

KRZYSZTOF RACZYNSKI

 krzysztofraczynski.net



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I am a hydrologist with a decade of experience in hydrology and spatial analysis and modeling. My expertise lies in hydrologic extremes for better protection and management in times of global change. I am passionate about data-driven approaches to advancing sustainable solutions in the environmental sciences for better resilience.



CLIFTONSTRENGTHS

Relator Deliberative Discipline Focus Analytical



SOFTWARE

Technical software:

QGIS ArcGIS Pro AutoCAD 2D Statistica

Programming and web:

Python MySQL R C# WordPress

Modeling software:

HEC-RAS WRF-Hydro

Operating systems:

Windows Linux (Debian)


Other:

MS Office SketchUp Blender DaVinci Resolve



EDUCATION

• **Maria Curie-Sklodowska University** Lublin, Poland

 2014-2018

Doctor of Philosophy: Geography (Hydrology)

Dissertation: Low-flows of Lublin region rivers

• **Cracow University of Technology** Cracow, Poland

 2012-2013

Master of Engineering: Environmental Engineering (Hydroengineering and Geoengineering)

Thesis: Water shortages in upper Raba river basin in years 1971-1981

• **Cracow University of Technology** Cracow, Poland

 2008-2012

Bachelor of Engineering: Environmental Engineering (Hydroengineering and Geoengineering)

Thesis: Flood in 2010 against the historical floods in Lesser Poland Vistula Gorge



EXPERIENCE

● **Mississippi State University**

High Performance Computing Center, Starkville, Mississippi, USA

2023-present *Assistant Research Professor, Geosystems Research Institute*

2021-2023 *Postdoctoral Associate, Northern Gulf Institute*

- Creating a collaborative regional drought research program based on observational and model data.
- Conducting scientific research on drought distribution, detection, and parametrization.
- Constructing hydrological and statistical streamflow models.
- Scientific publications and grant applications preparation, participation in conferences and seminars.
- Conducting GIS workshops on request.
- Extension publications preparation on the use of GIS software.

● **M31EDU LLC**

Starkville, Mississippi, USA

2018-present *Founder, Instructor*

- Designing online courses on GIS, SQL, and Python programming.
- Recording and teaching online courses.
- Helping students identify and solve problems.

● **Maria Curie-Skłodowska University**

Faculty of Earth Sciences and Spatial Management, Lublin, PL

2019-2022 *Assistant Professor, Faculty of Earth Sciences and Spatial Management*

2016-2019 *Research and Teaching Assistant, Faculty of Earth Sciences and Spatial Management*

- Preparing and teaching classes in subjects related to GIS, hydrology, statistics, and environmental modeling, a total of 17 subjects, 240 hours per semester.
- Designing and conducting regional hydrological conditions research programs.
- Research on detection, parameterization, and modeling of hydrological extremes.
- Conducting hydrological measurements using the ADCP probe and a hydrometric mill.
- Instructing and supervising students during field research.
- Creating scientific publications and participating in conferences and seminars.

● **Dam Control Center**

Cracow, PL

2011-2011 *Office and Field Internship Worker*

- Controlling the stability of reservoir slopes and flood embankments.
- Preparing design documentation.
- Preparing GIS projects on the location and course of hydrotechnical facilities.
- River channel delineation.



GRANTS AWARDED

● **National Science Centre (Poland)**

2019-2021 *The impact of climate change on the dynamics of hydrological extreme events: Development of the assumptions and methodology for the project. 44,221.00 PLN*

● **Faculty of Earth Sciences and Spatial Management (Poland)**

2018-2019 *A conceptual model of the dynamics of changes in water resources of the Bystrzyca River. 6,853.56 PLN*

