

## СПИСЪК НА НАУЧНИТЕ ТРУДОВЕ С АБСТРАКТИ ЗА ПЕРИОДА 2016-2026 ГОДИНА

1. Michail Lubomirov Michailov, Jiří Baláš, **Stoyan Kolev Tanev**, Hristo Stoyanov Andonov, Jan Kodejška and Lee Brown. Reliability and Validity of Finger Strength and Endurance Measurements in Rock Climbing RESEARCH QUARTERLY FOR EXERCISE AND SPORT 2018, VOL. 89, NO. 2, 246–254, doi.org/10.1080/02701367.2018.1441484 ([See full content of the paper](#))

**Abstract:** Purpose: An advanced system for the assessment of climbing-specific performance was developed and used to: (a) investigate the effect of arm fixation (AF) on construct validity evidence and reliability of climbing-specific finger-strength measurement; (b) assess reliability of finger-strength and endurance measurements; and (c) evaluate the relationship between finger flexor all-out test scores and climbing ability. Methods: To determine the effect of AF, 22 male climbers performed 2 maximal strength and all-out tests with AF (shoulder and elbow flexed at 90°) and without AF (shoulder flexed at 180° and elbow fully extended). To determine reliability, 9 male climbers completed 2 maximal strength tests with and without AF and an all-out and intermittent test without AF. Results: The maximal strength test without AF more strongly determined climbing ability than the test with AF ( $r^2 = .48$  and  $r^2 = .42$  for sport climbing;  $r^2 = .66$  and  $r^2 = .42$  for bouldering, respectively). Force and time variables were highly reliable; the rate of force development and fatigue index had moderate and low reliability. The maximal strength test with AF provided slightly higher reliability than without AF (intraclass correlation coefficient [ICC] = 0.94, ICC = 0.88, respectively). However, smaller maximal forces were achieved during AF ( $484 \pm 112$  N) than without AF ( $546 \pm 132$  N). All-out test average force had sufficiently high reliability (ICC = 0.92) and a relationship to sport climbing ( $r^2 = .42$ ) and bouldering ability ( $r^2 = .58$ ). Conclusion: Finger strength and endurance measurements provided sufficient construct validity evidence and high reliability for time and force parameters. Arm fixation provides more reliable results; however, the position without AF is recommended as it is more related to climbing ability.

2. **StoyanTanev** (2025). DETERMINATION OF THE THRESHOLD FOR SEARCHING OF VENTRICULAR CONTRACTIONS IN ECG. Research Paper, 25(12), 151-161.  
<https://journaleit.org/wp-content/uploads/12-Dec-2025.pdf>

**Abstract:** This article presents a methodology for reliably determining a threshold for searching and detecting ventricular contractions (QRS complexes) in electrocardiographic (ECG) signals. The developed algorithm combines isoelectric line filtering, high-frequency noise suppression, optimized first derivative calculation, and statistical accumulation of local maxima in an accumulator structure. Adaptive mechanisms are included for segmenting the recording and determining local thresholds for dynamically changing QRS complex amplitude. The effectiveness of the method has been verified on AHA (American Heart Association) and MIT-BIH (Electrocardiogram Massachusetts Institute of Technology-Beth Israel Hospital) databases, with results showing high robustness to noise, baseline drift, and significant amplitude variations. The algorithm is suitable for applications in clinical systems and low-power portable real-time monitoring devices.

3. **Stoyan Tanev** (2026). DOMINANT QRS MORPHOLOGY EXTRACTION USING STATISTICAL ACCUMULATION IN LONG-TERM ECG RECORDINGS. Research Paper, 26(4), 85-90. <https://journaleit.org/wp-content/uploads/10-April-2026.pdf>

**Abstract**

This article presents a methodology for reliably determining a threshold for searching and detecting ventricular contractions (QRS complexes) in electrocardiographic (ECG) signals. The developed algorithm combines isoelectric line filtering, high-frequency noise suppression, optimized first derivative calculation, and statistical accumulation of local maxima in an accumulator structure. Adaptive mechanisms are included for segmenting the recording and determining local thresholds for dynamically changing QRS complex amplitude. The effectiveness of the method has been verified on AHA (American Heart Association) and MIT-BIH (Electrocardiogram Massachusetts Institute of Technology-Beth Israel Hospital) databases, with results showing high robustness to noise, baseline drift, and significant amplitude variations. The algorithm is suitable for applications in clinical systems and low-power portable real-time monitoring devices.

