Project acronym : MULTIMAT
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Project Participant : Laboratoire d'Etudes des Microstructures (LEM)
Name,First name ,Category, Nationality : Salman Oguz Umut, ESR, Turkish
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My name is Umut Salman. I completed my undergraduate studies at the Physics Department of Istanbul Technical University. I obtained my Master's degree on Material Science and Nano Objects at the Paris Ecole Polytechnique. During my studies, I undertook an internship based on the simulation of crystal growth at the laboratory Physique de la Matière Condensée (PMC) of Ecole Polytechnique . The objective of my work was to create and find an algorithm by making use of wavelets for the simulation of the Phase Field method which is used efficiently for crystal growth. After getting my master's degree, I began my doctorate thesis work at the Laboratoire d'Etudes des Microstructures (LEM) on the modeling of martensitic transformation and shape memory alloys with the phase field method, under the direction of Alphonse Finel.

We have started by studying the precipitation mechanisms and hysterisis cycles associated with the thermally–induced martensitic transformation. Particularly, we have observed a large hysterisis so–called thermoelastic , caracterised by jumps (avalanches) of the martensite fraction. We want to continue this work in two paths. Firstly, we will try to understand the phenomenon of the precipitation by avalanches by Phase Field Method, which assumes that the elastic strain fields are associated to a relaxation time much smaller than the characteristic time of the microstructure evolution. This separation of time scale is natural for the diffusive transformations, but it has not been justified for the displacive transformations. This is the reason why we will be studying the martensitic transformation with a method that is not purely dissipative but that takes into account the real dynamics of the strain fields.

In the first year of my thesis, I participated in a " PHASE FIELD" school in Houches, France and I did an oral presentation in the 10th of Condense Matter Journey in Toulouse.

Finally, I took a course « Statistical Mechanics of Disordered Systems« at ENS.