● **Faculty of Earth Sciences and Spatial Management (Poland)**

2014-2017 *Low flows of Lublin Region rivers. 11,786.69 PLN*



PUBLICATIONS

- Raczyński K., Dyer J., 2024, Harmonic Oscillator Seasonal-trend Model for Analyzing the Reoccurring Nature of Extreme Events. *SoftwareX*, 27, 101771, [10.1016/j.softx.2024.101771](https://doi.org/10.1016/j.softx.2024.101771)
- Raczyński K., Dyer J., 2024, Utilizing waveform synthesis in harmonic oscillator seasonal trend model for short- and long-term streamflow drought modeling and forecasting. *Journal of Hydroinformatics*, jh2024229, [10.2166/hydro.2024.229](https://doi.org/10.2166/hydro.2024.229)
- Lehmann-Konera S., Ruman M., Frankowski M., Małarzewski Ł., **Raczyński K.**, Pawlak F., Józwick J., Potapowicz J., Polkowska Z., 2024, Short-Term Observations of Rainfall Chemistry Composition in Bellsund (SW Spitsbergen, Svalbard). *Water*, 16, 299, [10.3390/w16020299](https://doi.org/10.3390/w16020299)
- Lehmann-Konera S., Zagórski P., Franczak Ł., **Raczyński K.**, Al Bakain R., Nowiński K., Frankowski M., Dobek M., Ruman M., Szumińska D., Polkowska Ż., 2024, Spatial variability of the hydrochemistry of shallow groundwaters and surface waters of the Rensdyrbekken: A case study of a permafrost catchment in Bellsund (SW Spitsbergen, Svalbard). *Land Degradation and Development*, 1-14, [10.1002/ldr.5028](https://doi.org/10.1002/ldr.5028)
- Raczyński K., Dyer J., 2023, Changes in Streamflow Drought and Flood Distribution Over Poland Using Trend Decomposition. *Acta Geophysica*, [10.1007/s11600-023-01188-0](https://doi.org/10.1007/s11600-023-01188-0)
- Raczyński K., Dyer J., 2023, Quantifying patterns of streamflow peaks over the southeastern United States using a long-term retrospective data set. *Hydrological Processes*, 37(8), e14960, [10.1002/hyp.14960](https://doi.org/10.1002/hyp.14960)
- Raczyński K., Dyer J., 2023, Harmonic Oscillator Seasonal Trend (HOST) Model for Hydrological Drought Pattern Identification and Analysis. *Journal of Hydrology*, 620(B), 129514, [10.1016/j.jhydrol.2023.129514](https://doi.org/10.1016/j.jhydrol.2023.129514)
- Raczyński K., Dyer J., 2022, Variability of Annual and Monthly Streamflow Droughts over the Southeastern United States. *Water*, 14, 3848, [10.3390/w14233848](https://doi.org/10.3390/w14233848)
- Raczyński K., Dyer J., 2022, Development of an Objective Low Flow Identification Method Using Breakpoint Analysis. *Water*, 14(14), 2212, [10.3390/w14142212](https://doi.org/10.3390/w14142212)
- Dyer J., Mercer A., **Raczyński K.**, 2022, Identifying Spatial Patterns of Hydrologic Drought over the Southeast US Using Retrospective National Water Model Simulations. *Water*, 14(10), 1525, [10.3390/w14101525](https://doi.org/10.3390/w14101525)
- Lehmann-Konera S., Ruman M., Frankowski M., Małarzewski L., **Raczyński K.**, Pawlak F., Kozioł K., Polkowska Z., 2022, Rainwater chemistry composition in bellsund (SW Spitsbergen, Svalbard), sources of elements and deposition discrepancies in the coastal area. *Chemosphere*, 137281, [10.1016/j.chemosphere.2022.137281](https://doi.org/10.1016/j.chemosphere.2022.137281)
- Raczyński K., Dyer J., 2021, Simulating low flows over a heterogeneous landscape in southeastern Poland. *Hydrological Processes*, 35(8), e14322, [10.1002/hyp.14322](https://doi.org/10.1002/hyp.14322)
- Raczyński K., 2020, Influence of a Multipurpose Retention Reservoir on Extreme River Flows, a Case Study of the Nielisz Reservoir on the Wieprz River (Eastern Poland). *Water Resources*, 47, 29–40, [10.1134/S0097807820010091](https://doi.org/10.1134/S0097807820010091)
- Raczyński K., Dyer J., 2020, Multi-annual and seasonal variability of low-flow river conditions in southeastern Poland. *Hydrological Sciences Journal*, 65:15, 2561-2576, [10.1080/02626667.2020.1826491](https://doi.org/10.1080/02626667.2020.1826491)
- Ferencz B., Dawidek J., Toporowska M., **Raczyński K.**, 2020, Environmental implications of potamophases duration and concentration period in the floodplain lakes of the Bug River valley. *Science of The Total Environment*, Volume 746, 2020, 141108, [10.1016/j.scitotenv.2020.141108](https://doi.org/10.1016/j.scitotenv.2020.141108)
- Raczyński K., 2018, Nielisz Reservoir's impact on the Wieprz River low flows alignment. *Gospodarka Wodna*, 7, 197-200
- Baran-Gurgul K., **Raczyński K.**, 2017, Dynamics of low flows in mountain and upland rivers on the example of Wisłoka and upper Wieprz. part 2: Long-term volatility. *Woda-Środowisko-Obszary Wiejskie*, 17, 1:57, 5-17
- Baran-Gurgul K., **Raczyński K.**, 2016, Dynamics of low flows in mountain and upland rivers on the example of Wisłoka and upper Wieprz part 1: Seasonality. *Woda-Środowisko-Obszary Wiejskie*, 16, 4/56, 17-31
- Baran-Gurgul K., **Raczyński K.**, 2016, Low flows in mountain and upland catchments on the example of Wisłoka and Wieprz Rivers. *Przegląd Naukowy Inżynieria i Kształtowanie Środowiska*, 25/4, 397-409
- Raczyński K., 2015, Methods of separating low flows into independent events on the example of rivers of Eastern Poland. *Woda-Środowisko-Obszary Wiejskie*, 15, 4/52, 39-56
- Raczyński K., 2015, Thresholds of low flows in the rivers of the Lublin region. *Annales Universitatis Mariae Curie-Skłodowska*, sectio B – Geographia, Geologia, Mineralogia et Petrographia, 70/1, 117-129
- Raczyński K., 2015, Low flows in the upper Raba catchment in 1971–1981. *Monitoring Środowiska Przyrodniczego* 17, 73-81



