

<p><b>Project SHENG of the National Science Centre, Poland</b></p> <p><b>consortium of IMGW-PIB and IMP PAN</b></p>	
<p><b><i>Numerical modelling of dispersed turbulent flows considering particle-scale interactions</i></b></p>	

## Opening for a Post-Doctoral position

Numerical modeling of dispersed turbulent flows  
considering particle-scale interactions

*Institute of Fluid-Flow Machinery, Polish Academy of Sciences,  
Gdańsk, Poland*

### About the project

In the framework of Chinese-Polish collaboration in the fundamental research, supported by the National Science Centre (NCN, Poland), the present project SHENG is focused on the development of computational methods and detailed analysis of turbulent flows containing small water droplets. The problem is of major relevance in meteorology for cloud microphysics and the warm rain formation. It is also of general interest in various industrial applications. They are at the crossroads between academic research and practical concerns (e.g., droplet coalescence/breakup in sprays or short-time relative particle dispersion). For a popular description see: <https://ncn.gov.pl/konkursy/wyniki/2019-04-26-sheng1?language=en> the button "Funding scheme", choose "SHENG-ST", position No.7.

The general aim of the project is to further develop the modelling of physical phenomena involved, to apply numerical simulation tools and carry on a quantitative analysis of the motion of the dispersed phase (inertial particles or drops) in turbulent flows of the continuous phase (air). The detailed computations (DNS) will be performed along with the large-eddy simulations (LES) that are becoming more and more useful in various applications of turbulent flows with particles. The LES approach needs further improvement here, especially for the estimation of particle collisions and their aerodynamic/hydrodynamic interactions.

### The offer

We offer a Post-Doctoral position in the Multiphase Flow Group, IMP PAN Gdańsk, Poland ([www.imp.gda.pl/en](http://www.imp.gda.pl/en)) A full time (40 h/week) employment is funded for 6 months. The gross salary is 8300 zł/month (indicatively: equivalent to ~1200 €/month net income, subject to some variation depending on tax regulations and on the EUR/PLN exchange rate). There are no constraints as to the nationality of the applicant; however, no extra mobility allowance neither family allowance can be granted, no visa fee & travel costs refund, etc. There might be prolongation of the employment period, yet the funding scheme is subject to change.

The candidate will be based at IMP PAN in Gdańsk; short visits at the project coordinator (IMGW Warsaw) are foreseen. The candidate will have an opportunity of conference participation (national or international) to present his/her research findings. A research stay of a few weeks at the project partner (the Shenzhen University, China) is planned, subject to possible travel restrictions.

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## **Tasks**

The project is of theoretical and computational nature: it involves DNS and LES of two-phase flows with the dispersed phase in the form of small droplets, applying the Eulerian-Lagrangian approach implemented in an in-house, state-of-the-art, highly parallel code. As an essential research task, the candidate will participate in development and validation of new physical and mathematical models of the subfilter flow effects on droplets in LES, in particular pertaining to short-range interactions, collisions and coalescence. For further information, please contact Prof. Jacek Pozorski at +48 58 5225145 or [jp@imp.gda.pl](mailto:jp@imp.gda.pl).

## **Requirements**

We are looking for a strongly motivated candidate with intellectual curiosity, willing to work in the research environment against tight deadlines, ready to learn and gain new experience.

Specific requirements:

- PhD degree (basically, awarded no earlier than 2015) in physics, applied mathematics or engineering (mechanical, chemical, aerospace or similar field), preferably related to turbulent and/or multiphase flow phenomena
- well-organised person with a proven ability to work independently,
- skilled in mathematical thinking and physical approach to the problems,
- operational knowledge of numerical methods for fluid dynamics; development experience of CFD software and/or parallel computing will be an asset,
- proven track record, including JCR-list papers and international conference talks,
- knowledge of Linux OS, good programming skills (Fortran or C or C++) as well as in data postprocessing software (Python or alike),
- good command of written and spoken English.

## **Selection procedure**

Submission of applications is possible through 15 May 2022. The applications should include (i) a cover letter (CL), (ii) CV with photo, (iii) all diplomas, (iv) list of publications, and (v) contact information to 2+ reference persons or reference letters from them. As the motivation for research is essential, applicants are required to clearly point out in their cover letter how the activity to accomplish the project aims will build upon their education and research to date. Incomplete applications will not be taken into consideration.

Please include in the CL the following statement: "I agree to have my personal data processed for the needs of the recruitment process, as required by the law of the Republic of Poland (in accordance with the Act of 08.20.1997 on personal data protection - Dz. U. No 133, item 883)".

In the selection procedure, emphasis will be placed on education, experience and personal suitability, as well as motivation, in terms of the requirements specified in the advertisement.

Please submit your application by regular mail to:

IMP PAN, Fiszera 14, 80-231 Gdańsk, Poland or by e-mail to [job@imp.gda.pl](mailto:job@imp.gda.pl) with the annotation / subject line: "Post-doctoral application: SHENG".

If needed, selected Candidates may be invited for an interview (online or in person).