



**Tashkent Medical
Academy**



**Siberian state medical
university**

**International scientific
and practical conference
of young scientists**

**“ISSUES OF BIOPHYSICS
IN MEDICINE”**

ISSN 2181-7812

11 May, 2023

MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION
OF THE REPUBLIC OF UZBEKISTAN

MINISTRY OF HEALTHCARE

TASHKENT MEDICAL ACADEMY

**ABSTRACT BOOK OF THE INTERNATIONAL SCIENTIFIC AND PRACTICAL
CONFERENCE OF YOUNG SCIENTISTS “ISSUES OF BIOPHYSICS IN MEDICINE”**

TASHKENT-2023

O‘ZBEKISTON RESPUBLIKASI
OLIV VA O‘RTA MAXSUS TA‘LIM VAZIRLIGI

O‘ZBEKISTON RESPUBLIKASI SOG‘LIQNI SAQLASH VAZIRLIGI

TOSHKENT TIBBIYOT AKADEMIYASI

**“TIBBIYOTDA BIOFIZIKA MASALALARI” MAVZUSIDAGI
YOSH OLIMLARNING XALQARO ILMIY-AMALIY KONFERENSIYA TO‘PLAMI**

TOSHKENT-2023

МИНИСТЕРСТВО ВЫСШЕГО И СРЕДНЕГО СПЕЦИАЛЬНОГО
ОБРАЗОВАНИЯ РЕСПУБЛИКИ УЗБЕКИСТАН

МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РЕСПУБЛИКИ
УЗБЕКИСТАН

ТАШКЕНТСКАЯ МЕДИЦИНСКАЯ АКАДЕМИЯ

**СБОРНИК МАТЕРИАЛОВ МЕЖДУНАРОДНОЙ НАУЧНО-ПРАКТИЧЕСКОЙ
КОНФЕРЕНЦИИ МОЛОДЫХ УЧЁНЫХ “ВОПРОСЫ БИОФИЗИКИ В
МЕДИЦИНЕ”**

Ташкент – 2023

CHIEF EDITOR
professor Shadmanov A.K.

EDITORIAL TEAM:

Gusakova S.V. – Head of Biophysics and Functional Diagnostics Division of Siberian State Medical University (SibMed), professor	Aliyev S.U. – Dean of the Department Pharmacy, management, medical biology, medical bioengineering and higher nursing faculty of Tashkent Medical Academy (TMA), Associate professor
Bazarbayev M.I. head of the "Biomedical Engineering, Informatics and Biophysics" department of Tashkent Medical Academy (TMA), Associate professor	Mullojonov I. – Associate professor of the department "Biomedical Engineering, Informatics and Biophysics" of TMA
Maxsudov V.G. – senior lecturer of the department "Biomedical Engineering, Informatics and Biophysics" of TMA, PhD	Ermetov E.Ya. – senior lecturer of the department "Biomedical Engineering, Informatics and Biophysics" of TMA
Sobirjonov A.Z. – senior lecturer of the department "Biomedical Engineering, Informatics and Biophysics" of TMA	Raximov B.T. – assistant of the department "Biomedical Engineering, Informatics and Biophysics" of TMA
Abdujabbarova U.M. – assistant of the department "Biomedical Engineering, Informatics and Biophysics" of TMA	Sayfullayeva D.I. – assistant of the department "Biomedical Engineering, Informatics and Biophysics" of TMA

ГЛАВНЫЙ РЕДАКТОР
проф. Шадманов А.К.

РЕДАКЦИОННАЯ КОЛЛЕГИЯ:

Гусакова С.В. – доктор медицинских наук, заведующая кафедрой Биофизики и функциональной диагностики Сибирского государственного медицинского университета (СибГМУ), профессор	Алиев С.У. – Декан факультета "Фармация, менеджмент, медицинская биология, биомедицинская инженерия и ВСД Ташкентского медицинского академии (ТМА), доцент
Базарбаев М.И. – заведующий кафедрой «Биомедицинского инженирии, информатики и биофизики» ТМА, доцент	Муллоджонов И. – доцент кафедрой «Биомедицинского инженирии, информатики и биофизики» ТМА
Максудов В.Г. – старший преподаватель кафедры «Биомедицинского инженирии, информатики и биофизики» ТМА, PhD	Эрметов Э.Я. – старший преподаватель кафедры «Биомедицинского инженирии, информатики и биофизики» ТМА
Собиржонов А.З. – старший преподаватель кафедры «Биомедицинского инженирии, информатики и биофизики» ТМА	Рахимов Б.Т. – ассистент кафедры «Биомедицинского инженирии, информатики и биофизики» ТМА
Абдужабброва У.М. – ассистент кафедры «Биомедицинского инженирии, информатики и биофизики» ТМА	Сайфуллаева Д.И. – ассистент кафедры «Биомедицинского инженирии, информатики и биофизики» ТМА

BOSH MUHARRIR
professor Shadmanov A.K.

