Krakow, February 2025

Curriculum vitae

First and last name: Klaudia Proniewska

Place of birth July 6, 1985

Place of birth Krakow, Poland

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EDUCATION

2024 dr habil., Resolution No. 2/XII/2024 of the Council of the Discipline of Medical Sciences at the Jagiellonian University dated December 10, 2024, conferred the degree of habilitated doctor in the field of medical sciences and health sciences, in the discipline of medical sciences, upon Dr. Klaudia Proniewska. The scientific achievement serving as the basis for the habilitation procedure is a series of thematically related articles (original works) titled: *Immersive Technologies and Functional Imaging in Cardiology*.

2014 Ph. D., Faculty of Electrical Engineering, Automatics, Computer Science and Biomedical Engineering, AGH University of Science and Technology in Krakow, the subject of the doctoral dissertation *"Identification of human life parameters based on cardiological and respiratory signals"*

2009 MSc. In Eng., Faculty of Physics and Applied Computer Science, AGH University of Science and Technology in Kraków, thesis topic *"MA Acoustic methods in the analysis of esophageal speech"*

Professional Appointments

1.10.2024 – present, Head of the NSSU Functional and Virtual 3D Medical Imaging Lab, Krakow, Poland

01.05.2022 – present, Deputy Director of the Center for Digital Medicine and Robotics Jagiellonian University Collegium Medicum, Krakow, Poland

1.08.2024 – present, Assistant Professor, research employe, Center for Digital Medicine and Robotics Jagiellonian University Collegium Medicum, Krakow,

01.03.2016 – 31.07.2024, Assistant Professor, research and didactic employee, Department of Bioinformatics and Telemedicine, Faculty of Medicine, Jagiellonian University Collegium Medicum, Krakow

01.10.2014 - 29.02.2016, Assistant with a Ph. D., didactic and scientific employee, Department of Biophysics, Department of Physiology, Faculty of Medicine, Jagiellonian University Collegium Medicum, Krakow

01.04.2014 – 1.04.2024, Chief Core Laboratory Officer, KCRI, Kraków

01.04.2010 - 31.03.2014, Core Laboratory Analyst, KCRI, Krakow

2008, internship at AGH University of Science and Technology Stanisława Staszica in Kraków, Faculty of Mechanical Engineering and Robotics AGH, Department of Mechanics and Vibroacoustics, Practices in speech signal processing

2008, internship at AGH University of Science and Technology Stanisława Staszica in Kraków, Faculty of Physics and Applied Computer Science, Inspector of radiation protection type IOR-0; IOR-1

2007, internship at Krakow Specialist Hospital John Paul II, Center for Diagnostics, Prevention and Telemedicine with the sub-department of Quick Diagnostics, Practice in medical imaging.

2006, internship at 5th Military Clinical Hospital with the SP ZOZ Polyclinic in Krakow, Department of Medical Analytics Medical Practice

Scientific Work

Klaudia Proniewska in 2024 completed the degree of habilitated doctor in the field of medical sciences and health sciences, in the discipline of medical sciences. The scientific achievement serving as the basis for the habilitation procedure is a series of thematically related articles (original works) titled: *Immersive Technologies and Functional Imaging in Cardiology*.

Klaudia Proniewska completed Ph.D. **studies in Biocybernetics and Biomedical Engineering at the AGH University of Science and Technology in Krakow** in 2014. In the same year, she obtained a Ph.D. in technical sciences in the discipline of Biocybernetics and Biomedical Engineering, granted by a resolution of the Council of the Faculty of Electrical Engineering, Automatics, Computer Science and Biomedical Engineering. AGH University of Science and Technology in Krakow of December 18, 2014. based on the presented doctoral dissertation: *Identification of human life parameters based on cardiological and respiratory signals (Identification of human vital functions based on selected cardiac and respiratory signals).*

As part of the scientific activity carried out during the doctoral studies, Ph.D. Proniewska received a **regional scholarship "Doctus", which was funded by the Małopolska Center of Entrepreneurship**, for doctoral students educating in a field recognized as particularly important for a given region.

In 2013, Dr. Proniewska carried out research work as part of an internship at the Thoraxcenter Heart Disease Center, **Erasmus MC, Rotterdam, the Netherlands**.

The results of research carried out at Thoraxcenter Rotterdam were recognized by the jury of the Computing in Cardiology conference, where she received a Mortar scholarship (in the USA) awarded for innovative solutions in the field of cardiological patient monitoring.

