various levels guided by generally accepted scientific measurement criteria (e.g., citation indexes). This has both physical reasons (e.g., inability to obtain data from the Citation Index of the Science Citation Institute of Thompson Reuters, because access to the database is costly, about 50,000 US\$ per year) and subjective (psychological) reasons, since the vast majority of managers do not have serious publications. These managers, or officials (with academic degrees, specifically with titles of doctor and professor, but still official nonetheless), and who had once engaged in research, now determine science policy. Even though they have an outstanding reputation, they are mainly involved with managerial work to offer advice on new research approaches. Therefore, they take into account all publications, regardless of the quality of the journal, book or proceedings in which they are presented, so that in general the summarized quantity seems relatively normal, and to give the impression that they are “active”.

9. Excessive concentration of focus or lack of focus. According to Dezhina (2011), who bases her assumptions on the *Web of Science*, 95 of Russia’s 112 most cited journals are published by Russian Academy of Sciences (RAS) institutes, while only two are published by universities. Interestingly, ~60-71% of all fundamental research (based on total research funding) is conducted by RAS institutes, with only ~12-15% being accounted for by higher education institutes. That study also highlights how university funding tends to be channeled most predominantly towards teaching rather than to research. New measures by the government appear to be in place to create a new standard in higher education (Fig. 1).

10. Imbalance of research funding. Ironically, more funding goes to Russian scientists outside of Russia and to foreign researchers than to Russian researchers, even though the great majority of applicants are Russian researchers (Table 1).

Some language problems with the presentation of scientific results have been experienced by non-native English researchers who write in Japanese, Chinese, Romanian, Hungarian, Polish and many other languages and to a lesser extent, but still significantly so - in French and German. It is not by accident that almost all journals published in Germany or France have switched to publishing in English. Therefore, Russian journals that publish articles in Russian

Table 1 Applications for “mega grants” and grants awarded based on origin of project manager.

Origin or project manager	Total No. applicants (%) (n = 507)	Total No. grants (%) (n = 40)
Russian scientists	43	12.5
Foreign scientists	35	35
Foreign scientists from the Russian-speaking diaspora	22	52.5

Source: <http://mon.gov.ru/press/news/7876/>

are very willing to accept manuscripts written in English because it enhances their profile. Previously, such manuscripts were translated into Russian, but in subsequent years these journals introduced an English version of the Russian version of the journal. The logic most often provided by the editorial committees is that Russian readers have a good ability in reading English articles, and in order for that journal to enhance its IF, publishing the results in English would be the most logical step since most scientists would be able to read English and then include these results in the references.

Partly due to Russian mentality, writing articles in journals at various levels is almost exclusively the task of the researcher (student or senior), although the quality is always verified by the senior researcher or principal investigator. Therefore the choice of journal for publication is determined by and only conceived by the researcher, including the tasks they face (e.g., preparation for PhD thesis), as well as considerations of "security" reasons (it is easier to prepare 5 articles in non-peer-reviewed journals than one article in a leading journal), thus allowing them to obtain their PhD safely.

In addition, many Russian institutions and universities publish scientific proceedings, which include the results of studies conducted by researchers at those institutions. They are subjected to a minimum of literary editing, and publishing the results in this way is even easier than in a journal. Since, as mentioned earlier, that salary of a scientist or a professor is almost completely independent of the quality of publications, thus the tendency of the overwhelming majority of researchers is to minimize the labor costs of publication of the results of their scientific work.

There are several reasons that might require a Russian scientist to write a manuscript in a serious journal: personal energy and desire of the researcher to progress scientifically; preparing groundwork for future grant applications; a desire to show their results to the greatest possible number of scientists of a global community; the need to publish the results obtained in cooperation with researchers from different countries.

This background now brings us to the most important: what limits the preparation of an article and what factors might contribute to its publication?

DIFFICULTIES IN THE PREPARATION OF A GOOD RESEARCH ARTICLE

Several factors inhibit Russian scientists from seeking to write a scientific paper for a good or high level international journal.

1. Problems with the English. Many Russian colleagues from the beginning of Perestroika (<http://en.wikipedia.org/wiki/Perestroika>) and the collapse of the Soviet Union had the opportunity to publish scientific results in journals in English, but the vast majority of cases were denied - or simply, "Sorry, your article is not suitable for our journal", or more strictly - "bad English". Now, it is understood that the articles were not bad in terms of experimental material - just that they were written so badly that every reviewer immediately assigned a negative evaluation. The possible reasons for this are explained in the previous sections.

2. For successful article submission to a journal, the accurate selection of a journal is needed. It is not enough just to have good research and prepare according to the results obtained; one needs to focus more to address questions that

would cover the scope of a particular journal. With years of successful experience in publishing articles in Russian (former USSR) scientific journals, I (ASL) know in advance where to write, what and how. At the initial stage (first 10 years of my publishing activities), I (ASL) often had problems caused by exactly the wrong direction of articles to journals. Subsequent processing of an article in another journal could result in its successful publication. Difficulties have reached a new level: which journal to choose from a few hundred English-language journals that would find an article interesting and pertinent enough to publish.