TAHRIR HAYATI

Gusakova S.V. – tibbiyot fanlari doktori, Sibir davlat tibbiyot universitetining Biofizika va funksional diagnostika kafedrasi mudiri, professor	Aliyev S.U. – TTA, Farmatsiya, menejment, tibbiy biologiya, tibbiy biomuhandislik, oliy ma'lumotli hamshira fakulteti dekani, dotsent
Bazarbayev M.I. – TTA Biotibbiyot muhandisligi, informatika va biofizika kafedrasi mudiri, dotsent	Mullojonov I. – TTA Biotibbiyot muhandisligi, informatika va biofizika kafedrasi dotsenti
Maxsudov V.G. – TTA Biotibbiyot muhandisligi, informatika va biofizika kafedrasi katta o'qituvchisi, PhD	Ermetov E.Ya. – TTA Biotibbiyot muhandisligi, informatika va biofizika kafedrasi katta o'qituvchisi
Sobirjonov A.Z. – TTA Biotibbiyot muhandisligi, informatika va biofizika kafedrasi katta o'qituvchisi	Raximov B.T. – TTA Biotibbiyot muhandisligi, informatika va biofizika kafedrasi assistenti
Abdujabbarova U.M. – TTA Biotibbiyot muhandisligi, informatika va biofizika kafedrasi assistenti	Sayfullayeva D.I. – TTA Biotibbiyot muhandisligi, informatika va biofizika kafedrasi assistenti

INITIATIVE FOR OPTIMIZING IMAGE QUALITY AND RADIATION DOSE

Isroilova Shakhzoda, Sakina Khan

Tashkent Medical Academy, Tashkent, Uzbekistan

ABSTRACT

Medical imaging has become one of the most effective non-invasive diagnostic tools for the precise result. Since, it has grown to be the most demanding in the field of medicine, it also carries higher health risk due to the long exposure of ionizing radiation. For a very long time, it was believed that increasing radiation exposure was the only way to improve image quality. Since its introduction in the early 1970s, CT has had a dramatic evolution that has greatly improved its diagnostic performance in many clinical scenarios and vastly broadened its field of application. As a result, it has become crucial to balance radiation exposure while also optimizing the image quality of the diagnosis.

KEYWORDS

Medical imaging, ionizing radiation, optimizing image quality, CT scan, reducing radiation exposure

INTRODUCTION

Radiation exposure is a critical issue in multidetector CT (MDCT) particularly since fast MDCT scanners have become widely available, and the method has been proposed as a noninvasive diagnostic tool for an increasing number of clinical applications. Additional features of MDCT imaging affecting individual dose are related to the inappropriate use of scanners caused by practices such as scanning beyond the area of interest or acquiring unnecessary multiphase image sets. Several strategies have been implemented over the last few years which are based on X-ray emission or optimization of scanning parameters (i.e. mAs, kV, pitch, collimation) or which take account of the individual patient's characteristics (automatic exposure control systems and ECG-pulsing techniques for ECG-gated acquisitions). Even if CT represents only 11% of radiologic procedures, it accounts for as much as 70% of the total effective dose from all diagnostic radiologic studies. However, despite clear evidence that CT can provide fundamental information for diagnosis and patient care, the risk of malignancy induced by ionizing radiation from CT examinations must be carefully considered. One of the main obstacles to reducing radiation dose is image noise. Noise in CT has two principal sources: quantum noise and electronic noise. These strategies allow optimization of image quality while keeping individual exposure at the lowest level.

REFERENCES

1. Catalano C, Francone M, Ascarelli A, Mangia M, Iacucci I, Passariello R. Optimizing radiation dose and image quality. *Eur Radiol.* 2007 Dec;17 Suppl 6:F26-32. doi: 10.1007/s10406-007-0225-6. PMID: 18376454.
2. Fabio Paolicchi, Lorenzo Faggioni, Luca Bastiani, Sabrina Molinaro, Michele Puglioli, Davide Caramella, and Carlo Bartolozzi *American Journal of Roentgenology* 2014 202:6, 1309-1315
3. Yu L, Liu X, Leng S, Kofler JM, Ramirez-Giraldo JC, Qu M, Christner J, Fletcher JG, McCollough CH. Radiation dose reduction in computed tomography: techniques and future perspective. *Imaging Med.* 2009 Oct;1(1):65-84. doi: 10.2217/iim.09.5. PMID: 22308169; PMCID: PMC3271708.
4. M.I.Bazarbayev, B.T.Raximov, A.Z.Sobirjonov, D.I.Sayfullayeva, Z.R.Jurayeva, S.I.Ixrorova The Importance of Digital Technologies in the Teaching of Fundamental Sciences in Medical Universities. *American Journal of Medicine and Medical Sciences.* *American Journal of Medicine and Medical Sciences* 2023, 13(6): 814-820 DOI: 10.5923/j.ajmms.2023.13.06.09
5. Бобур Рахимов, Зиёда Жураева. Методика обучения информационным технологиям в высших медицинских учебных заведениях. *Educational Research in Universal Sciences.* 2-том. Страницы 4-13. 2023/2/27.
6. ВТ Рахимов, АЗ Собиржонов, ИБ Зупаров, ЗР Жураева. Роль инновационных образовательных технологий в обучении биофизике. *Educational Research in Universal Sciences.* 2-том. Страницы 4-13. 2023/4/27.
7. Bobur Raximov, Umida Abdujabbarova. The importance of physical and biophysical processes in the study of medicine. *TTA Axborotnomasi.* ISSN:2181-7812. URI:<http://repository.tma.uz/xmlui/handle/1/5762>. 30-Dec-2022
8. B.T. Raximov. Tibbiyotda ximiya terapiya jarayonini matematik modellashtirish masalasalasi. XXXIV Міжнародної наука-практичної інтернет-конференції. Том 33, Номер34, Страницы 603-608. 2014/04/30