TEACHING EXPERIENCE

● *Online courses*

📍 Udemy

GIS in QGIS3 for beginners

total length: **11 hours**, languages: Polish, English; running since 2018

Intermediate GIS in QGIS3

total length: **7.5 hours**, languages: Polish, English; running since 2021

Spatial attributes in QGIS3

total length: **10.5 hours**, languages: Polish; running since 2021

MySQL creating and managing relational databases

total length: **5.5 hours**, languages: Polish, English; running since 2020

Python introduction to programming

total length: **9 hours**, languages: Polish, English; running since 2020

● *In-person courses*

📍 Maria Curie-Skłodowska University

Modeling and forecasting environmental change

length per semester: **20 hours** laboratory, years of teaching: 2020 – 2021

GIS

length per semester: **15 hours** lecture and **45 hours** laboratory, years of teaching: 2017 – 2021

Hydrology

length per semester: **7 hours** lecture and **20 hours** laboratory, years of teaching: 2017 – 2021

Potamology

length per semester: **5 hours** lecture and **20 hours** laboratory, years of teaching: 2017 – 2021

Global environmental problems

length per semester: **15 hours** discussion class, years of teaching: 2017 – 2021

Hydrogeology

length per semester: **5 hours** lecture and **20 hours** laboratory, years of teaching: 2017 – 2019

