

Prospective supervisor's form

Name of the supervisor: Jacek Gębicki

Academic title: PhD. DSc. Eng.

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Faculty of Chemistry

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Discipline: chemical sciences [NCh] none

Optional

Key words (obligatory four key words describing research interests / expertise):

electronic nose

air quality

odours

deodorization methods

Bibliometric indicators

1. Number of journal publications in WoS/ Scopus 100/94

2. Citations excluding self-citations WoS 641 Scopus 644

3. Hirsch index WoS 17 Scopus 19

1. The number of PhD students who have graduated under your supervision: 1

2. The number of PhD students currently supervised:

a. within the current doctoral school 0

b. within doctoral studies (previous system) 3

3. Are you currently accepting new PhD students:

a. Polish Yes/No Yes

b. Foreign Yes/No No

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Research interests or topics offered for PhD research (no more than 2000 characters)ⁱⁱ

1. The use of an electronic nose to determine the concentrations of individual components of gas fragrance mixtures.
2. Assessment of deodorization efficiency using sensor techniques.
3. Low cost sensor arrays for assessing ambient air quality.

Ad.1. Identifying the compounds responsible for the smell of the mixture and precisely determining their concentrations is very troublesome and expensive. In recent years, growing hope is associated with the use of electronic nose devices. These devices are made of a sensor matrix and pattern recognition system capable of recognizing simple or complex odors. The use of linear and non-linear data analysis methods makes it possible to determine with good probability the concentrations of the dominant components responsible for the smell of a gaseous odor mixture. Research will be conducted with different types of electronic nose prototypes and using regression methods of data analysis.

Ad 2. Deodorization of gases consists of:

The selection of the most effective deodorization method is difficult and depends on the overall content of impurities in the air stream being cleaned. The research will be conducted using biofiltration and absorption processes as deodorization methods of model fragrance mixtures containing organic sulfur and nitrogen compounds. The evaluation of the effectiveness of the deodorization process will be assessed by means of the electronic nose technique assisted by chromatographic or sensory analyzes.

Ad.3. The research will be carried out using commercially available measuring sensors adopted and configured in sensor matrices designed to assess air quality, among others, against such unfavorable phenomena as smog or exceeding the alarm levels of air pollution.

Funding or special equipment needed to carry out a PhD projectⁱⁱⁱ:

1. Is funding available for experimental work: *Yes/No/not needed*

2. Is the equipment needed to complete a PhD project available in your lab/department: *Yes/No/not needed*

Most important publications – no more than 5 published after 1.01.2018

No	Authors/title/journal	Number of points according to the current list of the Ministry of Science and Higher Education	Publication year
1.	T. Wasilewski, D. Migoń, J. Gębicki, W. Kamysz, Critical review of electronic nose and tongue instruments prospects in pharmaceutical analysis, ANALYTICA CHIMICA ACTA, 1077, 14-29, 2019.	100	2019
2.	T. Wasilewski, B. Szulczyński, M. Wojciechowski, W. Kamysz, J. Gębicki, A Highly Selective Biosensor Based on Peptide Directly Derived from the HarmOBP7 Aldehyde Binding Site, Sensors, 19(19), 4284, 2019.	100	2019

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3.	B. Szulczyński, J. Gębicki, Determination of Odor Intensity of Binary Gas Mixtures Using Perceptual Models and an Electronic Nose Combined with Fuzzy Logic, <i>Sensors</i> , 19(16), 3473, 2019.	100	2019
4.	P. Rybarczyk, B. Szulczyński, J. Gębicki, J. Hupka/ Treatment of malodorous air in biotrickling filters: A review, <i>Biochemical Engineering Journal</i> , 141, 146-162, 2019.	100	2019
5.	B. Szulczyński, K. Armiński, J. Namieśnik, J. Gębicki, Determination of Odour Interactions in Gaseous Mixtures Using Electronic Nose Methods with Artificial Neural Networks, <i>Sensors</i> , 18(2), 519, 2018.	100	2018

Most recent externally funded projects you were involved in – no more than 3

No	Project title, the name of the Principal Investigator (PI) and the institution the project was carried out	Years	Role in the project ^{iv}
1.	Implementation to practice of sensor matrices as indicating tools for air quality monitoring in Tricity agglomeration, Jacek Gębicki, Provincial Fund for Environmental Protection and Water Management	2017-2020	PI
2.	Instrumentation of odour measurement using electronic nose, Jacek Gębicki, National Science Centre	2016-2020	PI
3.	Monitoring of odor nuisance of refinery-household origin in the Tri-City Agglomeration using electronic nose technology, Jacek Namieśnik, National Centre for Research and Development	2014-2017	Co-I

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Additional relevant information – (no more than 1600 characters)^v

1. Tomasz Wasilewski - PhD student from the Medical University of Gdańsk
 - a). 2nd Degree Scientific Award of the Rector of the Medical University of Gdańsk, 2018.
 - b). Award in the Polish Academy of Sciences Competition in Gdańsk for the best creative research work published in 2017 in the technical sciences category, 2018.
2. Bartosz Szulczyński - PhD student from the Gdańsk University of Technology
 - a). Scholarship of the Rector of the Gdańsk University of Technology, 2017, 2018, 2019.
 - b). Pro-quality scholarship for the best doctoral students, 2017, 2018, 2019.
3. Edyta Słupek - PhD student from the Gdańsk University of Technology
 - a). Pro-quality scholarship for the best doctoral students, 2018, 2019.
 - b). Task scholarship (POWER project), 2018, 2019.

ⁱ You may select up to two disciplines out of 12 disciplines represented in the Doctoral School

ⁱⁱ Observe the limit of not more than 2000 characters

ⁱⁱⁱ Leave only one answer

^{iv} Select the role in the project: PI stands for principal investigator (refers to the holder of an independent grant and the lead researcher for the grant project), Co-I for co-investigator (Co-I assists the principal investigator in the management and leadership of the research project), R for researcher

^v Add any other relevant information e.g. awards for PhD students whom you supervised (no more than 1600 characters)