4. **Stoyan Tanev**. Removal of artifacts in the oscillometric curve during arterial blood pressure measurement. Aerospace Research in Bulgariq, vol. 38, Bulgarian Academy of Sciences, Space Research and Technology Institute. (приета за течат)

**Abstract:** Arterial blood pressure is one of the most important vital parameters of warm-blooded organisms, directly connected to their survival. This paper presents a method for measuring arterial blood pressure using the oscillometric technique. Algorithms for processing the oscillometric curve are discussed, with particular attention paid to the removal of parasitic signals recorded during measurement, such as noise and artifacts of electrical and mechanical origin. The determination of systolic and diastolic arterial blood pressure is demonstrated. The proposed method is applicable to aerospace medical instrumentation for continuous monitoring of arterial blood pressure in pilots and astronauts under extreme operating conditions.

5. **Stoyan Tanev**. Method for suppressing interference in ecg signals recorded under conditions of intense physical movement. Aerospace Research in Bulgariq, vol. 38, Bulgarian Academy of Sciences, Space Research and Technology Institute, (приета за печат).

**Abstract:** The processing of electrocardiographic (ECG) signals recorded from subjects in extreme environments presents a significant challenge due to the presence of noise, vibrations, and other aggressive factors that hinder precise analysis and diagnosis. This article explores modern technologies and algorithms for processing and filtering ECG signals in conditions of increased risk and adverse factors. A method for noise reduction of the recorded signal is discussed, which improves the reliability and accuracy of monitoring in situations such as combat operations, air and space missions. A solution for effective monitoring of heart function in extreme conditions is presented, with the aim of improving processing speed and signal quality in various critical scenarios.

6. **Stoyan Tanev**. Measurement of arterial blood pressure by analyzing the pulse wave transit time at a selected peripheral point, Доклади БАН, Comptes rendus de l'Acad\_emie bulgare des Sciences, Tome 79, No 3, 2026.

**Abstract:** Arterial blood pressure is one of the most important vital parameters of warm-blooded organisms, which is connected directly to their existence. This paper presents a method and apparatus for continuous blood pressure monitoring in extreme conditions by measuring pulse wave transit time. An approach is developed to determine the individual coefficients of the subject, allowing for the calculation of systolic and diastolic arterial pressures.

7. **Танев С.**, Трендафилов П., Сотиров Г., Малинова Н. Комуникационна система за високоскоростен обмен на данни под вода. Годишна международна научна конференция наввву „Георги Бенковски“ 2023 сборник доклади 06 октомври 2023 г; стр.183-192 . ISSN 2738-716X.

**Abstract:** The article concerns a communication system for establishing a reliable wireless connection between devices exchanging large streams of information at high speed during underwater diving activities in fresh and salt water. The communication system allows the construction of different types of networks. It enables fast and easy switching on and off of additional devices both on the surface and underwater. By means of the individual components of the system, a higher reliability of the underwater information network is achieved thanks to the galvanic isolation between the information buses for the exchange of the information of the individual devices.

8. Shopov Nikola, Malinova Nikoleta, **Tanev Stoyan**, Tsekov Milan. The effect of hyperbaric exposure on heart rate variability. 25<sup>th</sup> CONGRESS OF BALKAN MILITARY MEDICAL COMMITTEE, AbstractBook28 – 31 May 2023, Albena, Bulgaria.

**Abstract:** Introduction: Exposure to hyperbaric pressure leads to changes in a number of physiological mechanisms and functions of the body. Many of these changes are due both to being in a high-pressure environment and to the effects of subsequent decompression. In recent years, various factors and mechanisms that have an impact on decompression stress have been investigated in an attempt to assess and prevent it. The aim of the present presentation is to present the study of changes in heart rate variability in persons performing dives as a method to assess the decompression stress of dives.

