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Инновационная стратегическая сессия в научной деятельности Центра диагностики и телемедицины

И.А. Виноградова, Л.А. Низовцова, О.В. Омелянская

Научно-практический клинический центр диагностики и телемедицинских технологий, Москва, Российская Федерация

АННОТАЦИЯ

Иногда для того чтобы создавать что-то новое, нужно выходить за рамки возможного и привычного. Человеческий потенциал безграничен, а мир технологических возможностей открывает новые горизонты и помогает достичь даже самой сложной цели.

Настоящему учёному необходимо умение выходить за рамки правил, ограничивающих образ его мыслей. То, что мы знаем, гораздо сильнее препятствует нашему научному прогрессу, чем то, чего мы не знаем. Очистить разум от предвзятости довольно трудно, практически невозможно. Как и невозможно вытащить себя из «колеи» правил без помощи какой-нибудь идеи со стороны.

Последняя неделя июля в ГБУЗ «Научно-практический клинический центр диагностики и телемедицинских технологий Департамента здравоохранения Москвы» была ознаменована ярким, неординарным событием — «Неделей науки», которая показала сотрудникам важность научных открытий как для отдельно взятого человека, так и для общества в целом, и, по сути, явилась площадкой для обсуждения опережающих технологий, вызовов и решений. Четыре дня учёные Центра презентовали и защищали свои доклады, а их коллеги задавали вопросы по применению и воплощению инициатив.

Ключевые слова: искусственный интеллект; нейровизуализация; организация здравоохранения; научные проекты.

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Innovative strategic session in the scientific activity of the Center for Diagnostics and Telemedicine

Irina A. Vinogradova, Lyudmila A. Nizovtsova, Olga V. Omelyanskaya

Research and Practical Clinical Center for Diagnostics and Telemedicine Technologies, Moscow, Russian Federation

ABSTRACT

Sometimes, you need to go beyond the possible and ordinary in order to create something new. Human potential is limitless, and the world of technological possibilities opens up new horizons and helps to achieve the most difficult goals.

A real scientist should think out of the box and go beyond the rules. Sticking with what we know today and being not open to new knowledge hinders our scientific progress. It is quite difficult, if not impossible, to get rid of bias. Similar to how it is almost beyond our possibilities to pull yourself out of the "rut" of the rules without a help.

However, we tried to do impossible possible at our "Science Week." The last week of July at the Research and Practical Clinical Center for Diagnostics and Telemedicine Technologies of the Moscow Healthcare Department was highlighted by this outstanding extraordinary event. During this week, the importance of scientific discoveries for both an individual and whole society was demonstrated. In fact, it was a platform for discussing advanced technologies, challenges, and solutions. For 4 days, the scientists of the Center presented their reports and defended their ideas. Their colleagues took part in the discussion and asked questions about the application and implementation of their initiatives.

Keywords: artificial intelligence; neuroimaging; healthcare management; scientific projects.

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诊断和远程医疗中心科学活动中的创新战略会议

Irina A. Vinogradova, Lyudmila A. Nizovtsova, Olga V. Omelyanskaya

Research and Practical Clinical Center for Diagnostics and Telemedicine Technologies, Moscow, Russian Federation

简评

有时为了创造新东西，你必须超越可能和通常的东西。人类的潜力是无限的，一个充满技术可能性的世界开辟了新天地，有助于实现最具挑战性的目标。

一个真正的科学家需要有能力超越限制其思考方式的规则。我们知道的东西比我们不知道的东西更能成为我们科学进步的障碍。清除头脑中的偏见是相当困难的，几乎不可能。正如没有一些外部想法的帮助，就不可能让自己走出规则的“困境”。

7月的最后一周，在莫斯科医疗保健部门的诊断和远程医疗技术科学与实践临床中心举办了一场精彩非凡的活动——《科学周》，向员工展示了科学发现对个人和整个社会的重要性，事实上，是讨论先进技术、挑战和解决方案的平台。在为期四天的时间里，该中心的科学家们展示并捍卫了他们的报告，他们的同事们就提出了关于如何应用和实施倡议的问题。

关键词：人工智能；神经影像学；医疗机构；科学项目。

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INTRODUCTION

On July 25–28, 2022, the Research and Practical Clinical Centre for Diagnostics and Telemedicine Technologies of the Moscow Department of Health hosted Science Week, the largest scientific event arranged by the Centre and attended by approximately 100 employees from practically all departments and divisions. Due to the wide range of participants, Science Week has become a unique scientific event that can be considered a platform for discussing important interdisciplinary problems of science and technology as well as the first step in promoting research and project activities among young people and a place to demonstrate the achievements of research departments of the Centre.

