

REVIEW

by

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Rector of Medical University “Prof. Dr. Paraskev Stoyanov” – Varna

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Varna**

Subject: Competition for the academic position of “Associate Professor” in the specialty “Orthopaedics and Traumatology”, Professional Field 7.1 Medicine, Field of Higher Education 7. Healthcare and Sports, Faculty of Medicine, Department of Orthopaedics and Traumatology, Medical University “Prof. Dr. Paraskev Stoyanov” – Varna, pursuant to an announcement published in State Gazette, issue No. 50 of 02.06.2026, with candidate

Dr. Stoyan Ivanov Ivanov, PhD

By Order of the Rector of MU–Varna No. R-109-273/30.07.2026 and by decision of the Faculty Council (Minutes No. 62/27.07.2026), I was appointed as a member of the Scientific Jury. By decision of the Scientific Jury recorded in Minutes No. 1/10.08.2026, I was assigned to prepare a review under the procedure for appointment to the academic position of “Associate Professor” in the specialty “Orthopaedics and Traumatology”, Professional Field 7.1 Medicine, Field of Higher Education 7. Healthcare and Sports, Faculty of Medicine, Department of Orthopaedics and Traumatology, Medical University “Prof. Dr. Paraskev Stoyanov” – Varna.

Only one candidate, Dr. Stoyan Ivanov Ivanov, submitted documents for participation in the competition. The candidate has submitted all required documents in accordance with the requirements of the Academic Staff Development Act and the Regulations of Medical University – Varna for its implementation.

Dr. Stoyan Ivanov was born in 1984 in Yambol. He graduated in Medicine in 2009 from Medical University – Sofia. In 2010, he enrolled in specialty training in Orthopaedics and Traumatology at St. Anna Hospital, Varna. Since September 2021, he has successively held the academic positions of Assistant Professor (2021–2022) and Chief Assistant Professor (from 25.11.2022 to the present) at the Department of Orthopaedics and Traumatology, Medical University – Varna. He acquired the specialty “Orthopaedics and Traumatology” in 2015. In 2020, he defended his doctoral dissertation at the Department of Orthopaedics and Traumatology in the specialty “Orthopaedics and Traumatology” on the topic “Minimally Invasive Surgery for Displaced Intra-articular Fractures of the Calcaneus”. Since 2022, he has been a Chief Assistant Professor at the Department. Since 2022, he has also worked as an orthopaedic surgeon at University Hospital “St. Marina”, Varna.

The candidate regularly participates in national meetings and congresses of the Bulgarian Orthopaedic and Traumatology Association and in a number of international congresses of AO Trauma and AO Recon, the European Federation of National Associations of Orthopaedics and Traumatology (EFORT), the European Society of Sports Traumatology, Knee Surgery and Arthroscopy (ESSKA), the European Orthopaedic Research Society (EORS), the European Hip Society (EHS), and the European Foot and Ankle Society (EFAS). From 2015 to the present, the candidate has completed numerous advanced professional training courses, including: AO Trauma Basic Course and AO Trauma Advanced Course, Bulgaria; Hip Expert Training – Badalona, Spain; Knee Expert Training Navigation – Würzburg, Germany; courses in pelvic and acetabular surgery – Graz, Zurich, Homburg, and Amsterdam (Austria, Switzerland, Germany, and the Netherlands); a course in minimally invasive surgery of the calcaneus (Linz, Austria); a course in knee arthroplasty (Zagreb, Croatia); and a course in ultrasound-guided cryoneurolysis (Copenhagen, Denmark). In 2019, he completed a three-month specialization/fellowship at the AO Research Institute Davos, Switzerland. In nationally organized courses held under the auspices of AO Trauma and AO Recon (2021, 2024, 2025, and 2026), Dr. Ivanov participated as a lecturer.

Dr. Stoyan Ivanov holds certificates in highly specialized medical activities: “Joint Arthroplasty”, “Arthroscopy”, “Ultrasonography of the Paediatric Hip”, “Pelvic and Acetabular Surgery”, and “Hand Surgery”. He has held a Master’s degree in Health Management from the University of National and World Economy, Sofia, since 2018.

