

ACADEMIC TEACHER PROFESSIONAL EXPERIENCE DOCTORAL SCHOOL OF WROCŁAW UNIVERSITY OF SCIENCE AND TECHNOLOGY

1. Basic information

Name, surname:	Marcin, Poręba
Grade / Title:	PhD, DSc, Eng
Scientific discipline	Chemical Sciences
Faculty:	Faculty of Chemistry
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Link to home page and/or research profiles (Google Scholar, ResearchGate, etc.)	https://scholar.google.com/citations?hl=pl&use r=n- rtkZAAAAAJ&view op=list works&sortby=pubd ate

2. Publication record

Up to 10 most important papers published over the period of previous 10 years.

No	Description (authors, publication title, journal / conference, DOI)	Publication
•		year
1.	"Caspase-2 is essential for proliferation and self-renewal of nucleophosmin-mutated acute myeloid leukemia"	
	Sakthivel D, Brown-Suedel A, Lopez KE, Salgar S, Coutinho LE, Keane F, Huang S, Mc Sherry K, Charendoff ChI, Dunne KP, Dexter J, Vargas- Hernández A, BaoChau Le, Shin CS, Carisey AF, Poreba M , Flanagan JM, Bouchier-Hayes L;	2024
	<i>Science advances</i> 2024, 10, 31, IF (2023) = 11.7	
2.	"Selective chemical reagents to investigate the role of caspase 6 in apoptosis in acute leukemia T cells"	2022
	Groborz K, Kalinką M, Grzymska J, Kołt S, Snipas SJ, Poręba M	2023
	Chemical Science 2023, 14, 2289-2302, IF (2023) = 9.97	
3.	"Diagnostic and therapeutic potential of protease inhibition"	
	Ćwilichowska N, Świderska KW, Dobrzyń A, Drąg M, Poręba M	2022
	Molecular Aspects of Medicine; 2022, 88, 101144, IF (2022) = 16.3	



4.	"Multiplexed probing of proteolytic enzymes using mass cytometry- compatible activity-based probes"	
	Poręba M , Groborz K, Rut W, Pore M, Snipas SJ, Vizovisek M, Turk B, Kuhn P, Drąg M, Salvesen GS	2020
	Journal of the American Chemical Society; 2020, 142, 39, 16704- 16715, IF (2020) = 15.4	
5.	"Exploring the prime site in caspases as a novel chemical strategy for understanding the mechanisms of cell death: a proof of concept study on necroptosis in cancer cells"	
	Groborz K, Gonzalez-Ramirez M, Snipas SJ, Salvesen GS, Drąg M, Poręba M	2020
	Cell Death and Differentiation; 2020, 27(2), 451-465, IF (2020/2021) = 15.8	
6.	"Caspase selective reagents for diagnosis apoptotic mechanisms"	
	Poręba M, Groborz K, Navarro M, Snipas SJ, Drąg M, Salvesen GS	2019
	Cell Death and Differentiation; 2019, 26(2), 229-244, IF (2019) = 10.7	
7.	"Fluorescent probes towards selective cathepsin B detection and visualization in cancer cells and patient samples"	
	Poręba M , Groborz K, Vizovisek M, Maruggi M, Turk D, Turk B, Powis G, Drąg M, Salvesen GS	2019
	Chemical Science; 2019, 10(36):8461-8477, IF (2019) = 9.3	
8.	"Synthesis of a HyCoSuL peptide substrate library to dissect protease substrate specificity"	
	Poręba M, Salvesen GS, Drąg M	2017
	<i>Nature Protocols;</i> 12(10), 2189-2214, IF (2017) = 12.4	
9.		2018