The Directorate of Science presented more than 40 reports that described original solutions going beyond the existing paradigms and suggested responses to great challenges including social risks and threats.

Science Week plays an important role as a space for broad communication, allowing colleagues to suggest new research topics and areas, share initiatives, increase networking, and cooperate for working on projects. Researchers reported wishing to prove themself in related areas, new collaborations were born, and participants showed keen interest in each other's ideas.

During preparation for Science Week, Yuriy A. Vasilyev, Candidate of Medical Sciences, Director of State Budgetary Healthcare Institution of the Research and Practical Clinical Centre for Diagnostics and Telemedicine Technologies, asked participants to focus on visionary scientific work, which means to come up with something unusual and interesting. "There should be no limits for science. Even the most unordinary ideas should have a chance to be implemented if they seem valuable," he said.

RESEARCH PROJECTS AND DISCUSSION

Most projects were covered by two main areas, namely, research and practical projects aimed at facilitating the study participation or treatment process for patients, and healthcare management projects aimed at simplifying the work of healthcare professionals including nursing staff. There were various ideas including fundamental proposals going beyond existing approaches and methods. Each presentation ended with an online vote with all participants evaluating the viability of each project presented, followed by active discussion and a Q&A session.

The Developing an R&D Centre project presented by Daria Sharova, the Head of Innovative Technologies was voted the leading project. Her presentation outlined the global goal of the project which is to ensure a universally high level of medical device development in Russia by creating an R&D Centre based on the Centre for Diagnostics and Telemedicine.

The presentation by Roman Reshetnikov, the Head of Medical Research, also attracted great interest. Its topic was "Psychoradiology: Detection of Mental Disorders Using Radiation Diagnostics." The project is dedicated to the urgent problem of population screening for mental disorders, which are among the top five diseases or disorders leading to

The Steering Committee headed by Yuriy A. Vasilyev, Candidate of Medical Sciences, Director of the Research and Practical Clinical Centre for Diagnostics and Telemedicine Technologies.

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Science Week is well underway. Day 3.

disability. To solve this problem, it was proposed to create a trusted diagnostic tool using objective and evidence-based neuroimaging biomarkers. Among other features, this tool allows the clinician to provide timely and personalized psychological counseling for those patients who need it. When discussing the project, some opportunities were revealed for cooperation with other relevant scientific and medical organizations.

Denis Leonov, the Senior Research Fellow of Medical Research, presented the "Affordable Teaching Phantoms for Medical Universities" start-up project, which was also considered very interesting. The project aims to increase the effectiveness of teaching medical students by introducing a line of phantoms into the educational process. Phantoms can imitate the setting of diagnostic ultrasound of various human organs, including cerebrovascular ultrasound. Phantoms provide closer conditions to real-world clinical practice and there is wide scope for the method. Commercial medical ultrasound phantoms are very specific as they simulate specific clinical scenarios. As a result, they are too expensive to be used in a multidisciplinary research and teaching process [1]. When fulfilling a government order, a unique technique has been developed to arrange affordable serial production of phantoms for a specific clinical task. There are two proposed options, namely, large-scale production which is more affordable and manufacturing single phantoms to order. Considering the market volume in Russia, the volume of such production can be approximately 2000 pieces per year.