He is a member of national (BOTA, BAAST) and international (EHS, EFAS, EORS, ESSKA, EFFORT) orthopaedic associations.

Dr. Ivanov has more than five years of teaching experience, having successively held the positions of part-time Assistant Professor, Assistant Professor, and Chief Assistant Professor. He participates in teaching “Orthopaedics and Traumatology” to students in the Medicine programme in both Bulgarian-language and English-language education, as well as “Orthopaedics and Traumatology with Orthotics and Prosthetics” to students in the Kinesitherapy programme at Medical University – Varna.

The candidate’s annual teaching workload meets and exceeds the University’s established standard for teaching employment. Dr. Ivanov participates in two research projects:

- Postdoctoral researcher under Science Fund Project No. 22015 – Competition Session 2022. Project Leader: Dr. Stoyan Ivanov.
- Postdoctoral researcher under Science Fund Project No. BG-RRP-2.004-0009 MUVE-TEAM (MUVE-TEAM), “Personalised Implants for Bone Regeneration Therapy (PERSIM)”.

The scientific works submitted for participation in the competition, 29 in total, reflect the candidate’s research activity during the period 2015–2025. As publications submitted in lieu of a monographic habilitation thesis, the candidate presents 10 full-text scientific publications in journals that are referenced and indexed in internationally recognized scientific databases (Web of Science and Scopus), recognized by the National Centre for Information and Documentation (NACID) under the Ministry of Education and Science. They reflect the research activity during the period 2022–2025 and are included in the academic reference under indicator B4 (B4.1–B4.11): “Publications equivalent to a monographic habilitation thesis”.

In addition to the articles submitted in lieu of a monographic habilitation thesis, Dr. Ivanov presents another 16 scientific publications under indicators G7 and G8 of the academic reference, as well as three articles beyond the minimum scientometric requirements, indexed in internationally recognized scientific databases (Web of Science and Scopus). Ten of the articles with which the candidate participates in this competition have an impact factor, with a total impact factor of 26.34.

Distribution of the scientific works by type:

Habilitation thesis – 1

Dissertation – 1

Teaching aids – 2

Publications in journals and proceedings – 29

Distribution of the scientific works by language of publication:

Publications in Bulgarian – 5

Publications in a foreign language (English) – 24

Distribution of the scientific works by authorship:

As sole author – 5

Co-authored – 24, of which:

first author – in 8 publications

second author – in 9 publications

third/fourth author – in 6 publications

Distribution of the works by scientific field:

Modern orthopaedics and traumatology is developing in an environment of accelerated technological progress that requires integration of precise diagnostics, digital preoperative planning, stable surgical fixation, and personalized early rehabilitation. The treatment of complex intra-articular fractures, bone defects in elderly patients, periprosthetic joint infections (PJI), and soft-tissue injuries requires an interdisciplinary approach to achieve an optimal quality of life for patients.

The main directions of Dr. Ivanov's research are related to optimizing surgical treatment and fixation stability in complex joint-depression fractures of the calcaneus and proximal humerus; refining the diagnostic algorithm for periprosthetic joint infections (PJI) through innovative methods (sonication and PMN leukocytes); introducing digital technologies, computer navigation, and 3D-printed physical models for personalized preoperative planning in real time; investigating biologically active implant coatings, bone substitutes, and plasma concentrates (PRP) for bone and tissue regeneration; and developing specific protocols for physical therapy and early kinesitherapy for rapid functional recovery of orthopaedic patients.

Distribution of the works by scientific field:

1. Orthopaedics and Traumatology (Primary scientific field) – Includes clinical studies, arthroplasty, infection diagnostics, paediatric traumatology, soft-tissue surgery, and analyses of complications.

Works: [B4-6], [B4-7], [B4-8], [B4-9], [G7-15], [G7-16], [G8-20], [G8-22], [G8-23], [G8-25], [G8-26]

2. Biomechanics and Experimental Orthopaedics – Includes experimental studies on human cadaveric models to assess fixation stability and innovative screw configurations.

