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highlights	<ul style="list-style-type: none"> · numerical modelling and data analysis in atmospheric physics · cloud physics, aerosol-cloud-precipitation interactions, particle-based μ-physics · research software engineering focused on reproducibility & maintainability · free and open-source software maintenance, dissemination and advocacy · scientific data visualisation, vector graphics and typesetting · public presentations, teaching sciences, organisation of meetings · building teams, keeping things simple, done and documented · international experience in academic, gov, corporate and startup realms
employment	<p>2023.05–...: AGH Univ. (Physics/Appl. CS), Kraków, Poland researcher at the Environmental Physics Group: rainbow.fis.agh.edu.pl</p> <p>2021.07–2022.06: Univ. Illinois (Atmos. Sci.), Urbana, Illinois, USA postdoc at the group of Nicole Riemer: atmos.illinois.edu/~nriemer</p> <p>2018.10–2023.04: Jagiellonian Univ. (Computer Sci.), Kraków, Poland open-source Python project leadership: PySDM, PyMPDATA, numba-mpi mentorship for graduate students (computer science, physics)</p> <p>2017.10–2018.09: AETHON, Athens, Greece urban transport modelling (EU's H2020 "Innovation Associate" programme)</p> <p>2015.11–2017.09: Chatham Financial, Kraków, Poland financial models software development</p> <p>2013.12–2015.10: University of Warsaw ([Geo]Physics), Poland leadership in open-source CFD-related projects: github.com/igfuw lectureship (C++ for first-year undergraduate students)</p> <p>2005.10–2013.12: graduate studies (see below)</p> <p>2002.10–2005.12: Mazovian Governor Office, Warsaw, Poland web/db developer</p> <p>2000–2009: ITStudio.pl, Warsaw, Poland web/db developer</p>
university education	<p>2008–2013: Faculty of Physics, University of Warsaw – PhD in Physics thesis: Elements of modern cloud modelling (in English) supervisor: H. Pawłowska, degree obtained: 2013-12-16 referees: G. Feingold (NOAA), L. Loboeki (Warsaw Tech.)</p> <p>2002–2008: Faculty of Physics, University of Warsaw – MSc, 350 ECTS thesis: Microphysical properties of shallow convective clouds (in Polish) supervisor: H. Pawłowska; referee: K. Haman; degree obtained: 2008-06-25</p>
study visits	<p>2022: (2 weeks) California Institute of Technology (Pasadena, California)</p> <p>2015: (4 weeks) University of Hyogo (Kobe, Japan)</p> <p>2012: (4 weeks) National Center for Atmospheric Research (Boulder, Colorado)</p> <p>2010: (4 weeks) JAMSTEC/The Earth Simulator Center (Yokohama, Japan)</p>
coding skills	Python, C++, C#, C, IDL/GDL, Fortran, SQL, UNIX tools, \LaTeX / \BibTeX ; multi-threaded, GPU and MPI parallelism; design patterns; test automation
language skills	fluent: Polish, English ; basics: Russian, French

