

“Spitsbergen Challenge” – Educational Project for Students of Technical Universities

Katarzyna JANKOWSKA✉, Emilia BĄCZKOWSKA, Zuzanna DUNAJSKA,
Iga JABŁOŃSKA, Agnieszka KALINOWSKA, Igor KIŻEWSKI,
Ewelina KANCZURSKA, Monika LASER, Robert LATOWSKI, Agata MIODUSZEWSKA,
Adam PACEK, and Karol ZYCH

Gdańsk University of Technology Faculty of Civil and Environmental Engineering, Gdańsk, Poland

✉ kjank@pg.edu.pl

1. INTRODUCTION

The project aims to promote polar research and knowledge development among students at technical universities. By participating, students gain a global perspective on climate change and deepen their understanding of the mechanisms driving it. The project has two main objectives: scientific and didactic. The scientific objective is to organise an expedition to Spitsbergen, during which research is conducted to identify changes in the Arctic environment, which is undergoing rapid transformation due to anthropogenic pressure and climate change. The didactic objective is to provide students with experience in working on international and interdisciplinary scientific projects and to disseminate knowledge about climate change. The project is being implemented over three years (2022–2025), with a total of 36 students participating.

2. PREPARATIONS FOR THE EXPEDITION

To prepare for organising and participating in the Spitsbergen expedition, students took part in numerous activities aimed at improving their skills in fieldwork and laboratory research.

2.1 Science camps

3 field campaigns in Władysławowo (2022) – surface water monitoring in the Seaside Landscape Park, 7 field campaigns in Borucino (2022–2023) – monitoring of coastal waters in the Kashubian Landscape Park, 2 scientific camps in Nadbrzeże (2023–2024) – monitoring of coastal waters and bathing areas in the Vistula Lagoon, 1 scientific camp in the Beskidy Mountains (September 2022). During this five-day trek (over 65 km with a 3,000 m elevation gain), students tested their ability to live and work under conditions similar to those in summer on Spitsbergen (tent camping at around 0 °C, preparing meals from freeze-dried food). During the

trek, water samples were taken from springs, and basic environmental parameters (temperature, pH, conductivity) were measured. Training camp (2024) – focused on improving camping and orientation skills

2.2 Online role-playing game

An online role-playing game developed by the students supported expedition preparation by deepening participants' understanding of the challenges faced by polar researchers. Upon completing the game, participants are expected to: possess broad knowledge of polar regions, understand the mechanisms of climate change and the importance of mitigation, acquire skills necessary for laboratory work (microbiological and chemical), gain experience in conducting field research, develop the ability to recognise and mitigate risks in challenging field conditions

3. EXPEDITIONS

3.1 First polar expedition of Gdańsk tech students to Spitsbergen (8 participants)

The expedition in August 2023 focused on research in the Eidembukta lagoon area on the western coast of West Spitsbergen, in the Svalbard archipelago. Students organised a tent field camp and collaborated with scientists from the University of Klaipėda (Lithuania) and the Institute of Oceanology PAS (Sopot). Participants formed two teams: one conducting walking surveys to collect biological, chemical, and geological samples, and the other collecting hydrochemical and hydrological data using watercraft.

3.2 Second polar expedition of Gdańsk tech students to Spitsbergen (10 participants)

The second expedition in August 2024, held in the Kaffiøyra Plain region, The team was based at the NCU Polar Station. Students conducted hydrological and geomorphological studies and designed their own research programme focusing on the physicochemical and microbiological analysis of post-glacial lakes formed on the moraines of valley glaciers.

4. POPULARISATION OF SCIENCE

A key element of the project is the active dissemination of research outcomes. Students not only presented their work at scientific conferences but also acted as ambassadors of science during public outreach events, engaging diverse audiences and raising awareness of climate change and polar research.

5. SUMMARY

Participation in the Spitsbergen Challenge enabled students to develop essential research skills, gain experience in international teamwork, and build resilience in demanding field conditions. They improved their ability to manage risks, communicate science to diverse audiences, and translate academic knowledge into practice, preparing them for future careers in research and environmental engineering.

Acknowledgments. Financial support of these studies from Gdańsk University of Technology by the DEC-12/2022/IDUB/III.4.3/Pu and DEC-7/1/2022/IDUB/III.4a/Pu grant under the PLUTONIUM SUPPORTING STUDENT RESEARCH TEAMS – “Excellence Initiative – Research University” program” is gratefully acknowledged. Special thanks to our polar friends from the Institute of Oceanology PAS in Sopot and the Nicolaus Copernicus University Polar Station – Hahut.

Received 15 September 2025

Accepted 20 October 2025