Works: [B4-1], [B4-3], [B4-4], [B4-10], [Additional article No. 2 (Raykov et al., 2024)]

3. Digital Medicine and Innovative Technologies in Orthopaedics and Traumatology – Includes 3D printing of anatomical models, computer navigation, mathematical/computational modelling of bone structures, and digital registries.

Works: [B4-5], [G7-17], [G7-19], [Additional article No. 1 (Bliznakova et al., 2025)]

4. Biocompatible Materials, Bone Regeneration and Pharmacology – Includes studies of antibacterial and osteointegrative implant coatings, bone substitutes in regenerative medicine, biological treatment (PRP), and postoperative physiotherapy/kinesitherapy.

Works: [B4-2], [G7-11], [G7-12], [G7-13], [G7-14], [G7-18], [G8-21], [G8-24], [Additional article No. 3 (Ivanova et al., 2025)]

A large proportion of the submitted works have an impact factor (IF) and reflect international collaboration with leading research centres (such as the AO Research Institute Davos, Switzerland), combined with extensive personal clinical experience.

Main directions of the scientific works:

1. Experimental and clinical traumatology: Biomechanical analysis, innovative surgical techniques, fixation stability in fractures, and augmentation of bone defects.

2. Large-joint arthroplasty and revision surgery: Knee and hip arthroplasty, prevention of complications, diagnosis of periprosthetic joint infections, and analytical follow-up through a national registry.

3. Additive technologies and digitalization: 3D printing of anatomical models for surgical planning, computer-navigated arthroplasty, and computational modelling of bone tissue.

4. Biological treatment, biocompatible coatings and specialized rehabilitation: Application of autologous growth factors (PRP) and bone substitutes, innovative antibacterial implant coatings, and comprehensive kinesitherapy for early recovery.

Contributions related to the main directions of the scientific works:

DIRECTION 1: Experimental and Clinical Traumatology

Scientific-applied and clinical contribution (Cadaveric analysis): Through detailed biomechanical testing on human cadaveric models, the optimal load distribution in the fixation of

calcaneal fractures (Sanders II B) was established. It was demonstrated that longitudinal screws inserted through a superior approach provide superior stability and minimize plantar displacement of the posterior facet compared with screws inserted through an inferior approach.

Clinical-experimental contribution (Comparative analysis of fixation methods): The biomechanical superiority of an anterolateral locking plate combined with additional longitudinal screws, as well as intramedullary nailing, was demonstrated in severe comminuted intra-articular calcaneal fractures compared with standard lateral plates.

Clinical-applied contribution (Osteoporotic shoulder fractures): The effectiveness of an innovative surgical technique for PMMA cement augmentation in three- and four-part proximal humeral fractures in elderly patients was evaluated. The study demonstrated statistically significantly better early functional outcomes (DASH and Constant Scores at the 3rd and 6th months) compared with autologous bone grafting.

Experimental biomechanical contribution (Cyclic loading of the shoulder): Under cyclic testing (up to 10,000 cycles), it was demonstrated that manual augmentation with 6 mL of medium-viscosity PMMA cement in proximal humeral fractures fixed with a short PHILOS plate markedly reduces varus deformation and medial displacement and prevents migration and cut-out of the screws in the humeral head.

Clinical-applied contribution (Subtalar arthrodesis): Using a new cadaveric model, the biomechanical stability of a novel combination of partially threaded screws in a delta configuration was evaluated and demonstrated for achieving optimal compression in subtalar arthrodesis.

Methodological clinical contribution: Clinical experience with surgical approaches for tibial plateau fractures and the specific features of osteosynthesis through a posterior approach in scapular neck fractures were analysed.

DIRECTION 2: Large-Joint Arthroplasty and Revision Surgery

Clinical contribution (Prevention of errors in UKA): Based on a six-year retrospective analysis of 450 patients following unicompartamental (partial) knee arthroplasty, the leading technical errors (incorrect position of the femoral condyle and excessive tibial resection) were identified, leading to the proposal of a clinical protocol for reducing early aseptic loosening and polyethylene wear.

Clinical-applied contribution (Bone defects): Specific modifications and surgical techniques for filling tibial plateau bone defects during total knee arthroplasty were introduced and scientifically summarized in order to achieve stable primary fixation.

