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# ANDRII POHUDIN

**PhD | Associate Professor | Energy Engineering and Space Propulsion**

Department of Space Technology and Non-Conventional Energy Sources
National Aerospace University "Kharkiv Aviation Institute", Ukraine

## PROFILE

**Energy engineering researcher and university lecturer with over 10 years of teaching experience and 24 scientific and educational publications.** My expertise combines energy conversion, mathematical and physical modelling of energy processes, electrothermal and electric propulsion, spacecraft power and propulsion systems, dynamic-system analysis, experimental measurement, and control. My work is directly relevant to energy-system transformation through the analysis of efficient electrical-to-thermal-to-kinetic energy conversion, reduced propellant and energy consumption, system-level modelling, and the integration of sustainable power sources into advanced mobility and space systems.

## WORK EXPERIENCE

**2016–present**

### Associate Professor / University Lecturer

*National Aerospace University "Kharkiv Aviation Institute", Department of Space Technology and Non-Conventional Energy Sources*

- Lectures and practical classes in Energy Sources and Processes, Dynamics of Space Flight, Methods for Electrical Appliances, Instrumental Solutions, and Introduction to the Profession.
- Develops course content, laboratory and independent-study materials in energy engineering, modelling, programming, and data analysis.
- Supervises student projects involving energy processes, spacecraft systems, mathematical modelling, and control algorithms.
- Contributes to interdisciplinary teaching connecting electrical engineering, energy conversion, space technology, sustainability, and digital modelling.

**2000–2015**

### Systems Administration and Digital Infrastructure Experience

*National Aerospace University "Kharkiv Aviation Institute"*

- 15 years of experience supporting computing systems and digital infrastructure for education and research.
- Practical competence in software installation, system maintenance, educational IT environments, modelling tools, and technical troubleshooting.

## RESEARCH AND PROJECT EXPERIENCE

**2018–2020**

### Researcher — Modelling Processes in Electric Rocket Engines, Power Plants and Ion-Plasma Technologies for Modern Satellite Engineering

*State-funded research project, National Aerospace University "Kharkiv Aviation Institute"*

- Participated in the research project "Modelling of Processes in Electric Rocket Engines, Power Plants and Ion-Plasma Technologies for Modern Satellite Engineering".
- Contributed to modelling energy-conversion and plasma-related processes for spacecraft propulsion and power systems, with attention to operational dynamics, efficiency, and satellite-platform integration.
- State registration No. 0118U004547; final report completed in 2020; inventory No. 0221U103982.

2020

### Doctoral research — Electrothermal propulsion for a space tug

*National Aerospace University "Kharkiv Aviation Institute"*

Developed a mathematical model of an electric ohmic/electrothermal propulsion system and analysed its dynamic characteristics.

Investigated orbital manoeuvre requirements, spacecraft power availability, thermal preparation of the working fluid, start-up duration, energy use, and propellant consumption.

Validated modelling results using an experimental propulsion-system model and developed recommendations for control implementation.

## RELEVANCE TO "TRANSFORMATION OF THE ENERGY SYSTEM"

Energy conversion chains: electrical energy → thermal energy → propellant acceleration and useful mechanical effect.

Mathematical and physical modelling of complex energy systems, transient processes, efficiency, constraints, and control.

Optimisation of start-up and shutdown processes to reduce energy and resource consumption.

Electrification of propulsion and mobility systems as an example of replacing conventional chemical technologies with electrically powered alternatives.

Integration of renewable or low-carbon power sources with storage, power conditioning, thermal management, and propulsion loads.

Systems perspective linking generation, storage, conversion, control, reliability, and end-use requirements.

Potential lecture contribution: "Electric Propulsion and Energy Conversion for Sustainable Space Mobility: From Power Sources to System Dynamics".

Course information: LUH lecture series "Transformation of the Energy System" | Online lecture-series DOI: 10.5446/s_1938

## EDUCATION AND QUALIFICATIONS

2020

### Doctor of Philosophy (PhD), Specialty 142 — Energy Engineering

*National Aerospace University "Kharkiv Aviation Institute"*

Dissertation: "Formation of Dynamic Characteristics of an Electrothermal Propulsion System for a Space Tug".

Research focused on mathematical modelling, thermal dynamics, start-up and shutdown optimisation, energy and working-fluid consumption, experimental validation, and control algorithms for an electrothermal propulsion installation.

Defence date: 25 September 2020. Academic supervisor: Prof. Sergii V. Gubin.

2004

### Engineer, Aircraft and Complex Control Systems

*National Aerospace University "Kharkiv Aviation Institute"*

Completed engineering education in aircraft systems, control systems, dynamics, and technical modelling.

