



Międzynarodowa Środowiskowa Szkoła Doktorska  
przy Centrum Studiów Polarnych  
w Uniwersytecie Śląskim w Katowicach

ul. Bedzińska 60  
41-200 Sosnowiec  
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www.mssd.us.edu.pl



**Reference No:** IEDS/2020/US/02

**Title of PhD project:** *Dendroclimatic response of tundra vegetation to contemporary environmental changes in the Arctic*

**Leading unit:** International Environmental Doctoral School associated with the Centre for Polar Studies at the University of Silesia in Katowice (IEDS) - Institute of Earth Sciences, the University of Silesia

**Mode of study:** full-time

**Degree to be obtained:** PhD in the field of natural sciences, in the discipline of Earth and related environmental sciences

**Duration:** 4 years (8 semesters), from October 2020

**Language:** English

**Scholarship:** approx. 2370 PLN (1-2<sup>nd</sup> year); approx. 3650 PLN monthly (3-4<sup>th</sup> year)

**Requirements and regulations:** [www.mssd.us.edu.pl/kandydat-mssd/](http://www.mssd.us.edu.pl/kandydat-mssd/)

**Registration online:** [www.irk.us.edu.pl](http://www.irk.us.edu.pl)

**Conditions of recruitment:**

**I STAGE:** Knowledge test in the field of discipline. The test is scored on points: from 0 to 10 points.

A positive result of the test is that the candidate gets a minimum of 7 points. Absence on the test disqualifies the candidate from the entire qualification procedure.

**II STAGE:** a) the final result of the candidate's completion of higher education (maximum 6 points, diploma grading ratio: 6.0 (excellent) - 6 points, 5.0 - 5 points, 4.5 - 4 points, 4.0 - 3 points, 3.5 - 2 points, 3.0 - 1 point), b) for candidates (students) referred to in art. 186 para. 2 of the Act - a certificate of average grade from at least three years of uniform Master's studies, rounded to one decimal place, according to the conversion factor: 6.0 (excellent) - 6 points; 5.0 - 5 points; 4.5 - 4 points; 4.0 - 3 points; 3.5 - 2 points; 3.0 - 1 point).



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**III STAGE:** Interview for assessing: the candidate's intellectual level, knowledge of English, substantive level of the doctoral dissertation project, motivations and predispositions for scientific work, previous scientific achievements of the candidate (maximum 15 points).

#### Requirements:

1. Master's degree in geography, biology, geology or a related field and knowledge of research topics related to physical geography, in particular climatology, plant ecology, contemporary climate change, changes in the polar environment.
2. Interest in the applications of dendrochronology in the analysis of natural environment changes.
3. Knowledge of statistical methods and software (e.g. Excel, Statistica, R).
4. Interest in field work in difficult polar conditions.
5. Good knowledge of English enabling communication, reading and writing research papers.

#### Tasks description:

1. Analysis of meteorological data to assess contemporary climate changes (e.g. frequency of extreme events).
2. Preparation, organization and conducting field research in selected regions of the High and Low Arctic.
3. Collection of dwarf shrub samples in the field, preparation microscope slides, measurements of annual growth rings, data processing and dendroclimatic analysis.
4. Preparation of scientific papers and conference presentations.
5. Regular reporting of work progress.
6. Assistance in regular scientific and didactic tasks of the institute, including care and maintenance of measuring equipment.

#### Abstract

The Arctic natural environment is currently undergoing rapid changes. The increase in temperature caused that changes in species distribution and expansion of plants have been observed since the late 1980s. One of the most spectacular phenomena occurring in the terrestrial Arctic ecosystems, under the influence of climate change, is the so-called "Arctic



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greening". In recent years, however, a change in this tendency has been found and the phenomenon of tundra browning occurs. This negative process, leading to a reduction in biodiversity, increase in the amount of fires or intensity of landforming processes activity is not fully understood. This is primarily due to the complexity of the Arctic natural environment and the impact of a number of factors, such as: climatic conditions (temperature, precipitation, snow depth), permafrost thawing, soil cover features. One of the methods enabling the assessment of this process is polar dendroclimatology. It includes the study of the dependence of annual Arctic dwarf shrub growth-ring characteristics on selected climate elements.

The aim of the doctoral project, using climatological and dendrochronological research, is to recognize the temporal and spatial response of Arctic dwarf shrubs to contemporary climate changes. Field studies are planned in selected areas of the Low and High Arctic. Laboratory works will be conducted based on the existing research infrastructure at the Institute of Earth Sciences of the University of Silesia. The planned research will be implemented in cooperation with scientists from other research centers from Poland and abroad (Université Laval, Swiss Federal Institute for Forest, Snow and Landscape Research WSL, University of Oslo).

#### Other information:

1. The supervisor will be dr hab. Magdalena Opała-Owczarek, prof. UŚ, Climate and Climate Change Research Group, Institute of Earth Sciences, Faculty of Natural Sciences, University of Silesia in Katowice, [magdalena.opala@us.edu.pl](mailto:magdalena.opala@us.edu.pl),
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