Organizational-applied national contribution: The first Bulgarian clinical experience with the implementation of a national joint registry through the OrthoWave™ digital platform was documented and analysed, including an analysis of demographic data and early surgical parameters in the first 215 patients.

Diagnostic-applied contribution (Infections): The high reliability of determining the absolute number of polymorphonuclear neutrophils (PMN) in joint aspirate for rapid differentiation of low-virulence periprosthetic joint infections (PJI) was investigated and demonstrated.

Methodological clinical contribution (Sonication): The superior role of ultrasonic processing (sonication) of explanted metal for biofilm disruption was demonstrated, increasing the rate of successful pathogen isolation to 93.75% compared with conventional tissue cultures (50%).

DIRECTION 3: Digitalization and 3D Technologies in Orthopaedics and Traumatology

Clinical-applied and economic contribution (3D printing of the pelvis): A methodology was introduced for generating and 3D printing individualized plastic (PLA) models from CT data of patients with complex acetabular fractures. A statistically significant reduction in operating time (by an average of 59 minutes), a reduction in intraoperative blood loss (by 172.5 mL), and a marked reduction in X-ray exposure were demonstrated as a result of pre-bending the plates on the model.

Clinical-applied contribution (Extended 3D printing): The concept of preoperative 3D printing was expanded and successfully applied to planning complex deformities and fractures of the entire lower limb (tibial plateau, calcaneus, ankle).

Clinical-comparative contribution (Navigation vs. 3D planning): A comparative analysis of early postoperative outcomes after computer-navigated versus 3D-planned knee arthroplasty was performed, demonstrating superiority of computer navigation with regard to early range of motion and reduction of contractures.

Theoretical-methodological contribution (Computational modelling): An innovative approach was developed for creating a computational software model to simulate the structure of trabecular (cancellous) bone, opening new possibilities for the design of personalized implants.

DIRECTION 4: Biocompatible Materials, Bone Regeneration and Pharmacology

Experimental scientific-theoretical contribution (Antibacterial surfaces): The physicochemical properties of electrochemically deposited copper coatings on medical steel and

nickel alloys were investigated. A complete antibacterial effect (100% bacteriostasis) was demonstrated against the major pathogens of implant-associated infections – S. aureus and E. coli.

Clinical-applied biological contribution (PRP treatment): The clinical efficacy of a new, innovative method for obtaining platelet-rich plasma (PRP), applied in chronic enthesopathies and tendinopathies of the upper and lower limbs, was evaluated. Existing international classifications of platelet concentrates were critically analysed.

Theoretical review in regenerative medicine (Bone substitutes): Two large-scale systematic literature reviews were conducted, evaluating the biomedical characteristics of contemporary coatings based on chitosan, bioactive glass, and Laponite®/BMP-2, as well as the types of modern bone substitutes and their applications for accelerated osseointegration in clinical practice.

Clinical-applied physiotherapeutic contribution (Postoperative rehabilitation): Evidence-based kinesitherapeutic protocols were developed, tested, and implemented in high-risk patients: motorcyclists with severe polytrauma and “open-book” pelvic fractures; patients in the early stage following navigated arthroplasty; and patients with orthopaedic implants undergoing targeted MLS laser therapy and deep oscillation for rapid control of oedema and prevention of joint contractures (stiff elbow).

In conclusion, based on fulfilment of the minimum national requirements specified in the Regulations for the Implementation of the Academic Staff Development Act in the Republic of Bulgaria and the Regulations of Medical University – Varna, the established contributions of the candidate’s scientific activity, together with his teaching and clinical experience, provide grounds for my positive vote. I propose that the esteemed members of the Scientific Jury vote “in favour” and recommend to the Rector of MU–Varna that Dr. Stoyan Ivanov Ivanov, PhD, be appointed to the academic position of “Associate Professor” in the scientific specialty “Orthopaedics and Traumatology”, Professional Field 7.1 Medicine, Field of Higher Education 7. Healthcare and Sports, Faculty of Medicine, for the needs of the Department of Orthopaedics and Traumatology, Medical University “Prof. Dr. Paraskev Stoyanov” – Varna.

21.09.2026

Prof. Dimitar Raykov, DSc