In 2014, she continued her scientific research as part of an internship at the American **Cardiovascular Research Foundation in New York**.

In 2015, Dr. Proniewska participated in the internship **Top500 Innovators - the University of Cambridge, the University of Oxford** in the United Kingdom in the field of cooperation with

the economy, management of scientific research and commercialization of their results, a program implemented by the Ministry of Science and Higher Education.

As part of the Top500 Innovators internship, Dr. Proniewska acquired extensive knowledge in the management of scientific projects and their commercialization. Industry experts and innovation brokers from British technology transfer centers, based on their own experience, provided trainees with many guidelines for conducting scientific projects so that the commercialization process could be possible.

n the years 2010 -2013 she was the vice-president of doctoral students of the AGH University of Science and Technology, and in 2012 the representative of the National Representation of Doctoral Students for international affairs. She was also a member of the Management Board of Ph.D. students across Europe Eurodoc in the 2012/2013 term. Co-founder and member of the Foundation for the Development and Promotion of Science. Klaudia Proniewska is a member of the international organization of engineers IEEE (Institute of Electrical and Electronics Engineers). She has organizational skills acquired through the implementation of three cultural and scientific studies at AGH, among others, she co-organized two international conferences, i.e. Computing in Cardiology 2012 and Eurodoc 2012, IEEE Region 8 2014 congress

Currently, Klaudia Proniewska, DSc is a research and didactic employee, as an adjunct, at the CMCR UJCMand from May 2022 Deputy Director of the Center for Digital Medicine and Robotics Collegium Medicum (Centrum Medycyny Cyfrowej i Robotyki (cm-uj.krakow.pl))

Klaudia Proniewska specjalizuje się w nowoczesnych i cyfrowych metodach nauczania w edukacji medycznej. Kieruje międzynarodowym zespołem w Centrum Medycyny Cyfrowej i Robotyki przy Uniwersytecie Jagiellońskim Collegium Medicum, gdzie dzieli się swoimi doświadczeniami z integracji tych technologii w edukacji i klinicznym zastosowaniu. Jej praca koncentruje się na wizualizacji trójwymiarowych struktur anatomicznych, rzeczywistości mieszanej oraz nauczaniu problemowym w celu udoskonalenia metod nauczania w edukacji medycznej. Ma bogate doświadczenie naukowe i odbyła staże w renomowanych instytucjach na całym świecie. Więcej informacji możesz znaleźć na stronie: https://klaudiaproniewska.com/

Dr. Proniewska's scientific interests include **biomedical engineering**, in particular biomedical signal processing, coronary and cardiac imaging, and telemedicine solutions dedicated to the prevention of chronic diseases. Since 2017, he has been intensively working on the implementation of innovative methods of visualization of medical data based on augmented reality technologies and 3D space mapping (HoloMed - Holographic MedAssistan (cm-uj.krakow.pl)).

In 2021, the Jagiellonian University Medical College Mixed Reality Laboratory was officially established, of which Dr Proniewska is the head. The project was appreciated by Microsoft and promoted. The three-dimensional look into the human body can have a significant impact on the process of pre-procedural planning and monitoring of procedures as well as advanced medical education. The achievements were presented on Microsoft website, entitled: "Poland's Jagiellonian University Medical College brings the Microsoft HoloLens 2 into the classroom": Microsoft Customer Story-Uniwersytet Jagielloński – Collegium Medicum – nowy wymiar edukacji z HoloLens 2

Krakow, February 2025

Research carried out as part of the scientific activities at the JAGIELLONIAN UNIVERSITY MEDICAL COLLEGE

- Institute of Cardiology Jagiellonian University Medical College, Dariusz Dudek - visualization of pathological structures of the heart, planning of procedures, intraoperative space mapping, **using 3D medical data visualization methods and augmented reality, mapping the space of the room and the operating field.**

The effect of this cooperation was presented at the NFIC conference (New Frontiers in Interventional Cardiology Workshops;); NFIC_02.12.2019 ASD_ Structural treatment using Hololens 1 holography and 3D Azure Kinect 3D camera (proof of concept).

- I Department of General Surgery JAGIELLONIAN UNIVERSITY MEDICAL COLLEGE, Tomasz Rogula, 3D mapping of TransEnterix medical robot movements during a medical procedure, visualization of pathological structures **using HoloLens augmented reality goggles**, use of artificial intelligence during medical procedures. The effect of this collaboration is the first test of 3D mapping the movements of the medical robot.