Managing and protecting water resources

length per semester: **30 hours** laboratory, years of teaching: 2017 – 2018

Environmental processes modeling

length per semester: **7 hours** lecture and **30 hours** laboratory, years of teaching: 2016 – 2021

Hydrology of urban areas

length per semester: **30 hours** laboratory, years of teaching: 2016 – 2018

Hydrometry

length per semester: **15 hours** laboratory, years of teaching: 2016 – 2018

Hydrometeorology

length per semester: **15 hours** laboratory, years of teaching: 2016 – 2017

Catchment processes

length per semester: **30 hours** laboratory, years of teaching: 2015 – 2018

Basics of melioration

length per semester: **20 hours** laboratory, years of teaching: 2015 – 2017

Ecohydrology

length per semester: **5 hours** lecture and **25 hours** laboratory, years of teaching: 2015 – 2017

Statistics in hydrological studies

length per semester: **10 hours** lecture and **20 hours** laboratory, years of teaching: 2014 – 2021

Basics of Environment modeling

length per semester: **5 hours** lecture and **25 hours** laboratory, years of teaching: 2018 – 2021

Georeferenced Databases

length per semester: **20 hours** laboratory, years of teaching: 2018 – 2020



CONFERENCES AND SEMINARS

2024

American Geophysics Union Annual Meeting, Hydrology Conference, Washington D.C.

AI Discovery Day – Researcher session, Mississippi State University, Mississippi State, MS

Pathways To Resilience Summit, Mississippi State University, Mississippi State, MS

Mississippi Water Resources Conference, Flowood, MS, USA: *How random are extreme streamflow events?*

38th Conference on Hydrology, American Meteorological Society, 2024, Baltimore, Maryland, USA: *Detection of Extreme Streamflow Reoccurrence Patterns over the Southeast United States*

GRI Research Seminar Series, 2024, Starkville, MS, USA: *Floods, droughts, and harmonics: discovering the patterns of hydrologic extremes in the Southeast*

2023

Autonomous Systems Symposium, Mississippi State University

American Geophysics Union Fall Meeting, Hydrology Section, San Francisco, California, USA: *Simulating Parameters of Extreme Hydrologic Events Using a Modified Harmonic Model Applied to National Water Model (NWM) Retrospective Data*

Alabama Water Resources Conference, Orange Beach, Alabama, USA: *Assessment of Improved HOST Model for Analysis of Hydrologic Drought*

MSU/USDA Graduate Summer Research Symposium, Mississippi State University

Mississippi Water Resources Conference, Starkville, Mississippi, USA: *HOST model framework for analysis of hydrologic drought patterns over the Southeast US*

Data Science Symposium, Symposium, Mississippi State University

What's on the Horizon?, Seminar, Mississippi State University

ArcticScience SummitWeek, Vienna, Austria: *Spatial variation of major and trace elements in the water of the Reindeer Creek small permafrost catchment (Bellsund, Svalbard)*

37th Conference on Hydrology, American Meteorological Society, Denver, Colorado, USA: *Development of a Harmonic Model for Temporal Assessment of Hydrologic Drought*

Polar Night Week, Longyearbyen, Svalbard, Norway: *Spatial differentiation of major and trace elements composition in subsurface water of small permafrost catchment (Bellsund, Svalbard)*

2022

Mississippi Water Resources Conference, Starkville, Mississippi, USA: *Multiannual variability of low flow events over the Southeastern United States*

2019

XLVII Contemporary Problems of Hydrology, Jabłonna k. Warszawy, Poland: *(not)Data, the thing about hydrometeorological public data in Poland*

2018

XLVI Contemporary Problems of Hydrology, Jabłonna k. Warszawy, Poland: *Low flow of Lublin Region rivers*

2017

XLV Contemporary Problems of Hydrology, Jabłonna k. Warszawy, Poland: *Influence of selected elements of the geographical environment on the occurrence of low flows in Lublin Region rivers*

