

## Scientific schools of the Faculty of Mechatronics and Computer Technologies



**Founder – Volodymyr SHCHERBAN**, Doctor of Technical Sciences, professor, laureate of the State Prize of Ukraine in Science and Technology.

### MATHEMATICAL SUPPORT OF CAD EQUIPMENT AND TECHNOLOGICAL PROCESSES OF THE LIGHT AND TEXTILE INDUSTRY

#### **Directions:**

- development of methods for mathematical modeling of technological processes and equipment of light and textile industry;
- improvement of technological processes of the light and textile industry;
- development of scientific foundations of CAD technological processes and equipment for the light and textile industry;
- improvement of the structure and production technology of multilayer fabrics;
- development of the scientific foundations of thread mechanics.

#### **Results:**

- 2 doctoral theses and 6 candidate theses were defended;
- 300 scientific works were published, including 10 monographs;
- received 18 patents and copyright certificates.



**Founder – Bronislav ORLOVSKY**, Doctor of Technical Sciences, professor, honored worker of science and technology of Ukraine.

### IMPROVEMENT OF LIGHT INDUSTRY MACHINE DESIGN METHODS

**Directions:**

- development of scientific foundations of computer mechanics, high-speed machines of the light industry, optimization synthesis of target mechanisms of light and textile industry machines, object-oriented design of complex mechanical and technological systems on the example of machines of sewing, knitting, and shoe production, structural analysis and synthesis of spatial mechanisms;
- creation of sewing machines for the blind and sewing simulators;
- development of methods for designing sewing and household basic knitting machines.

**Results:**

- 7 doctoral theses and 54 candidate theses were defended;
- published more than 900 scientific works, including 10 monographs, 7 textbooks, and training manuals;
- received more than 300 patents and copyright certificates.



**Founder – Anatoly ZENKIN**, Doctor of Technical Sciences, professor, honored worker of science and technology of Ukraine, president of the Association of Technologists and Machine Builders of Ukraine.

**Academic supervisor – Hanna KHIMICHEVA**, Doctor of Technical Sciences, professor.

TECHNICAL AND ORGANIZATIONAL FUNDAMENTALS OF PRODUCT QUALITY IMPROVEMENT BASED ON MODERN METHODS OF METROLOGY, STANDARDIZATION AND CERTIFICATION

**Directions:**

- use of theoretical, methodical, and organizational foundations of work assurance in quality management and standardization;
- work on promising areas of standardization, mechanisms, and tools of product quality management;
- development of the foundations of building quality management systems, quality control of key technological processes;

- increasing the effectiveness of standardization.

**Results:**

- 4 doctoral theses and 21 candidate theses were defended;
- more than 400 works were published, including 15 monographs, 10 reference books, 10 textbooks, and 10 teaching aids;
- received more than 35 titles of protection for inventions.



**Founder – Borys PIPA**, Doctor of Technical Sciences, professor, honored worker of science and technology of Ukraine.

**Academic supervisor – Serhii PLESHKO**, PhD, associate professor.

**DYNAMICS, RELIABILITY AND DURABILITY OF CIRCULAR KNITTING MACHINES**

**Directions:**

- study of the peculiarities of the dynamics of knitting mechanisms of knitting machines;
- development of the theory of designing fundamentally new designs of working bodies of knitting mechanisms;
- study of the dynamics of drives of circular knitting machines;
- creation of fundamentally new actuator designs and the scientific basis of their design;
- research on the mechanisms of tensioning and rolling of circular knitted fabric.

**Results:**

- 3 doctoral theses and 18 candidate theses were defended;
- more than 1,000 scientific works were published, including 12 monographs, 2 textbooks, and 11 training manuals;
- received more than 530 copyright certificates and patents for inventions.



**Founder – Yury SKRYPNYK**, Doctor of Technical Sciences, professor, honored worker of science and technology of Ukraine.

**Academic supervisor – Hanna KHIMICHEVA**, Doctor of Technical Sciences, professor.

**SCIENTIFIC BASIS OF CREATING ADAPTIVE DEVICES AND SENSOR SYSTEMS FOR CONTROL OVER THE PARAMETERS OF TECHNOLOGICAL PROCESSES, THE ENVIRONMENT AND ASSESSMENT OF THEIR IMPACT ON THE PHYSICAL AND MENTAL STATE OF A PERSON**

**Directions:**

- methods and means of automatic correction of progressive errors of sensors and devices based on structural and temporal redundancy of measurements;
- automation of control over technological processes;
- creation of multifunctional measuring transducers based on reversible electrical effects;
- measurement of weak electromagnetic radiation;
- interaction of human electromagnetic fields with clothing and footwear materials;
- creation of radiometric equipment in the ultra-high frequency range;
- development of computer systems for assessing the comfort of clothing based on the electrophysical parameters of human skin and the level of electromagnetic radiation.

**Results:**

- 7 doctoral theses and 36 candidate theses were defended;
- 46 monographs, textbooks, and monographs, textbooks and training manuals, more than 350 articles and reports were published;
- received 960 patents and copyright certificates.



**Founder – Oleh KHOMYAK**, Doctor of Technical Sciences, professor, honored worker of public education of Ukraine.

**Academic supervisor – Volodymyr DVORZHAK**, PhD, associate professor.

**DYNAMICS, RELIABILITY AND DURABILITY OF FLAT KNITTING MACHINES**

**Directions:**

- dynamics of machines and mechanisms;
- development of the theory of design and improvement of mechanisms of flat knitting machines.

**Results:**

- 1 doctoral and 7 candidate theses were defended;
- published more than 300 scientific works, including 10 monographs, 1 textbook, and 13 training manuals;
- received 172 copyright certificates and patents.