- Cleveland Clinic, USA, Tomasz Rogula, Jacek Cywiński, Piyush Mathur, the use of artificial intelligence in the visualization of medical data **using the HoloLens goggles**. The result of this collaboration was the preparation of the Symposium BrainX Community, 2019 on the subject of artificial intelligence when using augmented reality.

- Case Western Reserve University (CWRU), Interactive Commons - Holoanatomy Labaoratorium - cooperation in the process of implementing to education and in the area of clinical sciences the possibilities of **augmented reality technology using HoloLens googles**. The result of this cooperation are tests of the HoloAnatomy application using goggles of extended transparency in the JAGIELLONIAN UNIVERSITY MEDICAL COLLEGE academic environment.

- The University of California, Los Angeles (UCLA), USA, Sławomir Łobodziński and Utrecht University Medical Center, Peter van Dam, - visualization of electrical wave propagation in the heart on specific 3D models of the heart. The effect of this cooperation is the implementation in the ECGSim software in the education of medical students, presentation at the Kasprowisko 2020 conference.

- Thoraxcenter, Erasmus MC, The Netherlands, Nico Bruining, cardiovascular visualization, 3D imaging of vessels and heart, implementation of new augmented reality technologies in 3D imaging. The result of this cooperation is scientific publications (listed in the publication part).

- Institute of Fundamental Technological Research of the Polish Academy of Sciences, prof.

Janusz Szczepański and dr inż. Agnieszka Pręgowska, in the area of biomedical signals analysis, in particular ECG, telemedicine solutions and the use of virtual and augmented reality as support for doctors. The result of this cooperation is 3 publications (100 points, 8 points and 40 points accepted), 1 monograph and 1 chapter of the monograph, 5 conference abstracts and 2 articles discussed at the conference.

In July 2019, Ph. D. Proniewska established cooperation with the Cleveland Clinic (CC) and Case Western Reserve University (CWRU) as **part of the use of augmented reality technology in medical education and clinical application**. CC and CWSU are currently one of the first centers that implement augmented reality technologies for everyday medical students and in clinical practice. Direct cooperation with the Interactive Commons laboratory (HoloAnatomy) and exchange of knowledge between Polish and American centers gives a broad perspective of commercialization of the proposed project.

Ph. D. Proniewska in March, April, May - 2020, **will coordinate tests of the HoloAnatomy application using augmented reality goggles** among students of the Faculty of Medicine Jagiellonian University Medical College.

Under supervision of Dr. Klaudia Proniewska Jagiellonian University Medical School became the first HoloAnatomy® Software Suite Partner in the Eastern Europe region and adapt a Mixed Reality platform for its students. The head of the project, Klaudia Proniewska, had this vision and desire to bring HoloAnatomy back in 2016 when the project was just in its infancy stage. Years later, after visiting Cleveland, where the software was underway and ready for launch in July 2019, the dream became a reality at Dr. Proniewska's university because of her leadership and belief in the new way of teaching and learning. Jagiellonian University Medical College officially piloted its first HoloAnatomy session with its medical students in October 2022, with exciting reactions from all involved:

- HoloAnatomy® and Mixed Reality in the Jagiellonian University - MRAME (cm-uj.krakow.pl)
- HoloAnatomy® Newsletter - January 2023 (mailchi.mp)

TEACHING

2014 – present, Teaching

Subjects:

- Telemedicine with Elements of Medical Simulation, English division of Medical School, 150 students / year / every year
- Telemedicine with Elements of Medical Simulation, Polish division of Medical School, 300 students / year / every year
- Computer science and medical statistics, Polish division of Dentistry Medical School, 80 students / year / every year
- Computer science and medical statistics, English division of Dentistry Medical School,

60 students / year / every year
- Modern technologies in dietetics, Polish division of Dietetics School, 20 students / year / every year
- HoloAnatomy – under the project MRAME – Mixed Reality Advanced Medical Education – classes of Anatomy in mixed reality environments with Hololesn2 glasses, academic year 2022/2023 – 200 students, 1st year Medical School (Polish and English division)
- "Methods of visualizing medical data using mixed reality technology (Mixed Reality)"/ 60 students 5th and 6th year of Medical School (Polish division), academic year 2021/22 and 2022/2023

SCIENTIFIC CIRCLES

2016 – supervising of Jagiellonian University Medical College Scientific Circle for Digital Medicine and Robotics, 30 students – members of scientific circles in academic year 2022/2023.

