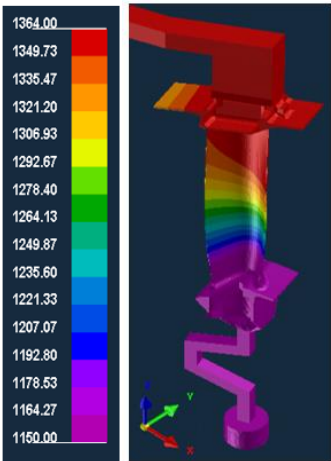


## Subject of the MapMod specialised master's degree in 2023

<b>Date</b>	May 22, 2023
<b>TITLE</b>	Numerical chaining between finite element multiphysics simulations
<b>Project acronym</b>	FE-MULTI
<b>Image (recommended)</b>	
<b>Caption of the image</b>	Haithem BEN HAMOUDA, PhD thesis, Mines Paris 2012 Temperature field in a turbine blade geometry
<b>Thesis work description</b>	<p>Safran Tech relies on multidomain heat flow simulations for casting of a metallic melt in a mold (i.e. filling, solidification, cooling) as part of the investment casting process modeling chain, with the objective to predict the formation of the grain structure. Based on strong coupling between the finite element (FE) software PROCAST and the cellular automaton (CA) method, computation times are not compatible with industrial exploitations.</p> <p>The objective to drastically reduce the computation times while maintaining predictivity is to use the simulation results from the multidomain heat flow simulations (PROCAST, FLOW3D or others) as an output that can be uploaded as an input of the multiphysics finite element software FusalgY available at CEMEF for the calculation of the grain structure.</p>
<b></b>	Investment casting process
<b>Type of project / Project partners</b>	Industrial contract with company SAFRAN Tech
<b>Objectives</b>	<ul style="list-style-type: none"> <li>-Definition of output data from the multidomain heat flow simulations software (PROCAST, FLOW 3D or others) as initial and boundary conditions at the metallic domain, including geometry and FE mesh.</li> <li>-Data setting of FusalgY to apply the recorded fields from the process simulation software (ProCast, FLOW3D or others).</li> <li>-Simulations FusalgY</li> <li>-Analyses of the methodology and parametric studies</li> </ul>

<b>Thematic / Industrial Field</b>	Aeronautics
<b>Key-words</b>	Simulation, Finite element, Forming process, Casting, Solidification
<b>Skills and abilities requested</b>	Engineer or master
<b>Gross annual salary</b>	
<b>Location</b>	CEMEF, Sophia Antipolis, France SAFRAN Tech, Gennevilliers, France
<b>Contact, supervisor &amp; research group(s)</b>	Gildas Guillemot, 2MS Charles-André Gandin ; équipe 2MS Michel Bellet, 2MS