Anastasiya Smorchkova, a Junior Researcher at Innovative Technologies, presented a project "Screening for Cerebral Artery Aneurysms and Evaluating Their Significance in Younger Patients." A ruptured cerebral aneurysm is one of the most common causes of nontraumatic intracerebral hemorrhage (approximately 13 cases per 100,000 per year). At the same time, in the period from aneurysm rupture to treatment, the mortality rate is 10%–15% [2]. According to clinical guidelines [3], noninvasive screening can be recommended for every person over 30 years of age, regardless of risk factors. The definitive factors of rupture risk are the perpendicular aneurysm height and the size ratio of the aneurysm and the adjacent vessel. These parameters can be evaluated by neuroimaging methods. As a solution, the authors proposed developing a morphometric artificial intelligence algorithm for detecting and measuring salient sizes and estimating the

Phantoms can be used for ultrasound imaging of blood vessels through the skull bones.

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The conference ended with a lively discussion.

aneurysm rupture probability. Therefore, this project may contribute to the increased detection of hidden (unruptured) cerebral aneurysms and potentially reduce mortality and disability in younger patients. During the discussion, the high social significance of the project was noted, as it is aimed at preventing the mortality of people of working age.

A series of reports presented by Ivan Blokhin, acting Head of the Research Sector in Radiation Diagnostics, was followed by a lively discussion. He described necessary changes in management in radiology departments suggesting solutions for interacting with patients as well as for optimizing and increasing the efficiency of radiologists. The Information Materials for Correct Patient Preparation for an Investigation project proposed to develop digital and paper information materials for patients preparing for the most common types of X-rays, CT, and MRI to reduce the number of delayed examinations due to poor patient preparation and the number of duplicate examinations due to poor image quality. The Working Memory of a Medical Organisation presentation proposed to analyze the time intervals for radiation diagnostics in various medical organizations. This analysis allows the optimization of operating and logistics processes in outpatient medical organizations by tracking patients at each stage of the diagnostic process using code bracelets and identifying pitfalls in routine outpatient practice.

All presentations are included in the Bank of Research Projects of the Centre for Diagnostics and Telemedicine.

In addition, the discussion highlighted the most promising areas that need to be included in a 3-year research plan of the Centre for Diagnostics and Telemedicine.

CONCLUSION

One of the outcomes of this event lies in developing an environment for the open long-term planning of research activities.

Scientists noticed how important it is to get a critical review because this helped them to see the weaknesses and potential problems of their projects. In addition, employees shared ideas and ways of doing similar work, so now they can try to optimize and improve their own projects.

At the end of Science Week, Yuriy Vasilyev, the Director of the Centre for Diagnostics and Telemedicine, expressed his hope that this event will become a regular one and will attract a growing number of participants every year.

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AUTHORS' INFO

*** Irina A. Vinogradova,** Cand. Sci. (Tech.);
address: 24 Petrovka str., 127051, Moscow, Russia;
ORCID: https://orcid.org/0000-0001-6465-4132;
eLibrary SPIN: 6493-1970; e-mail: i.vinogradova@npcmr.ru

Lyudmila A. Nizovtsova, MD, Dr. Sci. (Med), Professor;
ORCID: https://orcid.org/0000-0002-9614-4505;
eLibrary SPIN: 9957-8107; e-mail: lanizo@yandex.ru

Olga V. Omelyanskaya;
ORCID: https://orcid.org/0000-0002-0245-4431;
eLibrary SPIN: 8948-6152; e-mail: o.omelyanskaya@npcmr.ru

ОБ АВТОРАХ

*** Виноградова Ирина Александровна,** к.т.н.;
адрес: Россия, 127051, Москва, ул. Петровка, д. 24;
ORCID: https://orcid.org/0000-0001-6465-4132;
eLibrary SPIN: 6493-1970; e-mail: i.vinogradova@npcmr.ru

Низовцова Людмила Арсеньевна, д.м.н., профессор;
ORCID: https://orcid.org/0000-0002-9614-4505;
eLibrary SPIN: 9957-8107; e-mail: lanizo@yandex.ru

Омелянская Ольга Васильевна;
ORCID: https://orcid.org/0000-0002-0245-4431;
eLibrary SPIN: 8948-6152; e-mail: o.omelyanskaya@npcmr.ru

* Corresponding author / Автор, ответственный за переписку