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

**Scope of Work**

 **Massachusetts Institute of Technology**

**Janet M. Conrad**

**Ph.D Scientists** (Faculty Scientist/Post Doc Grads): **2** (1 1 3)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Labor Cat.** | **Names** | **WBS Level 3** | **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 | Janet M. Conrad | Administration | ICB member | 0.05 |   |   |   |   |  | 0.05 |
|  | Outreach | CosmicWatch | 0.05 |   |   |   |   |  | 0.05 |
|   | **Janet M. Conrad Total** |  | **0.10** |  |  |  |  |  | **0.10** |
| PO | Carlos Argüelles Delgado | Simulation Software | nuSQuIDS, LeptonInjector/LeptonWeighter, and MC reweighting development. Fitter tools: GolemFit. |   |  |   |   | 0.30 |  | 0.30 |
|  |  | Administration | BSM Technical coordinator | 0.30 |   |   |   |   |  | 0.30 |
|  | **Carlos Arguelles Total** |  | **0.20** |  |  |  | **0.20** |  | **0.4** |
| GR | Spencer Axani | Simulation Software | Pass 2 and calibration work |  |  |  |  |  0.50 |  | 0.50 |
|  |  | Outreach & Outreach | Desktop muon counters | 0.50 |  |  |  |  |  | 0.50 |
|  | **Spencer Axani Total**  |  | **0.30** |  |  |  | **0.40** |  | **0.7** |
|  | Marjon Moulai | Core Software | Atmospheric fluxes library from MCEq with uncertainties |  |  | 0.2 |  |  |  | 0.2 |
|  | **Marjon Moulai Total**  |  |  |  | **0.2** |  |  |  | **0.20** |
|  | Alejandro Diaz | Data releases for BSM-wg  | Organize and maintain BSM public data release page |  |  | 0.1 |  |  |  | 0.25 |
|   | **Alejandro Diaz Total**  |  |  |  | **0.1** |  |  |  | **0.1** |
| **MIT Total** | **0.60** | **0.0** | **0.3** | **0.0** | **0.60** | **0.0** | **1.50** |

 **Faculty:**

Janet M. Conrad – Institution lead, member of the ICB, organizer of CosmicWatch outreach.

**Scientists and Post Docs:**

Carlos Argüelles -- M&O responsibility is in maintaining and improving his simulation code for use in the MEOWS. Specific projects are 1) speeding up nuSQuIDS, 2) supporting the transition from NuGen to LeptonInjector/LeptonWeighter, 3) developing new tools for estimation of muon backgrounds, 4) development and support of GolemFit.

Analysis Topics: Work on the multiyear high-energy sterile analysis (MEOWS). Work on the HESE BSM analyses. Write papers arising from the HESE taskforce work.

**Grad Students:**

Spencer Axani – (5nd year) M&O responsibility is in Data Quality, Reconstruction and Simulation (2.5.1), presently concentrating on performing pass2 checks and Monte Carlo for the multiyear sterile neutrino analysis. Document work on new SPE parameterization. M&O responsibilities in R&D (2.1.2) consist of developing the desktop muon counters used for IceCube outreach.

Analysis Topic: IC86 sterile neutrino analysis using 7-year data set, aka the MEOWS 3+1.

Marjon Moulai – (4nd year) Study of atmospheric neutrino systematic uncertainties by means of the Barr parameterization. Implement the Barr parameterization in GolemFit in the MEOWS sample.

Analysis Topics: Develop neutrino decay analysis with the MEOWS sample.

Alejandro Diaz – (3rd year) Developing systematic treatment for MEOWS high-energy extension. Prepare first BSM-wg data repository.

Analysis Topics: Extended MEOWS.