Material and Methods: Results from other scientific studies are presented, as well as initial data from our own study of divers performing simulated dives in a hyperbaric chamber. During the sessions, a permanent ECG recording is performed, the heart and breathing rates are measured, and the blood pressure values are monitored in real time. After the dives, the decompression risk is assessed by means of Doppler monitoring of the gas bubbles in the venous circulation. Conclusion: Although changes in heart rate variability in response to decompression show significant both individual and interindividual variation, as more data are accumulated for an individual, they may be related to the physiological stress of performing a dive and decompression performed. We believe that when changes in various heart rate variability parameters are observed with statistical significance, they do not necessarily confirm or deny a specific relationship, but should be taken in context.

9. Margarita Dimitrova, Gyunver Hodjaoglu, **Stoyan Tanev**, Adelina Miteva. Radiation shielding efficiency of titanium alloys and composites for near-space applications. „Близкият Космос – обща цел“ 12-14.11.2025 г. НВУ „Васил Левски“, DOI: <https://doi.org/10.34660/INF.2025.72.85.009>

**Abstract:** Spacecraft and satellite materials are continuously exposed to ionizing radiation from solar and cosmic sources. These high-energy particles can induce material degradation, reduce mechanical strength and affect the performance of sensitive onboard equipment. This paper investigates the radiation

shielding performance of titanium alloys and titanium-based composites as potential materials for near-space and low Earth orbit applications. The study evaluates the attenuation capacity, structural stability and radiation-induced microstructural changes of selected titanium alloys compared to conventional aluminum alloys. The results contribute to the development of lightweight and durable shielding solutions that enhance spacecraft longevity and safety in radiation-rich environments.

10. Margarita Dimitrova, Gyunver Hodjaoglu, **Stoyan Tanev**, Adelina Miteva. RECYCLABLE AND SUSTAINABLE METALLIC MATERIALS FOR SPACE STRUCTURES: TOWARDS A CIRCULAR SPACE ECONOMY. „Близкият Космос – обща цел“ 12-14.11.2025 г. НВУ „Васил Левски“, DOI: 10.34660/INF.2025.16.37.010

**Abstract:** The growing number of satellites and spacecraft in near-Earth orbit has intensified concerns about material sustainability and space debris generation. Traditional space structures, often made from aluminium and titanium alloys, are typically designed for single-use missions, leading to a growing accumulation of defunct materials in orbit. This paper explores the potential of recyclable and reusable metallic materials - specifically titanium and aluminium alloys - for application in next-generation space systems. The study examines alloy composition, processing routes and design strategies that enable material recovery, reprocessing, or repurposing after mission completion. The mechanical, thermal, and corrosion properties of selected Ti and Al alloys are analyzed in the context of their recyclability and compatibility with in-orbit manufacturing technologies such as additive remanufacturing. The concept supports the European Space Agency’s “Zero Debris Charter” and the broader vision of a circular space economy, aiming to minimize waste, extend material lifecycles, and promote environmentally responsible exploration of near space.

11. Zoya Hubenova, **Stoyan Tanev**. Bulgarian contribution to research of human factors in space. Aerospace Resarch in Bulgariq, vol. 37, Bulgarian Academy of Sciences, Space Research and Technology Institute, p-ISSN 1313-0927, <https://doi.org/10.3897/arb.v37.e16>, or [http://journal.space.bas.bg/arhiv/n%2037/Articles/16\\_Hubenova.pdf](http://journal.space.bas.bg/arhiv/n%2037/Articles/16_Hubenova.pdf)

**Abstract:**The article is devoted to the activities of the Space Research and Technology Institute of the Bulgarian Academy of Sciences (SRTI-BAS) in the field of human factors research. It focuses on the projects and achievements of the last 10 years. The available equipment and apparatuses in the laboratories of the Institute are presented, as well as the possibilities for solving various problems related to the training, selection, and evaluation of operators working in extreme conditions.