Activity:

- lecture by Prof. Sławomir (Suave) Łobodziński, University of California, Los Angeles, The future of electrocardiology - how artificial intelligence is revolutionizing ECG analysis and interpretation, lecture organized by members of Scientific Circle for Digital Medicine and Robotics for the academic community of Jagiellonian University Medical College.
- HoloLens2 Mixed Reality workshop sessions at MTW 2023 - National Conference of Medical Students. Thanks to this, participants could "immerse" in the topographic anatomy of the heart and chest structures.
- demonstration of the HoloAnatomy Software Suite program in relation to the normal anatomy of the valvular apparatus of the heart at the Digital Anatomy NFIC 2022 session "Structural Cardiac Anatomy by #HoloAnatomy Software Suite in 3D - Mixed Reality experience - New Frontiers in Interventional Cardiology workshop (NFIC)".

During the period of activity of the Scientific Circle for Digital Medicine and Robotics scientific, the following activities can be distinguished that contribute to the dissemination of knowledge in this area:

- cyclical training in 3D segmentation of medical data for Jagiellonian University Medical College students,
- cyclical workshops with the use of immersive technologies, including Mixed Reality using HoloLens 2 Microsoft devices,
- workshops and study visits to medical centers, e.g. with the use of operating robots,
- cyclical training courses on scientific publications for Jagiellonian University Medical College students,
- cyclical 3D printing workshops with partner scientific circles of AGH – University of Science and Technology Transspeed and scientific circles New Technologies Jagiellonian University Medical College.

Prizes for students – members of Scientific Circle:

- Third place at the I-DAYS 2022 hachathon, SKN Medycyny Cyfrowej i Robotics Jagiellonian University Medical College
- 3 awards for members of the scientific circle of SKN Medycyny Cyfrowej i Robotics Jagiellonian University Medical College during the 31st edition of the International Medical Students' Conference (IMSC)

Students Grants – members of Scientific Circle:

Two grants were obtained for members of the Scientific Society of Digital Medicine and Robotics in the competition "Student Grants 2022/2023 Jagiellonian University Medical College"

- *Comparative analysis of a series of morphometric measurements of selected brain structures of patients with Huntington's disease in search of previously undemonstrated radiological changes – student coordinators: Antoni Cierniak, Michał Piotrowski*
- *An innovative approach to reducing falls in the elderly - designing a measurement and research method for identifying and reducing external barriers that are conducive to falls - student coordinators: Hubert Borecki, Tomasz Kozioł*

A grant was obtained as part of the MEiN competition, Program: "Student Scientific Circles create innovations"

- *Virtual 3D models of organs subjected to computer microtomography and their evaluation in the field of human anatomy - student coordinator – Julianna Dąbrowa*

RESEARCH GROUPS

HoloAnatomy Group Jagiellonian University Medical College and Cleveland Clinic HoloAnatomy® Suite takes advantage of these technical benefits and provides students an opportunity to learn anatomy in a completely new way, in 3D visualization. Heart and soul of every HoloAnatomy® lesson is a holographic slideshow. It consists of accurate, three-dimensional models with a controlled number of anatomical structures. There is also a possibility to add other educational materials to the slideshow. What is important, teacher and students see the model in the same place. This enables the tutor to point or magnify any structure from the model he wants to show. Lessons take place in the Mixed Reality Laboratory in the Center for Digital Medicine and Robotics. This space is specially adapted in order to perform classes in a trouble-free way due to stable Wi-Fi connection, matched wall patterns and controlled light intensity. On the other hand, the room remains extremely comfortable and cozy providing students and teachers the best possible experience. HoloAnatomy® and Mixed Reality in the Jagiellonian University - MRAME (cm-uj.krakow.pl)

HoloAnatomy Team at Jagiellonian University Medical College:

HoloAnatomy® lessons are prepared by a creator's team which is led by medical engineer Klaudia Proniewska PhD and consists of: Julianna Dąbrowa, MD Student; Michał Piotrowski, MD Student; Antoni Cierniak, MD Student.

