

PhD Position Announcement

Job Description

The Heat and Fluid Transport Engineering Research lab at New Jersey Institute of Technology (NJIT) seeks highly qualified students for two 4-year fully-funded PhD fellowships, both starting on September 1, 2025. The candidates should be motivated individuals with a strong background in engineering/informatics, numerical methods, and computer programming, and with outstanding communication skills. Previous experience in developing numerical schemes is a nice plus.

The objectives of the doctoral projects are the following:

- Augmenting the physical and performance capabilities of the open-source SPH-based code DualSPHysics via the implementation and validation of new numerical models.
- Transforming the software architecture to enable large simulations on multiple GPUs, both within a single node and across multiple nodes.
- Validating the performance of the above algorithms by carrying out an experimental campaign on the sloshing of engineered fluids in partially-filled tanks.

DualSPHysics is a SPH code developed to study fluid problems with a high computational cost and heavily used in both academia and industry. The DualSPHysics project is the product of an international collaboration among many universities and institutions, with the leading ones being Universidade de Vigo (Spain), University of Manchester (UK), Università degli studi di Parma (Italy), Universitat Politècnica de Catalunya (Spain), and New Jersey Institute of Technology (US).

The PhD positions are in Mechanical Engineering or Engineering Science, and they are funded by the National Science Foundation and NJIT. They offer a very competitive salary, and include frequent opportunities for travel, enabling engagement with leading global researchers, attendance of international conferences, and collaboration on groundbreaking projects. A level of teaching commitment is also expected by one or both candidates.

Why join the New Jersey Institute of Technology?

NJIT is a leading public polytechnic university and an R1 research institution, recognized for its high level of research activity by the Carnegie Classification. Located in Newark, NJ, the university offers access to the vibrant New York City metropolitan area, providing unparalleled opportunities for collaboration, innovation, and career advancement. NJIT is ranked among the top 100 universities worldwide for engineering and technology (U.S. News & World Report), making it a highly attractive destination for students and researchers globally.

Upon passing the qualifying exam within the first year at NJIT, the prospective students will also enroll in a PhD degree in Civil Engineering at the University of Parma under a PhD agreement between NJIT and the University of Parma with shared PhD mentorship. The point of contact and advisor at the University of Parma is Prof. Renato Vacondio (renato.vacondio@unipr.it). Upon fulfilling all the requirements of both PhD programs, the students can obtain **two PhD degrees** within the same doctoral project: one from NJIT and one from University of Parma.

Admission Requirements

Individuals applying for the position must have an MS degree in Mechanical/Civil/Aerospace Engineering, Applied Mathematics or Physics, Computer Science, or similar fields with a minimum GPA of 3.50/4.00. A background in applied mathematics, mathematical modeling, algorithms and programming (C++, CUDA, Python) is imperative. A background in fluid mechanics and heat transfer is also highly desired. An overall TOEFL IBT score of 80 or larger (with speaking score > 23) or an IELTS band score of 6.5 or larger is required. Provision of the GRE scores is

strongly encouraged and will be considered as a plus. Women and individuals from diverse and underrepresented communities are especially encouraged to apply.

If you are interested in the position, please email Prof. Angelo Tafuni (atafuni@njit.edu) using the following subject line in your email: "*PhD Application HaFTER lab (NJIT) – LastName FirstName*". Please attach the following documents to your email (use cloud platforms for files over 10 MB):

- A cover letter of max 2 pages describing yourself and why you are a good fit for this job.
- An up-to-date CV of max 5 pages.
- Contact information of at least 2 faculty members or industry managers that can provide letters of recommendation upon request.
- Graduate and undergraduate transcripts.
- Any relevant publications.
- Any proof of programming skills.

Review of applications will begin in March of 2025. For full consideration, please submit all application material as early as possible, but no later than February 28, 2025. The position will be open until filled.