	"Selective imaging of cathepsin L in breast cancer by fluorescent activity-based probes"	
	Poręba M , Rut W, Vizovisek M, Groborz K, Kasperkiewicz P, Finlay D, Vuori K, Turk D, Turk B, Salvesen GS, Drąg M	
	<i>Chemical Science</i> ; 2018, 9(8), 2113-2129, IF (2018) = 9.6	
10.		
	"Counter selection substrate library strategy for developing specific protease substrates and probes"	
	Poręba M , Solberg R, Rut W, Lunde N.N, Kasperkiewicz P, Snipas SJ, Mihelic M, Turk D, Turk B, Salvesen GS, Drąg M	2016
	Cell Chemical Biology; 2016, 23(8), 1023-1035, IF (2016) = 6.7	

3. Projects and grants

List of the most important 5 projects/grants with basic description including: title, source(s) of funding, name of the call, role in the project (e.g., principal investigator).

1	Role in the project (e.g., principal investigator, work package leader, etc.)	principal investigator
	Project title	Dissecting the regulatory interplay between proteases and protein kinases in acute lymphoblastic leukemia using mass cytometry compatible activity-based probes for personalized diagnostics
	Sources of funding	NCN
	Name of the call	OPUS-24
	Implementation period	2023-10-02 - 2027-10-01
2	Role in the project (e.g., principal investigator, work package leader, etc.)	principal investigator
	Project title	Dissecting the mechanisms of proteolytic cross-talk underlying pyroptosis, a programmed inflammatory cell death.
	Sources of funding	NCN
	Name of the call	OPUS-15
	Implementation period	2019-02-01 - 2022-07-31
3	Role in the project (e.g., principal investigator,	principal investigator



	work package leader,	
	etc.)	
	Project title	Dissecting the proteolytic fingerprint of breast cancer
		tissues using mass cytometry for personalized oncology.
	Sources of funding	NCN
	Name of the call	SONATA-14
	Implementation period	2019-07-26 - 2023-05-25
4	Role in the project (e.g.,	principal investigator
	principal investigator,	
	work package leader,	
	etc.)	
	Project title	Dissecting cancer activome to develop new generation of
		antibody-drug conjugates
	Sources of funding	NCN
	Name of the call	OPUS-20 (LAP)
	Implementation period	2021-09-20 - 2025-09-19
5	Role in the project (e.g.,	principal investigator
	principal investigator,	
	work package leader,	
	etc.)	
	Project title	Multiparametric analysis of blood samples from COVID-19
		convalescent patients using mass cytometry to study the
		dynamics of changes in the immune system and identify
		optimal plasma donors.
	Sources of funding	The National Center for Research and Development,
		Poland
	Name of the call	SZPITALE_JEDNOIMIENNE_63
	Implementation period	2021-01-25 - 2022-07-24

4. International experience

Brief description of international cooperation and experience (e.g., research stays, cooperation with foreign entities, coordination or participation in international projects or programmes, keynote speeches and presentations delivered at renowned international conferences, visiting professor stays, invited lectures).

No	Description	Year(s)
1.	2016 - 2019 (28 months), Prof. Guy Salvesen Lab , Postdoctoral Associate / Marie Skłodowska-Curie Fellow, Sanford Burnham Prebys Medical Discovery Institute, La Jolla, USA.	2016-2019
2.	2019 (3 months), Prof. Juliana Hamzah Lab , Visiting Professor, University of Western Australia, Harry Perkins Institute, Perth, Australia.	2019



3.	Marie Skłodowska-Curie Global Fellowship (MSCA) - "PROVIST:	2016-2019
	Protease visualization during tumor progression ; European	
	Commission - Horizon 2020 - MSCA; Sanford Burnham Probes	
	Medical Discovery Institute (La Jolla, CA, USA); principal investigator,	
	post-doctoral training	

5. Experience in teaching doctoral students

Brief description of experience in teaching doctoral students (e.g., courses in doctoral schools and PhD studies, summer/winter schools for doctoral students, tutorials, trainings, etc.).