The classes were conducted by anatomist from Chair of Anatomy CM UJ:

- Professor Jerzy Walocha, MD, PhD, DSc, Head of Department of Anatomy
- Grzegorz Goncerz, MD, PhD
- Bernard Solewski, MD
- Maciej Lis, MD
- Michał Zarzecki, MD
- Michał Goncerz, MSc

MRAME Group (international Partners), Mixed Reality supporting Advanced Medical Education (cm-uj.krakow.pl) - A new method of teaching medical skills. The primary goal is to allow organizations to develop and reinforce networks, increase their capacity to operate at transnational level in teaching, studying in 3D environment with mixed reality support, led by medical engineer Klaudia Proniewska PhD and consists International Team:

- LIDER – Jagiellonian University Medical College, Krakow, Poland
- Erasmus Universitair Medisch Centrum Rotterdam, Kingdom of the Netherlands
- Università Cattolica del Sacro Cuore, Italy
- Palacky University in Olomouc, Czech Republic
- Università degli Studi di Ferrara, Italy
- Stichting Katholieke Universiteit, Kingdom of the Netherlands

Cognitive load and learning Anatomy in AR spatial resolution capability in teaching anatomy, Transeuropean Multicenter RCT; initiators of the idea: Klaudia Proniewska, Julianna Dąbrowa (Jagiellonian University Medical College, Kraków, Poland), Marc Vorstenbosch, Thomas Maal (RadboudUMC, Nijmegen, The Netherlands)

HoloMed LIDER NCBR, Holographic MedAssistan, 3D operating room with unlimited perspective change and remote support, The core team of 4 people is supported by external medical consultants: HoloMed - Holographic MedAssistan (cm-uj.krakow.pl)

Functional imaging of the heart (cooperation with Peter van Dam) - we are currently working to improve the clinical value of the 12-lead ECG by using reverse heart modeling in conjunction with digital technologies.

mCT – advanced 3D visualizations enhanced by Mixed Reality - cooperation with the microcomputed tomography laboratory, under the direction of Dr hab. Eng. prof. AGH Jacek Tarasiuk, Faculty of Physics and Applied Computer Science, AGH Department of Condensed

Matter Physics and Prof. dr hab. n. med. Jerzy Walocha, Chair and Department of Anatomy of the Jagiellonian University Medical College and Prof. dr hab. n. med. Marek Sanak, Department of Forensic Medicine, Jagiellonian University Medical College, 2nd Department of Internal Medicine: Department of Molecular Biology and Clinical Genetics, Jagiellonian University Medical College as part of the project: "Virtual 3D models of organs subjected to computer microtomography and their evaluation in the field of human anatomy" supported by grant MEiN "Studenckie Koła Naukowe Tworzą Innowacje". As part of the cooperation, a grant application was prepared as part of the competition "Student scientific circles create innovations", the title of the project "Virtual 3D models of organs subjected to computer microtomography and their evaluation in the field of human anatomy". The application received a positive opinion and was qualified for funding.

MEMBERSHIP IN SCIENTIFIC ORGANIZATIONS

2020 – 2022, European Association of Percutaneous Cardiovascular Interventions, Digital Medicine Committee Member

From 2013, membership in the Polish Society of Cardiology

From 2009 Member of IEEE AGH-UST Krakow Student Branch

From 2005 Member of the International Association of Biomedical Engineering AGH - UST EMBS IEEE Students Club, Poland

2012 - 2013 / Member of the Management Board of EURODOC European Council of Doctoral Candidates and Junior

COMPLETED COURSES AND TRAINING

1. 2019, Medis QFR Training Course, Expert training, a certificate for use

Medis QAngio XA 3D analytical software, including QFR analysis.

Connection to the project: a new QFR imaging method, knowledge about new medical imaging is key to implementing such an innovative system as the Holographic Medical Assistant

2. 2018, Science Trainer, in the field of training project management

Link to the project: new methods of managing a training project

3. Cardiological Imaging Workshops TK, MR, SPECT, PET

Connection to the project: a new imaging method, knowledge about new medical imaging is crucial in implementing such an innovative system as the Holographic Medical Assistant

4. 2016, Medis Company, Leiden, The Netherlands, Expert schools in the field of a non-invasive method of estimating partial coronary flow reserve

Connection to the project: a new imaging method, knowledge about new medical imaging is key to implementing such an innovative system as the Holographic Medical Assistant

5. 2016, Department of Bioinformatics and Telemedicine, Jagiellonian University, Collegium Medicum, statistical workshop

Connection to the project: knowledge of medical data analysis is crucial when implementing a project, one of the tasks in the project concerns data analysis using biostatistics tools. A key course in the implementation of the project.