## TEACHING EXPERIENCE

| Course / area | Role | Relevant competencies |
|---|---|---|
| Energy Sources and Processes | Lecturer / course developer | Energy conversion, power sources, thermodynamic and electrical processes |
| Dynamics of Space Flight | Lecturer / author course | Orbital mechanics, propulsion requirements, system dynamics and mission energy |
| Methods for Electrical Appliances | Lecturer / author course | Electrical devices, measurements, modelling and engineering methods |

| Course / area | Role | Relevant competencies |
|---|---|---|
| Instrumental Solutions | Lecturer | Engineering tools, measurement and implementation |
| Introduction to the Profession | Lecturer | Engineering systems, professional practice and interdisciplinary orientation |
| Systems Modelling | Author of learning materials | Mathematical models, simulation schemes and complex systems |
| Algorithmisation and Programming | Co-author of learning materials | Procedural programming, data structures and algorithms |
| Intelligent Data Analysis / Fundamentals of Programming | Learning-material contributor | Data processing, computational thinking and digital methods |

## INTERNATIONAL TEACHING, SEMINARS AND ACADEMIC MOBILITY

**12 & 20 May 2026**

### Invited seminars

*Department of Electrical and Information Engineering, Politecnico di Bari, Italy*

"Disposal of Space Debris Utilizing a Space Tug" — invited seminar for researchers and PhD students.
"Ground Radio Tracking of Earth Remote Sensing Satellites" — invited seminar for researchers and PhD students.

**23–25 June 2025**

### Invited lecture at IJCIEOM 2025

*International Joint Conference on Industrial Engineering and Operations Management, Bari, Italy*

Delivered / was invited to deliver the lecture "Disposal of Space Debris Utilizing a Space Tug".
Contributed to international discussion on engineering solutions for space-debris management and sustainable orbital operations.

**Aug–Sep 2024**

### International postgraduate practical internship

*Faculty of Education, University of Bialystok, Poland*

Successfully completed the internship "Teaching and Research in a Contemporary University: Trends, Challenges, and Future Directions".
Enhanced competence in contemporary university pedagogy, research organisation, internationalisation, and academic communication.

## SELECTED PUBLICATIONS AND RESEARCH OUTPUTS


1. Pohudin, A., Gubin, S., Sinchenko, S., Shulga, I., & Pohudina, O. (2020). A Mathematical Model of Electric Ohmic Propulsion System Dynamics. 2020 IEEE 15th International Conference on Computer Sciences and Information Technologies (CSIT), 1–4. [online]
2. Pohudin, A., Gubin, S., Bilokin, V., & Ivanova, T. (2020). Methods and Means of the Experimental Research of the Electrothermal Arcjet Thrusters of Spacecrafts. Ukrainian Metrological Journal. [online]
3. Pohudin, A. V. (2020). Formation of Dynamic Characteristics of an Electrothermal Propulsion System for a Space Tug [PhD dissertation]. National Aerospace University "Kharkiv Aviation Institute". [online]
4. Nesterenko, S. Yu. (Project leader), Pohudin, A., et al. (2020). Modelling of Processes in Electric Rocket Engines, Power Plants and Ion-Plasma Technologies for Modern Satellite Engineering: Final R&D Report. State registration No. 0118U004547. [online]
5. Pohudin, A. V., Pohudina, O. K., & Gubin, S. V. (2018). Systems Modelling: Training Manual for Independent Work. Kharkiv Aviation Institute. [online]
6. Pohudin, A. V., & Pohudina, O. K. (2020). Algorithmisation and Programming. Kharkiv Aviation Institute. [online]

7. Pohudin, A. V., & Gubin, S. V. Features of Rational Control of Propulsion Systems for Forming a Satellite Constellation. [online]

## DIGITAL, TECHNICAL AND RESEARCH SKILLS

**Energy-system and propulsion modelling:** Dynamic systems, transient processes, thermal and fluid processes, energy balances, optimisation and control.

**Simulation and computation:** MATLAB/Simulink-oriented numerical modelling; algorithm development; model validation and data analysis.

**Experimental research:** Measurement of thrust, propellant flow, electrical power, temperature and vacuum parameters; test-bench planning and interpretation.

**Programming and IT:** Programming fundamentals, algorithmisation, data structures, system administration, software deployment and technical support.

**Academic teaching:** Course design, lectures, practical classes, methodological materials, student supervision and interdisciplinary communication.

## LANGUAGE SKILLS

| Language | Level | Description |
|---|---|---|
| Ukrainian | Native | Mother tongue |
| English | B1 | Independent user — intermediate level for professional and academic communication |

## SCIENTIFIC IDENTIFIERS AND LINKS

**ORCID:** https://orcid.org/0000-0002-8673-2119

**Scopus Author ID:** https://www.scopus.com/authid/detail.uri?authorId=57214223045

**Web of Science profile:** https://www.webofscience.com/wos/author/record/15650971

**Google Scholar:** https://scholar.google.com.ua/citations?user=byBVpHUAAAAJ&hl=ru

**ResearchGate:** https://www.researchgate.net/profile/Andrii-Pohudin