

# Prospective supervisor's form

Name of the supervisor: Jacek Ryl

Academic title: Ph.D., D.Sc.

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Gdańsk University of Technology Faculty of Chemistry

Department of Electrochemistry, Corrosion and Materials Engineering

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Discipline: chemical sciences [NCh] materials engineering [IMa]

Optional

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

# applied electrochemistry

# corrosion science

# surface analysis

# nanomaterials

## Bibliometric indicators

1. Number of journal publications in WoS/ Scopus 98

2. Citations excluding self-citations WoS 788 Scopus 845

3. Hirsch index WoS 21 Scopus 21

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 1

b. within doctoral studies (previous system) 0

3. Are you currently accepting new PhD students:

a. Polish Yes/No Yes

b. Foreign Yes/No Yes

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### Research interests or topics offered for PhD research (no more than 2000 characters)<sup>ii</sup>

Principal area of scientific activity lies in the applied electrochemistry, in particular corrosion science and anti-corrosion technologies, electrochemical sensors, materials for energy storage and conversion. Focused on modern functional materials, characterization of their properties, degradation mechanisms, and/or functionalization, with emphasize on impedance spectroscopy studies of non-stationary electrode processes and surface engineering. Surface physicochemistry and applied surface engineering specialist. Involved in development of electrochemical impedance techniques, DEIS, for the assessment and monitoring of non-stationary processes. More recently focused on studies related with complex charge transfer through heterogeneous electrode interface.

The topic of PhD research may be related with applied electrochemistry, where the effect of heterogeneous structure on material's properties is my primary focus. The factors such as non-uniform adsorption, geometry, crystallographic orientation or grain boundary effects have high influence on the response of electrochemical sensors, supercapacitors etc. The PhD studies may also be related with the development of the Dynamic Electrochemical Impedance Spectroscopy technique for utilization in corrosion monitoring, bio-electrochemical sensors, waste water treatment and others. Besides electrochemistry I am specialized in physic-chemical surface characterization through SEM/EDX, XPS, AES, EBSD, ellipsometry and others, which should be utilized in the PhD research.

### Funding or special equipment needed to carry out a PhD project<sup>iii</sup>:

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

No

2. Is the equipment needed to complete a PhD project

available in your lab/department: *Yes/No/not needed*

Yes

### 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.	Ł. Haryński, K. Grochowska, J. Karczewski, J. Ryl, K. Siuzdak, Scalable Route toward Superior Photoresponse of UV-Laser-Treated TiO <sub>2</sub> Nanotubes, ACS Applied Materials and Interfaces, 12(2), 2020, 3225-3235	200	2020
2.	A. Zieliński, M. Ciešlik, M. Sobaszek, R. Bogdanowicz, K. Darowicki, J. Ryl, Multifrequency nanoscale impedance microscopy (m-NIM): A novel approach towards detection of selective and subtle modifications on the surface of polycrystalline boron-doped diamond electrodes, Ultramicroscopy, 199, 2019, 34-45	140	2019

### Prospective supervisor's form

3.	D. Kharitonov, J. Sommertune, C. Ornek, J. Ryl, I. Kurilo, P. Claesson, J. Pan, Corrosion inhibition of aluminium alloy AA6063-T5 by vanadates: Local surface chemical events elucidated by confocal Raman micro-spectroscopy, Corrosion Science, 148, 2019, 237-250	140	2019
4.	J. Ryl, M. Brodowski, M. Kowalski, W. Lipińska, P. Niedziałkowski, J. Wysocka, Corrosion Inhibition Mechanism and Efficiency Differentiation of Dihydroxybenzene Isomers Towards Aluminum Alloy 5754 in Alkaline Media, Materials, 12(19), 2019, 3067	140	2019
5.	K. Sankaran, M. Ficek, K. Panda, C. Yeh, M. Sawczak, J. Ryl, K. Leou, J. Park, I. Lin, R. Bogdanowicz, K. Haenen, Boron-Doped Nanocrystalline Diamond–Carbon Nanospire Hybrid Electron Emission Source, ACS Applied Materials and Interfaces, 11(51), 2019, 48612-48623	200	2019

#### 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 <sup>i</sup>
1.	Study of the effect of green inhibitors on the corrosion process of aluminium alloys, PI: Jacek Ryl, funded under Iuventus Plus programme IP2015 067574 (MNiSW)	2017-2020	PI
2.	Electrochemical modification of boron doped diamond (BDD) thin films, PI: Jacek Ryl, funded under SONATA programme 2015/17/D/ST5/02571 (NCN)	2016-2020	PI
3.			PI

## Prospective supervisor's form

### Additional relevant information – (no more than 1600 characters)<sup>v</sup>

The supervised PhD student, Lukasz Burczyk, received his doctorate with honours in 2018, during the PhD studies he was the laureate of the proquality scholarship as well as Rector's scholarship.

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

<sup>ii</sup> Observe the limit of not more than 2000 characters

<sup>iii</sup> Leave only one answer

<sup>iv</sup> 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

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