6. 2010-2020 (annual participation), NFIC - New Frontiers in Interventional Cardiology, Krakow, Poland, cardiology workshops

Connection to the project: NFIC workshops concern modern diagnostic and therapeutic methods in interventional cardiology, knowledge in this subject is crucial when implementing the proposed project

7. 2015, UJCM Clinical Decision Making Laboratory and Poland Filia Nordic Cochrane Center, introduction to the methodology for developing systematic reviews

Connection to the project: Knowledge of how to systematically run databases and publish them is crucial when implementing key project milestones.

8. 2015, Cracow Branch Polish Society of Cardiology, Cardiological Imaging Workshops TK, MR, SPECT, AND PET

Connection to the project: Workshops on new imaging methods, knowledge about new imaging in medicine is crucial when implementing such an innovative system as the Holographic Medical Assistant

9. 2015, MedTrends, Kardio-Med Silesia, SCCS Zabrze, Zabrze in the heart of Silesia, Polish-British Forum on Modern Health Care

Connection to the project: Workshops on new trends in medicine, knowledge about new trends in medicine is crucial in implementing such an innovative system as the Holographic Medical Assistant.

10. 2015, Małopolska Center for Translational Medicine UJCM, Clinical trials of medical devices - theory and practice

Connection to the project: Clinical trial workshops, knowledge of new clinical trials is crucial when implementing such an innovative system as the Holographic Medical Assistant, as a clinical trial is planned during the implementation of the project.

11. 2013, Cracow Branch Polish Society of Cardiology, June 21, 2013, Cardiological Imaging Workshops TK, MR, SPECT AND PET

Connection to the project: Workshops on new imaging methods, knowledge about new imaging in medicine is crucial when implementing such an innovative system as the Holographic Medical Assistant

12. 2013, Thoraxcenter, Rotterdam, Netherlands, Training on the IVUS study, iMap conducted by Boston Scientific

Connection to the project: a new imaging method, knowledge about new medical imaging is key to implementing such an innovative system as the Holographic Medical Assistant

13. 2012, MathWorks training, Image processing using Matlab

Connection to the project: Workshops related to the processing of source images is an important element of the entire data analysis process, crucial from project implementation

14. 2012, Spin-off / spin-out training organized as part of the Human Capital - National Cohesion Strategy program, Berndtson Training, July 2012

Connection to the project: Workshops related to the commercialization of the project, crucial from project implementation, the assumption of the project is the commercialization of the scientific project

15. 2012, Institute of Cardiology CM-UJ, Kraków, Poska, Training on Precision Guided PCI in LM and Complex ACS Interventions, Volcano

Connection to the project: a new imaging method, knowledge about new medical imaging is key to implementing such an innovative system as the Holographic Medical Assistant

16. 2010, Institute of Cardiology CM-UJ, Krakow, Poland, Preceptorship on IVUS, VH & FFR, Volcano

Connection to the project: a new imaging method, knowledge about new medical imaging is key to implementing such an innovative system as the Holographic Medical Assistant

OTHER EXPERIENCE - related to management

KCRI - from 2014 - present - **Head of Imaging Department**, Corelab KCRI

NFIC - from 2018 - currently - **Head of the Digital Health Section**, responsible for activities related to Digital Medicine

IEEE - Head of tasks related to the preparation of the international congress,

The Institute of Electrical and Electronics Engineers, IEEE Student & Young, Professional Congress in 2014 in Krakow.

Brain X Community - Head of the European section, Head of tasks related to the preparation of an international symposium on artificial intelligence and augmented reality in medicine, 30.X.2019

MCSB - Head of tasks related to the preparation of an international symposium on biocybernetics and artificial intelligence, responsible for workshops related to augmented reality in medicine, 22-24.05.2020

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SCIENCE PUBLICATIONS related to habilitation project

