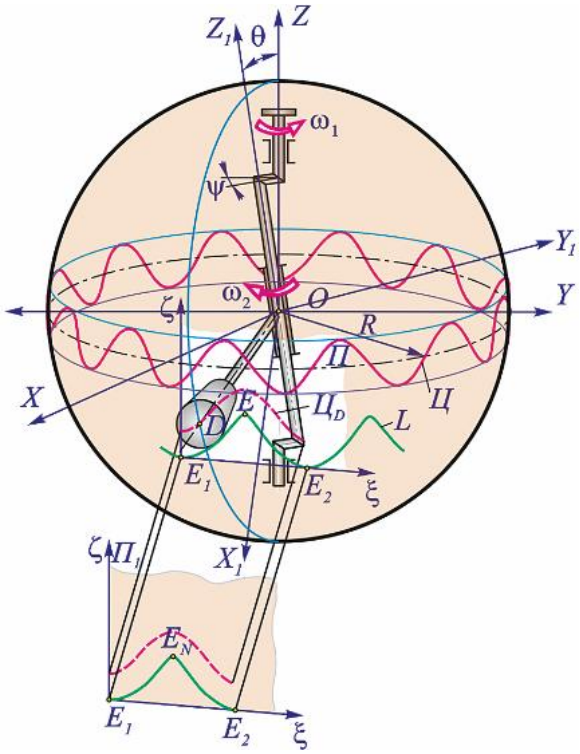
Department "*Fundamentals of Machines Design*"

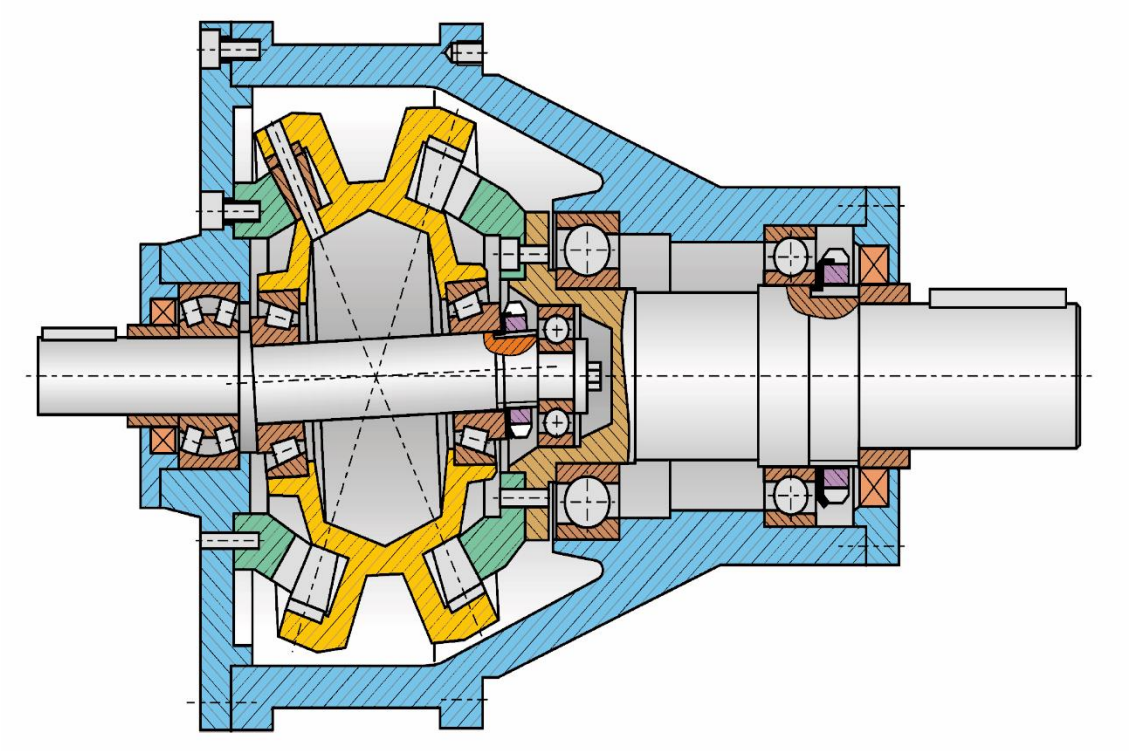
In 2014 the department "*Fundamentals of Machine Design*" was created by merging the departments "*Theory of Mechanisms and Machines' Parts*", "*Structural Mechanics*" and "*Materials science*". Currently the teaching staff is comprised of 16 full time and 4 part time staff including 1 Prof. Dr. Sc., 2 Dr. Sc., 14 Assoc. Prof., PhD. There are 4 PhD students within the department.