1D and 2D flood modeling using MIKE FLOOD and MIKE HydroRiver software, Cracow, Poland

2016

XLIV Contemporary Problems of Hydrology, Jabłonna k. Warszawy, Poland: *Characteristics of low flows in the rivers of the Lublin Region*

Hydrology Section of the Water Management Committee of the Polish Academy of Sciences, Warsaw, Poland: *Low flows of rivers in the Lublin region*

Scientific achievements of doctoral students, Cracow, Poland: *Low flow thresholds in the rivers of the Lublin region*

Scientific achievements of doctoral students, Cracow, Poland: *Methods of separating low flows into independent events on the example of rivers of Eastern Poland*

2015

Congress of Polish Geographers, Lublin, Poland: *Low Flows in the upper Raba catchment*

XLIII Contemporary Problems of Hydrology, Małdralin, Poland



COMMERCIAL PROJECTS AND EXPERTISE

- *Assessment of channel capacity for river Sanna to Wierzchowiska Pierwsze gauge with identification of retention areas*
2022, expertise
- *Second-level evaluation of the applications for co-financing in the calls for "Implementation of investments in the field of green and blue infrastructure in cities" financed by the Financial Mechanism of the European Economic Area 2014 - 2021 for the National Fund for Environmental Protection and Water Management*
2020-2021, expert
- *Second-level evaluation of the applications for co-financing in the calls for "The awareness-raising activities carried out by schools on mitigating climate change and adapting to its effects" financed by the Financial Mechanism of the European Economic Area 2014 - 2021 for the National Fund for Environmental Protection and Water Management*
2020-2021, expert
- *Assessment of the capacity of the Czechówka and Czerniejówka river channels in the conditions of urban anthropopressure in the Lublin area*
2020, expertise
- *Preparation of a rainfall model for areas at risk of flooding in the Świdnik city*
2018, expertise



OUTREACH

● **Publications**

- (GEO Tutorial) Raczynski, K., Grala, K., & Cartwright, J. H. *Work Automation in QGIS Using Model Builder*. Mississippi State University: Geosystems Research Institute, 2024, Starkville, MS
- (GEO Tutorial) Raczynski, K., Grala, K., & Cartwright, J. H. *Calling Algorithms from Field Calculator in QGIS*. Mississippi State University: Geosystems Research Institute, 2024, Starkville, MS
- (GEO Tutorial) Raczynski, K., Grala, K., & Cartwright, J. H. *Automatically Downloading Multiple Raster Files for Single Output*. Mississippi State University: Geosystems Research Institute, 2024, Starkville, MS
- (GEO Tutorial) Grala, K., Raczynski, K., & Cartwright, J. H. *Unlock a Hidden Potential of One-Line Expressions in QGIS*. Mississippi State University: Geosystems Research Institute, 2024, Starkville, MS
- (Newspaper article) *Climate change – true of myth?* Działkowicz, 2021, Warszawa, Poland
- (Newspaper article) *10 year of Floods, 10 years of Droughts*. Dziennik Wschodni, 2020, Lublin, Poland

● **Workshops**

- QGIS: Introduction to Model Builder*. 811, Richardson, Texas
- QGIS: Introduction to Python*. 811, Richardson, Texas
- International Earth Day and the Polish Geographer Day*. Workshops for elementary schools, 2017, Lublin, Poland
- International Earth Day and the Polish Geographer Day*. Science fair, workshops for elementary schools, 2016, Lublin, Poland
- National GIS Day*. Science fair, workshops for high schools, 2013, Cracow, Poland
- Pogórzeńskie Scientific Attractions*. Science fair, open workshops, 2013, Łuźna, Poland
- Cracow University of Technology Open Science Day*. Science fair, open workshops, 2013, Cracow, Poland
- National GIS Day*. Science fair, workshops for middle schools, 2012, Cracow, Poland
- Cracow Science Picnic*. Science fair, open workshops, 2012, Cracow, Poland
- Pogórzeńskie Scientific Attractions*. Science fair, open workshops, 2012, Łuźna, Poland
- Cracow University of Technology Open Science Day*. Science fair, workshops for high schools, 2012, Cracow, Poland
- National GIS Day*. Science fair, organization and open workshops, 2011, Cracow, Poland
- Cracow University of Technology Open Science Day*. Science fair, open workshops, 2011, Cracow, Poland