СЕНСОРЫ СЛЮНЫ ЧЕЛОВЕКА ДЛЯ ПЕРВИЧНОЙ ДИАГНОСТИКИ ЖЕЛУДОЧНО-КИШЕЧНОГО ТРАКТА <i>Яхшибоев Р.Э.¹, Яхшибоева Д.Э.², Эрметов Э.Я.²</i>	208
ROLE OF IT TECHNOLOGIES IN MODERN MEDICINE <i>Yulduzkhon D. Khaitova, Shabnam R. Karimova</i>	213
ZAMONAVIY TIBBIYOTDA IT TEXNOLOGIYALARINING SAMARADORLIGI <i>Rayimov Ollobedi Voxid o`g`li, Axmedov Jamshid Alisher o`g`li, Bobajanov Bekzod Odilovich</i>	217
ЗНАЧЕНИЕ В ЖИЗНИ ЧЕЛОВЕКА МОБИЛЬНЫХ МЕДИЦИНСКИХ ПРИЛОЖЕНИИ <i>Кудратиллаев М.Б.</i>	222
ОБЗОР МЕТОДОВ ТЕЛЕМЕДИЦИНЫ: ВОЗМОЖНОСТИ И ПЕРСПЕКТИВЫ <i>Кудратиллаев М.Б.</i>	226
ОБЗОР СУЩЕСТВУЮЩИХ МЕДИЦИНСКИХ МОБИЛЬНЫХ ПРИЛОЖЕНИЙ В РАЗРЕЗЕ СТРАН МИРА <i>Кудратиллаев М.Б, Яхшибоев Р.Э, Сиддиков Б.Н.</i>	231
СОҒЛИҚНИ САҚЛАШДА ИТ -ТЕХНОЛОГИЯНИНГ АҲАМИЯТИ <i>Эрметов Э.Я., Яхшибоева Д.Э., Махсудов В.Г.</i>	236
ЭЛЕКТРОННАЯ МЕДИЦИНСКАЯ ЗАПИСЬ (ELECTRONIC MEDICAL RECORD, EMR) И МЕДИЦИНСКИЕ ПРИЛОЖЕНИЯ <i>Кудратиллаев М.Б</i>	240
ЭФФЕКТИВНОСТЬ ИСПОЛЬЗОВАНИЯ НОВЫХ МЕТОДОВ ТЕЛЕМЕДИЦИНЫ ДЛЯ ПЕРВИЧНОЙ ДИАГНОСТИКИ <i>Кудратиллаев М.Б, Яхшибоев Р.Э, Сиддиков Б.Н.</i>	244
TIBBIY OLIYGOHLARDA TA'LIM-TARBIYA JARAYONIDA ZAMONAVIY AXBOROT TEXNOLOGIYALARINING IMKONIYATLARIDAN FOYDALANISH <i>Sayfullaeva Dilbar Izzatillaevna</i>	248
INITIATIVE FOR OPTIMIZING IMAGE QUALITY AND RADIATION DOSE <i>Isroilova Shakhzoda, Sakina Khan</i>	251
ZAMONAVIY TEXNOLOGIYALARINING TIBBIYOTDAGI DIAGNOSTIK VA DAVOLASH USULLARIGA TADBIQI <i>Latipova Komila</i>	252
AXBOROT TEXNOLOGIYALARINING TIBBIY TA'LIMDAGI AHAMIYATI <i>Abdukadirova B.Y.</i>	254
TIBBIY MA'LUMOTLARGA ISHLOV BERISHNI AVTOMATLASHNING ZAMONAVIY HOLATINI TAHLILI <i>Mullojonov I., Ixrarova S.I.</i>	256