organisation of meetings	<p>“Probabilistic Particle-Based Methods in Aerosol-Cloud Microphysics Modeling” (AMS Symposium on Aerosol–Cloud–Climate Interactions, Denver, 2023) https://annual.ametsoc.org/index.cfm/2023/program-events</p> <p>“Lagrangian cloud microphysics: progress and prospects” (EGU GA, 2020) http://meetingorganizer.copernicus.org/EGU2020/session/36655</p> <p>“Eulerian/Lagrangian methods for cloud microphysics” (Kraków, 2019) http://www.ii.uj.edu.pl/~arabas/workshop_2019/</p> <p>“Eulerian/Lagrangian methods for cloud microphysics” (Warsaw, 2015) http://goo.gl/1fj5H8</p> <p>“FOSS for scientists” (Brussels, 2013, day-long conference session) http://archive.fosdem.org/2013/schedule/track/foss_for_scientists/</p>
field campaigns	<p>2011: (3 weeks) CARRIBA helicopter measurements campaign (Barbados)</p> <p>2008: (3 weeks) EUCAARI aircraft measurements campaign (Rotterdam)</p> <p>2008: (2 weeks) SEASALT aircraft measurements campaign (Austrian Alps)</p> <p>2006: (3 weeks) AMMA aircraft measurements campaign (Burkina Faso)</p>
funding record	<p>Poland’s National Science Centre (ncn.gov.pl):</p> <p>2022-24: PI in a SONATA project (ca. \$250 000)</p> <p>2011-13: PI in a PRELUDIUM project (ca. \$15 000)</p> <p>Foundation for Polish Science (fnp.org.pl):</p> <p>2018-21: PI in “Reintegration” grant (ca. \$200 000)</p> <p>2014: Mentorship programme (mentor: prof. Harm Jonker, TU Delft)</p> <p>2012-13: 2×START fellowship (incl. visit at NCAR, Boulder, CO)</p> <p>2011: Conference award (SIAM GS11, Long Beach, California)</p> <p>European Facility for Airborne Research (eufar.net):</p> <p>2008: PI in SEASALT student project (seasalt.igf.fuw.edu.pl) (ca. \$25 000)</p>
open-source software	<p>PyPartMC (2021–...): ~ 500 C++/Fortran/Python commits, maintenance</p> <p>numba-mpi (2020–...): ~ 50 Python commits, maintenance</p> <p>PyMPDATA & PySDM (2019–...): ~ 3000 Python commits, maintenance</p> <p>libmpdata++, libcloudph++ (2013–2015): ~1000 C++ commits</p> <p>GNU Data Language (2009–...): ~500 C++ commits, co-maintenance</p>
extramural seminars	<p>Institute for Atmospheric Physics, Univ. Mainz (2019, 2022 virtual)</p> <p>Environ. & Climate Sci. Dept, Brookhaven National Lab, NY (2022)</p> <p>SoMAS, Stony Brook University, NY (2022)</p> <p>Dept. Environ. Sci. & Engineering, Caltech (2022): youtu.be/OOJe-JFMDpU</p> <p>Dept. Atmospheric Sciences, Univ. Illinois at Urbana-Champaign (2021)</p> <p>Dept. Atmospheric and Oceanic Sciences, McGill University, Montreal (2019)</p> <p>National Center for Atmospheric Research, Boulder, Colorado (2019, ’14, ’12, ’10)</p> <p>Los Alamos National Laboratory (2019)</p> <p>Faculty of Sciences, University of Pécs, Hungary (2019)</p> <p>Department of Atmospheric Sciences, Yonsei University, Seoul (2019)</p> <p>Graduate School for Simulation Studies, University of Hyogo, Kobe (2019, ’15)</p> <p>Nanjing University of Information Science and Technology, China (2019)</p> <p>Lab. de mécanique des fluides et d’acoustique, École Centrale de Lyon (2019)</p> <p>Physics Seminar, Michigan Tech, Houghton, Michigan (2018)</p> <p>Dept. of Atmospheric Sciences, University of Wyoming, Laramie (2018, ’15)</p> <p>Complex Systems and Applications Group, Demokritos, Athens, Greece (2018)</p> <p>Chemical Engineering Department, University of Patras, Greece (2018)</p> <p>Faculty of Civil Engineering and Geosciences, TU Delft, The Netherlands (2015)</p> <p>National Atmospheric and Oceanic Administration, Boulder, Colorado (2012)</p> <p>Meteorological Research Institute, Tsukuba, Japan, (2010)</p> <p>Japan Agency for Marine-Earth Science and Technology, Yokohama (2010)</p>

**conference
presentations**

American Meteorological Society Annual Meeting:
'23 (Denver, chair & poster), '22 (Houston, virtual talk)
FOSDEM (Free & Open Source Software Devs Euro Meeting, Brussels):
'23 (talk), '21, '20, '19 & '18 (volunteer), '17, '16, '15, '14, '13 (chair), '12, '11 (talk), '10
American Meteorological Society Cloud Physics Conference:
'22 (Madison, poster), '18 (Vancouver, poster)
International Conference on Clouds and Precipitation:
'21 (virtual, 2 contris), '12 (Leipzig, talk), '08 (Cancún, talk)
UCAR Software Engineering Assembly Conference (Boulder, Colorado):
'21, '13 (talk)
European Geosciences Union General Assemblies (Vienna):
'20 (virtual, co-convener), '10 (poster), '09 (poster), '07 (poster)
Numerical Analysis and Scientific Computation with Applications:
'18 (Kalamata, talk)
Transportation Research Arena (Vienna): '18 (poster)
C++Now by Boost & Software Freedom Conservancy (Aspen, Colorado):
'15 (talk)
SIAM Conference on Mathematical and Computational Issues in Geosciences:
'13 (Padua, talk), '11 (Long Beach, talk)
American Geophysical Union Fall Meetings (San Francisco):
'12 (poster), '10 (poster)
Metström: Multiple Scales in Fluid Mechanics and Meteorology (Berlin):
'11 (talk)