The department manages three Research Centres

1. ***Planetary precessional gears Research Center "Precesia",*** (Director: Prof. Ion Bostan), which includes the following laboratories:
   - "Computational modelling of precessional gears";
   - "Mechanical gear research";
   - "Precision Mechanics";
   - "New technologies for gear manufacturing";
   - "Mechanical testing of materials and surface study";



The results of the research done within the Centre were published in 8 monographs, 6 textbooks, 180 patents (ex USSR, Russia and Moldova) concerned with new kinematic structures, non-standard gears, manufacturing methods, different structures for a varied domain of usage; development of more than 30 kinematic and power units of planetary precessional gears;



Research has focused on the theoretical basis of non-standard gears; theoretical basis of manufacturing technology of the gears with non-standard teeth shape; designing, manufacturing and testing precessional of kinematic and power gears for different domains;

International Projects:

- ✓ **Project** CRDF (Civilian Research & Development Foundation, US) MP2-2287 "*The Elaboration of Submersible Robot Complex Drive Mechanism for Ferro-manganese concretion extraction"* (2001-2003);
- ✓ **Project** CRDF MP2-3023 "*Elaboration of transmission for space devices*" (2001-2002).
- ✓ **Research grant** "*Design of a new type of gearing for crushing equipment advantageous from the point of view of its cost*". ARP GmbH, Alpirsbach, Fachhochschule Konstanz, Germany. 2004-2006.

2. **Renewable Energy Conversion Systems Centre (CESCER),** (Director: Prof. Dr. Sc. Valeriu Dulgheru), includes the labs:
   - ✓ *"Modelling and Simulation of Renewable Energy Conversion Systems";*
   - ✓ *"Aerodynamic Research";*
   - ✓ *"Hydro and Wind Blades manufacturing from Composite Materials";*
   - ✓ *"Testing Site for Renewable Energy Conversion Systems";*
   - ✓

Within the Centre the research has focused on the following domains:

- *Wind energy conversion systems*: blade design for Vertical and Horizontal Axis Wind Turbines; Ten horizontal axis wind turbines with the rating power of 10 kW each were designed, manufactured and tested; development and testing of a Vertical Axis Wind Turbine unit;
- *Systems for converting the kinetic energy of water*: blade development for vertical and horizontal axis hydro plants which were manufactured and tested on the Prut River. Three prototypes were developed, 4kW each.
- *Solar PV conversion systems: Structural-part orientation mechanisms and monitoring was developed for two agricultural enterprises. The goal was to provide energy for irrigation systems.*

The research produced within the centre has been published in 5 monographs (including BOSTAN I., Gheorghe A., DULGHERU V., Sobor I., BOSTAN V., Sochirean A. Resilient Energy Systems. Renewables: Wind, Solar, Hydro. - Springer, VIII, 2013. - 507 p. – ISBN 978-94-007-4188-1), 2 textbooks and more than 300 research papers, more than 70 patents (ex USSR, Moldova and Romania)

International Projects:

✓ **Project** CRDF (Civilian Research & Development Foundation, US) ME2-3031 "*A helical turbine system for wind and hydraulic energy recovery"* (2003-2005);

✓ **Project** BSEC HDF MP2-3023 "*Technological systems based on the utilization of water kinetic energy for rural consumers*" (TESUWKERC)" (2001-2002).

✓ **Project SCOPES** (*Scientific Cooperation between Eastern Europe and Switzerland*) *IB7320-110902/1 "Conversion of renewable kinetic energy of water: synthesis, theoretical modelling and experimental evaluation"* (2005-2008).

3. ***Centre for Technical Creativity*** (Director: Prof. Dr. Sc. Valeriu Dulgheru), which includes:
    - ✓ The circle of Young Inventors, within which 22 students authored more than 40 patents.

The research produced within the centre has been published in 6 monographs, more than 100 research articles, and more than 40 patents together with students and PhD students;

Key People in the Department

Dulgheru Valeriu (b. 1956), D.Sc., Laureate of State Prizes of the Republic of Moldova in the field of Science, Technology and Production (1998); Honorary Inventor of the Republic of Moldova (1994, 147 inventions), Topnotch inventor of Romania (1995), awarded more than 220 prizes and medals from International Exhibitions of Inventions. Publications: 4 monographs and 5 textbooks, more than 350 articles.

Bostan Viorel (b. 1972), D.Sc. Univ. Prof.; Prize of Moldavian Academy of Sciences (2014); awarded more than 50 prizes and medals from International Exhibitions of Inventions. Publications: 6 monographs, 1 textbook, 22 inventions and more than 150 articles.

Bostan Ion (b. 1949), D.Sc. Univ. Prof. Full member of the Moldovan Academy of Sciences; Laureate of two State Prizes of the Republic of Moldova in the field of Science, Technology and Production (1978, 1998); awarded with the Gold Medal of the World Organization for Intellectual Property; Honorary Inventor of the Republic of Moldova (1989, 238 inventions); Topnotch inventor of Romania (1994); awarded more than 250 of prizes and medals from International Exhibitions of Inventions. Publications: 8 monographs and 3 textbooks, more than 400 articles.

Contact Information for the Department

Valeriu Dulgheru:
E-mail: valeriu.dulgheru@bpm.utm.md

Viorel Bostan:
E-mail: viorel.bostan@adm.utm.md

Ion Bostan:
E-mail: ion.bostan@cnts.utm.md

For H2020 and other EU funding opportunities, please contact Prof. Michael Remes
Email: michael.remes@adm.utm.md