**Application - Large Research Project**

1. **Name of the applicant**

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1. **CV**

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| Brief CV of the applicant. Highlight your three major research achievements.  Up to 1 page. |

1. **Project name**

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| Short name of the project. The name does not have to be the same as the name of the research project for which you will need SLING computing resources. |

1. **Summary**

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| Briefly summarise the content of the project, mentioning the main objectives and how high-performance computing will help you achieve them.  This section should be identical to the summary in the submission form and should therefore be written in a format suitable for publication on the website or in the report of the infrastructure manager.  Up to 1/2 page. |

1. **Scientific and research objectives and socio-economic impacts of the project**

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| Give the scientific, technological and societal relevance of your project. Justify the relevance of the project and its interdisciplinary nature. State the expected results and the interdisciplinary value of your proposal. Highlight the main challenges and argue for the advantages in your research work that will be brought by the use of resources on computational clusters.  Up to 1/2 page. |

1. **Describe the research methods, software and approach to concurrent implementation**

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| The description should be suitable for experts in your field, but also informative enough for the general panel that will compare proposals from different fields.   * 1. Project description   Describe the motivation, objectives and scientific challenges of the problem. Evaluate the project comparatively with similar current research. Describe and justify the choice of computational methods. Indicate the progress you will make using SLING resources. State the expected results of your proposal.   * 1. Software   Describe the software packages you intend to use and justify your choice.   * 1. Approach to simultaneous implementation   For software, please specify support for parallel execution. Describe whether the concurrency will be implemented at the SLURM transaction level or whether there is support for concurrency in the software itself. Specify whether the software allows concurrent execution on multiple cores on a single node (multithreading, OpenMP, Pthreads, OpenACC), the use of one or more graphics accelerators per node and distributed processing on multiple nodes (MPI, Dask).   * 1. Working with data   Describe the data - sensitivity of content, quantity, short and long term retention times, access to data for project collaborators, etc.  Give the frequency of reads and writes during processing. For data stored outside the compute cluster, provide the sources and expected bandwidth for transferring it to and from the cluster.   * 1. Reference   Please list up to 20 references that you refer to in your description.  Up to 3 pages. |

1. **Project duration, planned project steps and milestones**

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| Describe the project timeline and major milestones, highlighting the steps where you need a computational cluster. For the duration of the project, estimate the monthly resource requirements (Gantt chart).  For the steps to be performed on the compute cluster (data preparation, main processing, final processing), describe the typical operations (number of starts, amount of resources used at the same time, duration, total number of node hours).  Up to 1 page. |

1. **Justification of the suitability of the treatments for implementation on the compute cluster**

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| Evaluate the suitability of the processing on the compute cluster quantitatively, preferably with the results of test and development projects that you have carried out on the same hardware as requested in this application (compute nodes, network connections). Exceptionally, you may use results from a similar cluster, in which case please indicate why you consider the results to be relevant. When analysing, please take into account the technical limitations of the computing cluster on which you are requesting resources. In your justification, evaluate the overall treatment separately and all the most critical steps separately.  For the key processing steps, graphically represent the dependency of the expected and actual processing time on the number of computational units used (cores, GPEs, nodes) and the key model parameters (typical data sizes, model complexity). The graph should include the measurements for the minimum number of computational units necessary to execute the program code, the measurements for the maximum number of computational units you were able to execute, and some (5) intermediate values. Suggest the optimal size of the operations (number of computational units used at the same time). The values should match the resource requirements that you indicate in sections 6 and 7.  Give memory requirements per compute core or node depending on the size of the problem (e.g. grid size, number of free parameters).  Up to 2 pages. |

1. **Resource needs**

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| Describe your computing resource needs (type of hardware, CPE and GPE computing resource needs, memory), data handling (space on the file system, need for short and long term storage). Clearly state specific requirements, e.g. for data visualisation, interactive use, access to external resources, special hardware needs (FPGA).  Up to 1 page. |

1. **Development and software tool needs**

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| Describe the software you intend to use (compilers, libraries, debuggers, user software). Give the versions of the software and libraries needed. Will you install the software yourself (translation, Anaconda), will you use environment modules (which versions) or containers (which versions).  Describe the need for code translation, new modules or new containers. Describe which concurrent processing mechanisms your software uses (multithreading with pThreads/OpenMP/OpenACC, how about inter-process communication with MPI, Dask), how about exploiting multiple graphics cards on the same node. Give the estimated need for help from system administrators.  Up to 1 page. |

1. **List of publications related to previous accesses**

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| Please list the publications in which you have mentioned the use of SLING computing clusters.  Up to 1/2 page. |

1. **Reviewers**

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| Suggest up to two scientific reviewers suitable to evaluate your application. Please indicate up to two reviewers you do not want to evaluate your application and the reason why. Please indicate the organisation and contact details next to the name of the reviewer. |