3. The success of the manuscript defines a logical, coherent and clear description of the results. Often this requires further consultation with experts, sometimes with the requirements of directional changes of the experiment design and conducting additional experiments. This requires contact with a specialist who can selflessly (i.e. without pay for work) and excluding the time spent (so much to sort out the manuscript, problem statement, results, etc.), carry out such assistance. Such professionals are contacted at conferences or by e-mail, particularly if they are in the same field of study.

4. In addition to the previous point, accurate statistics will contribute to the manuscript's success. An improved experimental and statistical design is still one of the biggest problems facing authors wishing to publish an article in a journal with a high or moderate IF. In general, Russian scientists do not learn statistics only as undergraduate students in university. There are no courses to assist Russian researchers and professors. Each department does not have a statistician that can be freely contacted and consulted about a research or a paper statistics analyses. Is it not ethical for Russian scientists to include a statistician as a co-author if they have only conducted the statistical analyses.

5. The article writing itself can be a problem in the sense that many revisions are required. Often, a manuscript is completely different from initial version after numerous revisions and corrections are made following the guidance and comments of competent editing (editorial preparation) by co-authors, reviewers, editors, etc.

6. All aspects related to the manuscript preparation and submission can be tedious and energy-consuming, including summaries, lists of potential reviewers, online submissions, etc., particularly if the researcher has little experience. These difficulties are made more complex for Russian scientists when all instructions, web-pages, and related documents are in English, even for those with long years of experience.

These are the primary problems that confront Russian scientists who feel that they have done good research, but who feel frustrated and demotivated by the hurdles that lay ahead, despite their great desire to publish in a top level international journal, leading them to give up fairly easily. This feeling of “settling for second best” is confounded by the fact that it is so much easier to publish in Russian in a Russian journal (less trouble with preparation) or as a proceedings with little quality control mechanisms in place.

It is within this context of so many obstacles and shortcomings that we now bring forth the option of collaborative co-authorship, coined by Teixeira da Silva in 2011, as an essential need to fortify the scientific content, and to make it presentable enough to be competitive within the internatio-

nal publishing arena. This issue is dealt with next, in a Russian setting.

INTERNATIONAL SCIENTIFIC CO-AUTHORSHIP – A NEED OR A LUXURY?

In a conventional or traditional interpretation of the term, international scientific cooperation can take many forms, but the prevailing view is that it involves joint implementation of research by a study group, which includes scientists or post-doc researchers from two (most often), three or more academic institutions or universities, or the collaboration between laboratories that are physically separated, to meet research objectives. However, such transnational (Russia + abroad) joint work is often severely limited by project funding or by competitive positions, since each research group has its leader, dictating the direction in which research should be developed, each group has its own local problem, limitations and conflicts of interest. In Russia, the inclusion of foreign, non-Russian co-authors of a paper based on research that they did not physically conduct is legitimate (and ethical), provided that they assisted with the preparation of the groundwork for the study, were involved in processing the results, or assisted with writing the manuscript. The decision is made by each researcher and is not an institutionalized decision.

Another form of cooperation to solve a common research hypothesis can involve the completion of and carrying out of various phases of the study by each group independently in their lab, and then combining the results. This also raises questions related to the legitimacy of such an experimental design because assessing the quality of the contribution of scientists from different groups, as well as their placement in the list of authors in a scientific manuscript can often lead to bitter bickering and serious conflicts of interest. In Russia, there are no rules governing the order of authors in a paper. This is usually determined by the two leaders (if two) of a group that participated in the work written about in that paper.

Finally, international scientific co-authorship is possible. By this term we understand the co-writing of a research paper by scientists from different countries. The question arises: if a scientist is not involved in the preparation of the experiment and in obtaining experimental data (Phases 1 and 2 according to ASL's classification), can that person be a co-author of that publication? In our view (ASL's laboratory and department), it is absolutely true and is acceptable/possible under certain limited conditions, which we will attempt to analyze carefully next. To do this, we must return to the stages of preparation of a manuscript, given in the initial part of this manuscript.

A need often arises to bring in a specialist to make the experimental data more clearly understood, or adequately prepared for an international audience. In this case, such a high-level specialist must perform one or more (but not necessarily all) the following tasks (as applied to the ASL laboratory):

1. Evaluate the quality of experimental material and decide whether it is sufficient enough, or not, to be a good enough article for publication in an international journal, although, through personal experience (ASL), the response to editors or reviewers can also influence the outcome.
2. Offer (if necessary) changes in the scheme of the experiment design, or additional experiments in order for the experimental cycle to be complete or, where an experiment has already been completed, provide advice for improvement of future experiments.
3. Assess the level and accuracy of statistical processing of experimental data, and if necessary, advise the conversion of results or other forms of statistical processing of results.
4. Make changes to the presentation and interpretation of

results so that they can be understood more clearly and logically.

5. Change the article structure and style to suit the requirements of the target journal.
6. To perform all editing and to ensure a complete manuscript ready for submission.
7. Selection of journal (or evaluation of the choice made by co-authors) and preparation of all related documents (letters to the editor, research highlights, etc.).
8. Submission of the manuscript to the target journal.

