

Open PhD position

Mechanics of shape memory alloys under extreme dynamic environments

An open doctoral position is available in the area(s) of experimental mechanics and dynamic behavior of materials, within the [Solid Mechanics Laboratory \(LMS\)](#), [École Polytechnique](#), Palaiseau, France.

About our team – [Mechanics and Materials under Extremes](#)

The team, led by Prof. Vignesh Kannan, studies the mechanics of materials and structures under large stresses, multi-physical fields and short time scales. We use mechanical design, electronic and optical instrumentation to push the cutting edge of experimental mechanics down to nano-second time scales, and μm length scales. Our experiments are motivated by theoretical foundations, with the goal of understanding fundamental mechanisms that govern the multi-physical response of materials. We continuously seek to develop a collaborative, supportive and international group of scientists who enjoy the pursuit of exciting problems, and each other's company!

Scientific overview for the position

Shape Memory Alloys (SMAs) are a class of active materials which exhibit “pseudo/super elastic” mechanical response, elasto/baro-caloric cooling, and mechanically-driven magnetic flux (for a special class of magnetic SMAs) — with applications ranging from impact damping to power generation. At the microscopic length scales, these phenomena occur due to spatially-heterogeneous structural changes in the atomic lattice — phase transformations — driven by mechanical, thermal and magnetic fields.

The PhD student will design and develop Kolsky bar experiments with high-speed instrumentation, to study the macroscopic response and evolution of phase boundaries in magnetic SMAs under high strain rates and multi-axial stress states. The resulting data sets will be used to discover the kinetics of phase transformations, and their effect on multi-physical coupling under dynamic loading conditions.

Your profile

- A masters degree in mechanical engineering, materials science, or a related field
- Strong background in continuum mechanics and experimental mechanics
- Experience in mechanical characterization of materials, optics and instrumentation
- Experience with high-strain-rate experiments is an advantage, but not a necessity
- You like working in multi-disciplinary environments at the interface of mechanics and materials science.
- You are comfortable communicating in English, and enjoy working in an international environment.

Finally and most importantly, if you are passionate and eager to study mechanics, develop rigorous experiments, and enjoy spending many hours in an experimental lab, you are eligible to apply!

Application documents

- Curriculum vitae (max. two pages)
- Letter of motivation (max. two pages)
- Official detailed transcript records (bachelor and masters)
- Name, designation and contact details of at least two referees

Send your application via e-mail to Prof. Vignesh Kannan (vignesh.kannan@polytechnique.edu).

Documents must be sent as a **single .zip file**, with the subject **"Application-PhD-lms-mmxtm2025"** (applications without the subject may not be considered).

Deadline: October 17, 2025 at 1800 hrs (Central European Time).