AWARDS

- ***Award for Contribution to the Development of E-learning in Poland***
2020, Eduj
- ***Doctoral Dissertation Honors***
2018, Maria Curie-Sklodowska University
- ***Prof. Włodzimierz Roniewicz Distinction Award***
2014, Chief Technical Organization: Association of Water and Land Reclamation Engineers and Technicians



ORGANIZATIONS AND SERVICE

- ***Professional organizations***
 - American Geophysical Union
member, 2023 – present
 - American Meteorological Society
member, 2023 – present
 - International Association of Hydrological Sciences
member, 2016 – present
 - Polish Hydrologists Association
member, 2017 – 2021
 - Polish Geographers Association
member, 2015 – 2021
 - International Association of Hydrogeologists
member, 2016 – 2018
- ***Commissions***
 - Program Development Commission for new studies in Military Geography
Maria Curie-Sklodowska University, *member 2019-2020, co-lead 2020 – 2021*
 - Electoral Commission of Faculty of Earth Sciences and Spatial Management
Maria Curie-Sklodowska University, *member, 2016 – 2020*
 - Congress of Polish Geographers
Conference organizing committee, Lublin, Poland, 2015
 - National GIS Day
Organizing committee, 2011, Cracow, Poland
- ***Service***
 - Student Competition Judge
OSPA American Geophysics Union AGU Fall Meeting Conference, 2023, San Francisco, California, USA
 - Poster Competition Judge
Alabama Water Resources Conference, 2023, Orange Beach, Alabama, USA
 - International Water Day
Radio Broadcast Panelist, Radio Lublin, 2019, Lublin, Poland
- ***Associations***
 - Student Settlement Association
board member, 2008 – 2013
 - Hydrogeomatics Student Scientific Association
Cracow University of Technology, *president, 2011 – 2013*



PEER-REVIEWS

Journal of Hydroinformatics
Journal of Hydrology
Natural Hazards
Applied Water Science
Journal of Hydrology: Regional Studies
Sustainability
Remote Sensing
Atmosphere
Hydrology
Water
Land
Acta Geophysica
Acta Scientiarum Polonorum
Geoinformatica Polonica
MSU Extension



CERTIFICATION AND TRAINING

Certification

Inclusive Excellence Certificate

Certification at Mississippi State University, 2024, Mississippi State, USA

Responsible Conduct of Research

2024, Starkville, Citi Program

Clifton Strengths Assessment

2024, Gallup, Starkville, Mississippi State

Trainings

GIS for Climate Action

2023, ESRI

Sustaining your project beyond the project period

2023, Mississippi State University

Proposal Preparation 101: A Crash Course in MSU's Grant-Related Processes and Support Services

2023, Mississippi State University

Grant Writer's Workshop

2023, GWSW, Mississippi State University

GIS Image Analysis in ArcGIS Pro

2023, University of Alaska Fairbanks

Unmanned Aerial Systems (UAS): Fundamentals

2023, University of Alaska Fairbanks

3D GIS

2023, University of Alaska Fairbanks

Remote Sensing of Wildfires

2023, University of Alaska Fairbanks

Python with ArcGIS Pro

2023, Mississippi State University

Intermediate ArcGIS Pro

2023, Mississippi State University

1D and 2D flood modeling using MIKE FLOOD and MIKE HydroRiver software

2017, DHI, Cracow (Poland)