**workshops,
schools,
courses**

2022: 2-nd QuIESCENT Workshop / Arctic Science Summit Week (virtual)
2022: 4-th International workshop on Cloud Turbulence (NITech, virtual)
2021: Software Carpentry instructor training (virtual)
2021: 10-th International Cloud Modelling Workshop (virtual)
2021: Advanced numerical methods for hyperbolic equations (U. Trento)
2019: Water Isotopes and Climate (NCAR)
2019: DYAMOND-ESiWACE Hackathon (Mainz)
2013: ITM COMPLETE Workshop (Warsaw)
2018: Particle-based modeling of cloud microphysics (U. Hyogo)
2018: Mathematics Applied in Transport and Traffic Systems (TUDelft)
2018: Innovation Management (A.T. Kearney, Dusseldorf/Berlin/Munich)
2017: Pedestrian Dynamics: Modelling, Validation and Calibr. (Brown Univ.)
2017: Robust Mathematical Finance (ETH)
2017: Quantitative Finance (U. Milano-Bicocca)
2016: Numerical methods for Hamilton-Jacobi equations (RICAM, Linz)
2014: IP, Licensing and Commercialisation (U. Oxford)
2014: Global Cloud Resolving Modelling (RIKEN, Kobe)
2014: Experim. Methodology in Comp. Sci. Research (U. St. Andrews)
2012: 8-th International Cloud Modelling Workshop (U. Warsaw)
2011: Atmospheric Water Vapour in the Climate System (Venice Int. Univ.)
2008: Aerosols and Climate Change (U. L'Aquila)
2008: Physics and chem. of air pollution and their effects (U. Helsinki)
2007: Boundary-Layer Research with Airborne Instruments (EUFAR, Iasi)
2007: Formation and growth of atmospheric aerosols (U. Helsinki)
2006: Multi-spectral environmental satellites (IMiGW/U. Wisconsin, Kraków)

mentorship

– Piotr Bartman (MSc in CS, defended in 2020)
– Oleksii Bulenok (MSc in CS, in progress)
– Kacper Derlatka (MSc in CS, in progress)
– Michael Olesik (MSc in physics, defended in 2020)

teaching	<p>Faculty of Math. and CS, Jagiellonian University:</p> <ul style="list-style-type: none"> 2020: Modelling of Atmospheric Clouds (lecture + computer lab) 2020: Programmer's Workshop (UNIX/L^AT_EX/git/...) (remote lab) 2020: Programming 1 (C/C++) (remote lab) 2018: Abstract programming (computer lab) 2018: Design patterns (computer lab) <p>Faculty of Physics, U. Warsaw:</p> <ul style="list-style-type: none"> 2015: Programming in C++ (lecture) <p>U. Vigo in Ourense, Spain:</p> <ul style="list-style-type: none"> 2014: A short course on object-oriented numerics (ephyslab.uvigo.es/numeric) <p>Institute of Geophysics, U. Warsaw:</p> <ul style="list-style-type: none"> 2011, '14: Numerical modelling in atmospheric physics 2010: Physics of the atmospheric boundary layer 2009, '10: Atmospheric thermodynamics and cloud physics 2008, '09: Hands-on data processing in meteorology
peer-reviewed papers	<p>de Jong, Mackay, Bulenok, Jaruga & Arabas, 2022: Breakups are Complicated: An Efficient Representation of Collisional Breakup in the Superdroplet Method (Geosci. Model Dev., doi: 10.5194/gmd-16-4193-2023)</p> <p>de Jong et al., 2023 New developments in PySDM and PySDM-examples v2: collisional breakup, immersion freezing, dry aerosol initialization, and adaptive time-stepping (J. Open Source Soft., doi: 10.21105/joss.04968)</p> <p>Hill, Lebo et al., 2023: Toward a numerical benchmark for warm rain processes (J. Atmos. Sci. doi: 10.1175/JAS-D-21-0275.1)</p> <p>Park, Duvert, Coulais, Jung, Arabas et al. 2022: GNU Data Language 1.0: a free/libre and open-source drop-in replacement for IDL/PV-WAVE (J. Open Source Soft. doi: 10.21105/joss.04633)</p> <p>Bartman et al. 2022: PyMPDATA v1: Numba-accelerated implementation of MPDATA with examples in Python, Julia and Matlab (J. Open Source Soft. doi: 10.21105/joss.03896)</p> <p>Bartman et al. 2022: PySDM v1: particle-based cloud modelling package for warm-rain microphysics and aqueous chemistry (J. Open Source Soft. doi: 10.21105/joss.03219)</p> <p>Olesik et al. 2022: On numerical broadening of particle-size spectra: a condensational growth study using PyMPDATA 1.0 (Geosci. Model Dev. 15, doi: 10.5194/gmd-15-3879-2022)</p> <p>Bartman & Arabas 2021: On the design of Monte-Carlo particle coagulation solver interface: a CPU/GPU Super-Droplet Method case study with PySDM (LNCS 12743, doi: 10.1007/978-3-030-77964-1_2)</p> <p>Arabas & Farhat 2020: Derivative Pricing as a Transport Problem: MPDATA solutions to Black-Scholes-type equations (J. Comput. Appl. Math. 373, doi: 10.1016/j.cam.2019.05.023)</p>