1. **Proniewska KK,** Abacherli R, van Dam PM. The DeltaWaveECG: The differences to the normal 12-lead ECG amplitudes. J Electrocardiol. 2023;76:45-54.
2. Garlinska M, Osial M, **Proniewska K**, Pregowska A. The Influence of Emerging Technologies on Distance Education. Electronics. 2023;12(7):1550.
3. Dolega-Dolegowski D, Dolega-Dolegowska M, Pregowska A, Malinowski K, **Proniewska K**. The Application of Mixed Reality in Root Canal Treatment. Applied Sciences. 2023;13(7):4078.
4. Radek Kolecki AP, Julianna Dąbrowa, Jerzy Skuciński, Tomasz Pulanecki, Piotr Walecki, Peter M. van Dam, Dariusz Dudek, Piotr Richter, **Klaudia Proniewska**. Assessment of the utility of Mixed Reality in medical education. Translational Research in Anatomy. 2022;28(100214).
5. Pregowska A, Osial M, Dolega-Dolegowski D, Kolecki R, **Proniewska K**. Information and Communication Technologies Combined with Mixed Reality as Supporting Tools in Medical Education. Electronics. 2022;11(22):3778.
6. Grad P, Przeklasa-Bierowiec AM, Malinowski KP, Witowski J, **Proniewska K**, Taton G. Application of HoloLens-based augmented reality and three-dimensional printed anatomical tooth reference models in dental education. Anat Sci Educ. 2022.
7. Dolega-Dolegowski D, **Proniewska K**, Dolega-Dolegowska M, Pregowska A, Hajto-Bryk J, Trojak M, et al. Application of holography and augmented reality based technology to visualize the internal structure of the dental root - a proof of concept. Head Face Med. 2022;18(1):12.
8. Zelias A, Khokhar AA, **Proniewska K**, Zlahoda-Huzior A, Ruggiero R, Chandra K, et al. Percutaneous coronary intervention of a tortuous and complex circumflex lesion using the robotic CorPath GRX system. Kardiol Pol. 2021;79(9):1044-5.
9. Skrzat J, Heryan K, Tarasiuk J, Wronski S, **Proniewska K**, Walecki P, et al. A 3D model of the renal vasculature - a joined result of the corrosion casting technique, micro-CT imaging and rapid prototyping technology. Folia Med Cracov. 2021;61(4):45-54.
10. **Proniewska K**, Pregowska A, Dolega-Dolegowski D, Dudek D. Immersive technologies as a solution for general data protection regulation in Europe and impact on the COVID-19 pandemic. Cardiol J. 2021;28(1):23-33.
11. **Proniewska K**, Khokhar AA, Dudek D. Advanced imaging in interventional cardiology: mixed reality to optimize preprocedural planning and intraprocedural monitoring. Kardiol Pol. 2021;79(3):331-5.
12. Kruk D, Plencler I, Walecki P, Daren A, Stankiewicz P, **Proniewska K**, et al. Application of 360 degrees virtual reality videos in the assessment of paranoia in schizophrenia patients: a pilot study. Psychiatr Pol. 2021:1-14.
13. Chmiel J, Malinowski KP, Ksiazek KM, Wnuk G, Dradrach J, **Proniewska K,** et al. Three-dimensional reconstruction of conventional catheter angiography-identified coronary artery aneurysms and ectasias. Cardiol J. 2021;28(4):623-6.
14. **Proniewska K,** Pregowska A, Walecki P, Dołęga-Dołęgowski D, Ferrari R, Dudek D. Overview of the holographic-guided cardiovascular interventions and training – a perspective. Bio-Algorithms and Med-Systems. 2020;16(3).

15. **Proniewska K**, Pręgowska A, Dolega-Dolegowski D, Chmiel J, Dudek D, editors. Three-Dimensional Operating Room with Unlimited Perspective2020; Cham: Springer International Publishing.
16. **Proniewska K**, Dołęga-Dołęgowski D, Pręgowska A, Walecki P, Dudek D. 8 Holography as a progressive revolution in medicine. In: Irena R-K, editor. Simulations in Medicine. Berlin, Boston: De Gruyter; 2020. p. 103-16.