No	Description	Year(s)
1.	Experience in teaching and mentoring doctoral students through various trainings and workshops. Delivered multiple invited presentations at universities and institutions, including Wroclaw, Lodz, Warsaw, and Krakow, as well as at the Polish Academy of Sciences. Topics covered include grant writing, scholarship applications, and scientific publication strategies	2018-2023

6. List of supervised doctoral students

List of all supervised doctoral students that defended the PhD including: name of the student, dissertation title, year of awarding PhD.

No	Name, surname	Dissertation title	Year of awarding PhD
1.	Katarzyna Groborz (supporting supervisor)	Small molecule Chemical tools for protease investigation with the use of mass cytometry	2020
2.	Natalia Horbach	Investigation of the role of calpain-1 in the process of pyroptosis using selective chemical tools	Thesis submitted in 2024
3.	Małgorzata Kalinka	Studying mechanisms of cell death dependent on proteolytic enzymes.	ongoing
4.	Natalia Ćwilichowska	Proteolytic analysis of breast cancer using mass cytometry for personalized oncology	ongoing
5.	Oliwia Malon	Design, synthesis, and analysis of a new generation of protease-activated anticancer prodrugs.	ongoing
6.	Martyna Majchrzak	Anticancer antibody-drug conjugates activated by prolyl proteases: From synthesis to in vivo studies	ongoing



7.	Abdulla Al Mamun	Dissecting proteolytic fingerprint in cancer using metal-tagged protease probes and mass cytometry	ongoing
8.	Julia Nguyen	Analysis of proteolytic enzyme activity in acute lymphoblastic leukemia using metal-labeled chemical probes	ongoing
9.	Maksymilian Zabijak	Chemical probes for the real time imaging of medically important proteases and kinases	ongoing

7. Prizes and awards

The most important national and international prizes and awards related to research, development and teaching activities.

No	Description	Year
1.	Award of Rector of Wroclaw University of Science and Technology for scientific achievements (also in 2022, 2020, 2018, 2016)	2024
2.	Travel Award Gordon Research Seminar / Grodon Research Conference on Proteolytic Enzymes and Their Inhibitors	2022
3.	SILVER CROSS OF MERIT presented by the President of Poland for the contribution in combating COVID-19 pandemic	2021
4.	Young Promotor of Poland Award (in category of Science) presented by The First Lady of Poland and Teraz Polska Foundation	2021
5.	Polish Academy of Science (PAS) Award for the best habilitation thesis in Analytical Chemistry	2021
6.	Polish Chemical Society Award for the best habilitation thesis in Chemistry	2021
7.	Scholarship by Ministry of Science and Higher Education for outstanding researchers	2017

8. Other significant achievements

Information on other significant achievements related to research, development and teaching activities.

I have been researching proteases for over 15 years, with a focus on developing **chemical tools** that enable the selective visualization of medically significant enzymes in diverse biological specimens, including patient samples.

My most significant scientific achievement is the development of **innovative chemical technology** that, for the first time, allows the visualization of multiple protease activities in biological samples at single-cell resolution using (imaging) mass cytometry (CyTOF). Central to this technology are **CyTOF-compatible, metal-conjugated chemical probes**, which we named TOF probes. These probes are designed to selectively target individual proteases. Additionally,



these metal-tagged TOF probes facilitate a comprehensive **analysis of the human activome** a term I coined to describe the set of catalytically active proteins within the human proteome. This research was recently published in the JACS journal. Importantly, this approach is not limited to proteases but can be extended to other enzyme classes, such as protein kinases.

What makes this achievement particularly noteworthy is that <u>it stems directly from my</u> <u>original research idea</u>. In 2015, as the only researcher from Poland, I was awarded the Marie Skłodowska-Curie Global Fellowship, which allowed me to pursue this project at SBP Medical Discovery Institute in La Jolla, CA, USA (2016-2018, Salvesen Lab). After completing this fellowship, I established Poland's first mass cytometry facility in 2018. Currently, we are engaged in projects that focus on immune profiling and single-cell analysis of patient samples (COVID-19, breast cancer, neutropenia, childhood ALL), with an emphasis on proteases. These studies hold great potential for application in personalized disease management.