- Arabas & Shima 2017:
On the CCN (de)activation nonlinearities
(Nonlin. Proc. Geophys. 24, doi: [10.5194/npg-24-535-2017](https://doi.org/10.5194/npg-24-535-2017))
- Arabas, Jaruga, Pawlowska & Grabowski, 2015:
libcloudph++ 1.0: a single-moment bulk, double-moment bulk, and
particle-based warm-rain microphysics library in C++
(Geosci. Model Dev. 8, doi: [10.5194/gmd-8-1677-2015](https://doi.org/10.5194/gmd-8-1677-2015))
- Jaruga, Arabas, Jarecka, Pawlowska, Smolarkiewicz & Waruszewski, 2015:
libmpdata++ 1.0: a library of parallel MPDATA solvers
for systems of generalised transport equations
(Geosci. Model Dev. 8, doi: [10.5194/gmd-8-1005-2015](https://doi.org/10.5194/gmd-8-1005-2015))
- Arabas, Jarecka, Jaruga & Fijałkowski, 2014:
Formula Translation in Blitz++, NumPy and Modern Fortran:
A Case Study of the Language Choice Tradeoffs
(Sci. Prog. 22, doi: [10.3233/SPR-140379](https://doi.org/10.3233/SPR-140379))
- Arabas & Shima, 2013:
Large-Eddy Simulations of Trade Wind Cumuli
Using Particle-Based Microphysics with Monte Carlo Coalescence
(J. Atmos. Sci., doi: [10.1175/JAS-D-12-0295.1](https://doi.org/10.1175/JAS-D-12-0295.1))
- Kulmala, Asmi, Lappalainen et al., 2011:
General overview: European Integrated project on Aerosol Cloud Climate
and Air Quality interactions (EUCAARI):
integrating aerosol research from nano to global scales
(Atmos. Chem. Phys., doi: [10.5194/acp-11-13061-2011](https://doi.org/10.5194/acp-11-13061-2011))
- Arabas & Pawlowska, 2011:
Adaptive method of lines for multi-component aerosol
condensational growth and CCN activation
(Geosci. Model Dev., doi: [10.5194/gmd-4-15-2011](https://doi.org/10.5194/gmd-4-15-2011))
- Cairo, Pommereau, Law et al., 2010:
An introduction to the SCOUT-AMMA stratospheric aircraft, balloons
and sondes campaign in West Africa, August 2006: rationale and roadmap
(Atmos. Chem. Phys., doi: [10.5194/acp-10-2237-2010](https://doi.org/10.5194/acp-10-2237-2010))
- Arabas, Pawlowska & Grabowski, 2009:
Effective radius and droplet spectral width
from in-situ aircraft observations in trade-wind cumuli during RICO
(Geosci. Res. Lett., doi: [10.1029/2009GL038257](https://doi.org/10.1029/2009GL038257))
- editorship** Geoscientific Model Development, topical editor since 2020 (geosci-model-dev.net)
Polish ed. of “Short Course in Cloud Physics” (WUJ, 2023): initiative/typesetting