ALL SCIENCE PUBLICATIONS

1. Proniewska Klaudia, Pregowska A., Malinowski K. P. Identification of Human Vital Functions Directly Relevant to the Respiratory System Based on the Cardiac and Acoustic Parameters and Random Forest. IRBM 2021 : Vol. 42, nr 3, s. 174-179
2. Koltowski Lukasz, Tomaniak Mariusz, Ochijewicz Dorota, Zieliński Kamil, Proniewska Klaudia, Malinowski Krzysztof P., Zaleska Martyna, Maksym Jakub, Roleder Tomasz, Partyka Lukasz, Kochman Wacław, Filipiak Krzysztof J., Opolski Grzegorz, Kochman Janusz. Serial Baseline, 12-, 24-, and 60-Month Optical Coherence Tomography Evaluation of ST Segment Elevation Myocardial Infarction Patients Treated with Absorb Bioresorbable Vascular Scaffold. American Journal of Cardiology. 2021 : Vol. 155, s. 23-31
3. Proniewska Klaudia. Mixed Reality : Enjoy the View. UA Magazine 2020, June 9
4. Ochijewicz Dorota, Tomaniak Mariusz, Kołtowski Lukasz, Rdzanek Adam, Pietrasik Arkadiusz, Proniewska Klaudia, Partyka Lukasz, Dijsktra Jouke, Huczek Zenon, Filipiak Krzysztof, Opolski Grzegorz, Kochman Janusz. Peri-strut low intensity areas and in-scaffold neointima growth after bioresorbable scaffold implantation in STEMI. A serial optical coherence tomography study. International Journal of Cardiology 2020 : Vol. 312, s. 27-32
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2. **Augmented reality as a doctor support to meet the General Data Protection Regulation in Europe, K. Proniewska**, D. Dołęga-Dołęgowski, A. Pregowska, D. Dudek, Advances in Interventional Cardiology, 2019: Vol. 15, No. 4, p. 514, Abstr. 13-P., Abstracts of original contributions 20th Interventional Cardiology Workshop New Frontiers in Interventional Cardiology, Krakow, Poland, December 12th, 2019.
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4. Serial 3- and 9-year Optical Coherence Tomography Assessment of Vascular Healing Response to Sirolimus- and Paclitaxel-Eluting Stents, M. Tomaniak, J. Kochman, Ł. Koltowski, A. Pietrasik, A. Rdzanek, J. Jąkała, **K. Proniewska**, K. P. Malinowski, K. Filipiak, G. Opolski JACC: Journal of the American College of Cardiology 2016; 68 (18) suppl. 1: B30 – B31, TCT – 74 A., Transcatheter Cardiovascular Therapeutics Abstracts. Twenty-Eighth Annual Symposium Transcatheter Cardiovascular Therapeutics (TCT).
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1. Holography as a progressive revolution in medicine, Simulations in Medicine Computer-aided diagnostics and therapy Ed. by Roterman-Konieczna; **K. Proniewska**, D. Dołęga-Dołęgowski, A. Pręgowska, P. Walecki, D. Dudek, I., DeGruyter 2020 (80 points)
2. Sleep Disorders: Biostatistical and Information Theory Based Approach, A. Pregowska, **K. Proniewska**, Scholar's Press 2018.
3. Coronary plaque quantification by multi-slice computed tomography, E. Pociask, **K. Proniewska**, N. Bruining, Frontiers of Medical Imaging Wiley Online Library 2014; 3-18.
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IMPLEMENTATIONS / LICENSE / UTILITY DESIGNS / ECONOMIC APPLICATIONS

Implementations

1. **K. Proniewska**: implementation of a computer system for the automatic recognition of transformer acoustic signals (KSARSA-T) at the company Elektromechaniczny - Krzysztof Szczepanik, Kraków, 8.01.2015.

The implementation consisted of recording an acoustic signal using a microphone, sound card, and computer. Appropriate programs analyze the sound. During the processing of this signal, the system informs about the operations carried out by displaying appropriate messages on the computer screen.

2. **K. Proniewska**: implementation of a computer system for automatic recognition of transformer acoustic signals (SARSA-T) at Aber, Kraków, 6/01/2015.

The implementation consisted of a recording of an acoustic signal using a microphone, sound card, and computer. Appropriate programs analyze the sound. During the processing of this signal, the system informs about the operations carried out by displaying appropriate messages on the computer screen.

Utility models

1. **K. Proniewska** (UJCM), A. Rydosz (AGH): Title: Mouthpiece connector. Description: Development of a mouthpiece connector element with a breath analyzer housing. Application number: W.124950, WIPO ST 10 / C: PL124950U, Your reference number: PK / 3650 / RW,

Applicant: Uniwersytet Jagielloński, Kraków, PL; AGH University of Science and Technology Stanisława Staszica in Cracow, Cracow.

The utility model will be implemented in Start-up ADE Sp z o.o. (Artur Rydosz, Konstanty Marszałek), which produces a breath analyzer.