If a co-author, who is not directly involved in obtaining the experimental data, carries out such work (this work is very important and difficult), then they certainly must be a co-author of the manuscript. This will not raise any ethical issues, nor will it lead to conflicts of interest, which usually occur when it is necessary to divide the experimental data among researchers for individual use, for example, in a PhD thesis. However, such a PCP co-author usually involves a person with high academic authority who already has higher academic degrees, a title and a highly developed academic CV.

Such cooperation can be both at the national and international level. Cooperation within Russia in terms of the joint writing of articles has a long tradition and usually causes no problems, as researchers working in one area can meet freely, to share their experimental samples, analyze them and discuss the results. However, such long-term domestic co-operation can not progress rapidly, since traditions and frameworks do not allow this form of collaboration to be extensively developed. In other words, the back-and-forth between authors, for revisions, edits, opinions, and then between authors and the journal, can take months. The mid- to long-term objectives of two different laboratories can differ, and thus enthusiasm and motivation for a long review and editing process leading up to publication might not suit the individual interests of each collaborating laboratory.

International cooperation, on the other hand, creates opportunities for rapid progress, as each side may have tangible advantages. On the Russian side, Russian research groups have a new potential for exposing their huge reservoir of unpublished data and a desire to present such data in the most favorable light, only because the foreign component of the co-authors group have the opportunity to help implement the ambitious plans of their Russian counterparts as they have many of the necessary competent skills to perform this task.

MICRO-SCALE ASSESSMENT OF INTERNATIONAL WRITING COLLABORATION WITHIN RUSSIA: MORDOVIAN STATE UNIVERSITY, A CASE STUDY

How is such cooperation evaluated by the administration of Russian institutions and universities? Often the administration's position is crucial in the evaluation of such a cooperation or collaboration. For example, at MSU, the administration is usually interested in conducting such collaboration. This enhances the status of a university (or institution), allows it to show our work more visibly and increases its meaningfulness in terms of the global scientific community, helping to attract additional funds (in the form of grants and research programs).

MSU has several research groups working on the principle of joint research (working in a field of study and/or publish joint paper). The first group comprises mathematicians from MSU and Jönköping University, Sweden. They published joint articles in the field of «Methods and Models for Computer Aided Design of Wind Power Systems for EMC and Power Quality». The group's work was carried out from 2004 to the present. 11 joint papers were published in Eng-

lish, including a book chapter and journal articles. Even after the project has formally ended, publications might still emerge 3-6 years later.

The second group consists of physicists from MSU and the University of Oulu, Finland. Their joint activities in the field "Theory of parametric amplification in superlattices" lasted from 2006 to the present, and led to the publication of 4 articles in journals (3 English and 1 Russian).

The third group includes biologists from Mordovian State University and the Lithuanian Institute of Horticulture, Babtai, Lithuania. They work in the field of plant physiology under the influence of abiotic and anthropogenic stressors. Cooperation has continued since 2005. We have a total 30 works, including 9 in English, 17 in Russian, and 4 in Lithuanian. This total includes 15 articles (4 in English, 7 in Russian, 4 in Lithuanian), but most in non-IF journals.

Another research team of biologists from MSU and Kagawa University, Japan, working in the field of *in vitro* tissue culture, as well as the study of plants, detached organs and cell cultures responses to the action of unfavorable environmental factors. Since 2006, ASL co-published one chapter in a book and 7 articles in journals, all except one without an IF.

In addition, several scholars of MSU have few joint publications with scientists from foreign institutions, with no long-term ongoing collaboration, although exact numbers and details are not easy to obtain.

MSU annually publishes about 2600-2900 manuscripts in total (in all fields of science) at different levels (articles in leading journals, in journals not included in databases, in proceedings, materials of scientific conferences, etc.). From this array of publications, the quantity of publications of MSU scientists, accounted for by major databases (Web of Science, Scopus, SpringerLink, etc.), for several years was small (not more 50 articles per year, e.g., 31 papers in 2011). Russian journals, submitted to the database Journal Citation Reports for 2009, are whole 133 journals, including 23 biological journals (http://www.spsl.nsc.ru/win/isitr/bd_jcr_09.htm). They have relatively low impact factor (in 2009, the maximum IF have the journals BIOCHEMISTRY-MOSCOW - 1.327, APPL BIOCHEM MICRO - 0.670, other journals have IF of 0.064 to 0.501)

(http://www.spsl.nsc.ru/win/isitr/str_43h.html).

More than 300-500 articles per year are considered (see online **Appendix 1**) for the Russian Science Citation Index, which includes more than 6500 Russian-language journals (http://elibrary.ru/project_risc.asp).

MSU in 2010 received the status of the National Research University, which is likely to increase the number of articles accounted for in major databases (Web of Science, Scopus, Science Citation Index Russian), possibly because funding for better equipment would increase.

MSU now seeks to increase the number of articles accounted for in leading international data bases up to 150 articles per year, which is impossible without an increase in the share of foreign co-authorship. However, in 2011 and 2012, this has not been achieved

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