**IceCube Institutional Memorandum Of Understanding (MOU)**

**Scope of Work**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Labor Cat.** | **Names** | **WBS L3** | **Tasks** | **WBS 2.1** | **WBS 2.2** | **WBS 2.3** | **WBS 2.4** | **WBS 2.5** | **WBS 2.6** | **Grand Total** |
| Program Coordination | Detector Maintenance & Operations | Computing & Data Management  | Data Processing & Simulation  | Software | Calibration |  |
| KE | Van Eijndhoven Nick | Reconstruction | development of reconstruction tools (IcePack framework), |   |   |   |   |  0.25 |  | 0.25 |
| Engineering and R&D Support | self-veto techniques for Icecube-Gen2 | 0.25 |   |   |   |  |  | 0.25 |
| **Van Eijndhoven Nick total** |  | **0.25** |  |  |  | **0.25** |  | **0.50** |
| De Clercq Catherine | Administration | Institutional Lead | 0.20 |   |   |   |   |  | 0.20 |
| **De Clercq Catherine total** |  | **0.20** |  |  |  |  |  | **0.20** |
|     PO | De Vries, Krijn | Reconstruction | muon track reconstruction in IceCube and DeepCore |   |   |   |   | 0.25 |  | 0.25 |
|   | Engineering and R&D Support | radio detection for IceCube-Gen2 | 0.25 |   |   |   |  |  | 0.25 |
|  | **De Vries, Krijn Total** |  | **0.25** |  |  |  | **0.25** |  | **0.50** |
|  | Toscano, Simona | Reconstruction | optimization of the geometry and the track reconstruction |  |  |  |  | 0.25 |  | 0.25 |
|  |  | Engineering and R&D Support | self-veto techniques for Icecube-Gen2 | 0.25 |  |  |  |  |  | 0.25 |
|   | **Toscano, Simona Total** |  | **0.25** |  |  |  | **0.25** |  | **0.50** |
| VUB PO | Detector Monitoring | Detector Monitoring |   | 0.06 |   |   |   |  | 0.06 |
|   | **VUB PO Total** |  |  | **0.06** |  |  |  |  | **0.06** |
| GR | De Wasseige, Gwenhael | Real-Time Alerts | Optimization of hitspooling for SN and solar flares |  | 0.25 |  |  |  |  | 0.25 |
|  |  | Education and Outreach | Education and Outreach | 0.25 |  |  |  |  |  | 0.25 |
|  | **De Wasseige, Gwenhael, Total**  |  | **0.25** | **0.25** |  |  |  |  | **0.50** |
|  | Maggi, Giuliano | Reconstruction | muon track reconstruction in IceCube and DeepCore |  |  |  |  | 0.25 |  | 0.25 |
|  |  | Core Software | Software Strike Team |  |  |  |  | 0.25 |  | 0.25 |
|   | **Maggi, Giuliano Total** |  |  |  |  |  | **0.50** |  | **0.50** |
|   | VUB GR | Detector Monitoring | Detector Monitoring |   | 0.06 |   |   |   |  | 0.06 |
|   | **VUB GR Total** |  |  | **0.06** |  |  |  |  | **0.06** |
| **VUB Total**  |  | **1.20** | **0.37** |  |  | **1.25** |  | **2.82** |

**Vrije Universiteit Brussel**

**Catherine de Clercq**

**Ph.D Scientists** (Faculty Scientist/Post Doc Grads): **4** (2 2 2)

**Note: Gen-2 contributions not relevant to IceCube M&O are highlighted in blue** (Total: 0.75 FTE)

**Faculty:**

Catherine de Clercq Institutional Lead

Nick Van Eijndhoven Development of reconstruction tools (IcePack framework),

GEN2 geometry optimization

**Scientists/post-docs:**

De Vries, Krijn Muon track reconstruction in IceCube and DeepCore

 R&D on radio detection

Analysis topics: GRB/AGN analysis

Simona Toscano Optimization of the geometry and the track reconstruction, and GEN2 geometry optimization

Analysis topics: Development of a hybrid reconstruction for EHE (GZK) events using the In-Ice part of IceCube and the radio detectors

**Ph.D. Students:**

Maggi Giuliano Muon track reconstruction in IceCube and DeepCore, Software Strike Team

                 Analysis topics: AGN analysis

 Thesis topic: Search for high-energy neutirnos from dust-obscured Active Galactic Nuclei

Gwenhael De Wasseige – Optimization of hitspooling for SN and solar flares, Education and Outreach

Analysis topics: Solar flares

 Thesis topic: Search for neutrinos from solar flares

**Diploma/Master Students:**

**Computing Resources**

**IIHE (ULB-VUB)**

|  |  |  |
| --- | --- | --- |
|  | **2016** | **2017** |
|  | **CPU Cores**  | **GPU Cards** | **CPU Cores** | **GPU Cards** |
| **IceCube**  |  | 14 | Up to 500 | 14 |
| **PINGU** |  |  |  |  |
| **Gen2**  |  |  |  |  |

The computing resources in the table are provided by the IIHE (ULB-VUB), i.e. by ULB and VUB together.

The 14 GPU cards are presently used for the production of MC samples for the collaboration. The jobs are launched centrally. From our side we cannot see whether the jobs run for IceCube, PINGU or Gen2.

We intend to also open access to CPU cores for the production of MC samples by the collaboration. This is now under development. Probably by next year a max of 500 cores could be made available. The number will increase gradually during 2016.

The person to contact for technical information is Samir, samir.amary@ulb.ac.be