**Review**

**of PhD. Eng. Agnieszka Cichocka autoreferat**

**"PERSONALIZATION IN DESIGNING NEW STRUCTURES OF CLOTHING PRODUCTS USING DIGITAL DATA PROCESSING"**

**presented on habilitation in Materials Engineering**

The presented scientific achievement "PERSONALIZATION IN DESIGNING NEW STRUCTURES OF CLOTHING PRODUCTS USING DIGITAL DATA PROCESSING" by PhD. Eng. Agnieszka Cichocka, is the justification of her habilitation application and concerns the theoretical foundations and the implementation of "virtual tools" in the process of designing clothes in 3D for the production of new structures of products for clothing. More specifically, this application is a proposal to solve the problem of creating tailored forms of clothing products, in particular personalized ones, by implementing them in a virtual space using CAD (Computer-Aided Design) system modules and a human body scanner. Personalization of cloths is one of very perspective ways to decrease textile waste via decreasing of non-used cloths and contribute to the main aspects of more sustainable textile and slow fashion (instead fast fashion) ideas.

Regarding the current state of knowledge and technology, presented by PhD Eng. Agnieszka Cichocka, the original results of scientific research and confirmed design achievements in the field of PERSONALIZATION IN DESIGNING NEW STRUCTURES OF CLOTHING PRODUCTS USING DIGITAL DATA PROCESSING constitute an innovative approach to the problem of perfect matching of personalized clothing to the user in the process of designing clothing in 3D using virtual tools. This process considers issues related to the structural design of clothing structures (original methodologies for designing clothing in 3D) as well as the material design of clothing structures (design and production of clothing packages from textile materials, with specific features and functionalities), which can be an important source of theoretical and practical information.

Investigations of a construction and technological nature presented original research works using methodologies of the 3D clothing design process (described, among others, in a series of publications presented as a component of the scientific achievement presented in the application - Autoreferat 4.2), confirmed by their use in the implementation, in co-authorship,

prototypes of special clothing that have obtained legal protection in Poland: Patent for invention No. 229203 titled "Clothing Acting as a Supplement to Dressings in the Therapy of Dermatological Diseases" (2018), [the collection of clothing, created on the basis of these patent assumptions, was awarded prizes in prestigious competitions: Invention Award ORIGITEA 2015, Gold medal at the JENA 2015 fair, Gold Medal Eureka - World Exhibition On Inventions, Research And New Technologies 2015, Gold Medal On International Warsaw Invention Show Iwis 2015], and Utility Model No. 71876 titled "Protective Clothing" (2021) - (Autoreferat 4.3).

As a significant contribution to the development of the discipline of Materials Engineering in textile and clothing, PhD. Eng. Agnieszka Cichocka recognizes the definition of phenomena that concern:

A. Developing a new design methodology, personalized construction structures of clothing products, including for atypical figures using a 2D method supported by scanning technology and a CAD system and the methodology of direct clothing design in 3D for atypical figures in virtual space [A2, A3, A9, B1]

B. Implementation of virtual techniques into the methodology of designing personalized, special clothing protecting against high temperatures and thermal radiation, as well as clothing supporting the treatment of dermatoses [A9, B1, O.K.1, O.K.2]

C. Development and testing in co-authorship of a material clothing package for clothing protecting against thermal radiation and material design of packages for protective clothing related to the modification of the outer coating as a function of the protective properties of the clothing [A4, A5, A6, A7, A8]

D. Proving the possibility of optimizing the personalization process of clothing products by using digital data processing as a process that considers the functions of clothing products, the preferences of the clothing user, the user's figure and the comfort of using the clothing product [A1, A2, A3, B1, A9]

E. Development in co-authorship of the design achievement: Patent for invention No. 229203 entitled Clothing acting as a supplement to the dressing in the treatment of dermatological diseases, obtained in 2018, which was created with significant support of virtual clothing design techniques [O.K.1]

F. Development in co-authorship of the design achievement: Utility Model No. 71876 titled "Protective clothing", which obtained protection rights in 2021, which was created with significant support of virtual clothing design techniques [O.K.2].

The interdisciplinary of the projects carried out by PhD. Eng. Agnieszka Cichocka's research work in her scientific career to date, is also confirmed by participation in her scientific and research projects, scientific publications, oral and poster presentations at international conferences, which were also created in cooperation with external scientific centers: CIOP PIB Łódź, IWNiRZ PIB Poznań, ENSAIT de Roubaix, France (also as an employed teaching and research employee in the position of Attachée Temporaire d'Enseignement et de Recherche (ATER) at ENSAIT de Roubaix for 2 years, thus consolidating the direction of scientific research and improving her competences in the application and use of CAD system solutions related to 3D clothing design.

Scientific activity of PhD Eng. Agnieszka Cichocka is summarized as the author and co-author of 29 scientific publications after her doctorate and 3 before her doctorate, as well as 41 presentations at international conferences after her doctorate and 7 before obtaining her doctorate in technical sciences, and co-authorship of 2 design achievements and industrial property rights obtained - 1 patent for an invention and 1 utility model. Additionally, she participated in 8 European projects as a performer, subject matter expert or listener. She was a supervisor of 10 engineering and master's theses and auxiliary supervisor of 2 doctorates defended at TUL.

In accordance with the above stated the works of PhD Eng. Agnieszka Cichocka, presented in autoreferat "PERSONALIZATION IN DESIGNING NEW STRUCTURES OF CLOTHING PRODUCTS USING DIGITAL DATA PROCESSING", submitted for habilitation in Materials Engineering, corresponds to the international standards and requirements, it is fully original work, has both scientific and practical value and the author PhD Eng. Agnieszka Cichocka deserves a habilitation degree in the field Materials Engineering.

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