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

**Scope of Work**

**University of Alabama**

**Dawn Williams**

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Labor Cat.** | **Names** | **WBS L3** | **Tasks** | | **Funds Source** | 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 | Williams, Dawn | Administration | Alabama Institutional Lead | | Inst. In-Kind | 0.05 |  | |  | |  | |  |  | 0.05 |
|  |  | Education and Outreach | IceCube Outreach | | Inst. In-Kind | 0.05 |  | |  | |  | |  |  | 0.05 |
|  |  | Public Data Products | Convenor of Data release task force | | M&O Core |  |  | |  | | 0.05 | |  |  | 0.05 |
|  |  | Ice Properties | Supporting flasher runs and flasher analysis | | Inst. In-Kind |  |  | |  | |  | |  | 0.10 | 0.10 |
|  |  | Detector Calibration | Baseline and charge harvesting and DOMCal | | M&O Core |  |  | |  | |  | |  | 0.10 | 0.10 |
|  | **Williams, Dawn Total** | |  | |  | **0.1** |  | |  | | **0.05** | |  | **0.20** | **0.35** |
|  | Santander, Marcos | Education and Outreach | IceCube Outreach | | Inst. In-Kind | .05 |  | |  | |  | |  |  | 0.05 |
|  | Administration | Realtime Oversight Committee member | | Inst. In-Kind | 0.1 |  | |  | |  | |  |  | 0.1 |
|  | Detector Monitoring | Online Moon shadow analysis (monitoring) | | Inst. In-Kind |  | 0.1 | |  | |  | |  |  | 0.1 |
|  | Reconstruction | Reconstruction validation - PSF studies | | Inst. In-Kind |  |  | |  | |  | | 0.05 |  | 0.05 |
| **Santander, Marcos Total** | |  | |  | **0.15** | **0.1** | |  | |  | | **0.05** |  | **0.30** |
| PO | Kopper, Sandro | Simulation Software | Simulation Software: low energy double pulse | | NSF Base Grant |  |  | |  | |  | | 0.15 |  | 0.15 |
|  |  | Reconstruction | Reconstruction of tau neutrino events and BSM double pulse events | | NSF Base Grant |  |  | |  | |  | | 0.15 |  | 0.15 |
|  | Distributed Computing Resources | Connecting Alabama GPUs to the cluster | | NSF Base Grant |  |  | | 0.05 | |  | |  |  | 0.05 |
| **Kopper, Sandro Total** | | | |  |  |  | | **0.05** | |  | | **0.30** |  | **0.35** |
| GR | Pedek, Samantha | Detector Calibration | Domcal run vetting | | NSF Base Grant |  |  | |  | |  | |  | 0.25 | 0.25 |
| Reconstruction | Tau double pulse FFT algorithm | | NSF Base Grant |  |  | |  | |  | | 0.25 |  | 0.25 |
|  | **Pedek, Samantha Total** | |  | |  |  |  | |  | |  | | **0.25** | **0.25** | **0.50** |
| GR | **Goswami, Sreetama** | Detector Monitoring | Online Moon shadow analysis (monitoring) | | Inst. In-Kind |  |  | |  | |  | |  | 0.1 | 0.1 |  | |  | |  | | 0.1 | |
|  |  | Detector Monitoring | Monitoring shifts (starting 2019) | | Inst. In-Kind |  | 0.05 | |  | |  | |  |  |  |  | |  | |  | |  | |
|  | **Goswami, Sreetama Total** | | | | |  | | **0.05** | |  | |  |  | **0.1** | **0.15** |  |  | |  | |  | |
| GR | Ghadimi, Ava | Detector Monitoring | Monitoring shifts (starting 2019) | Inst. In-Kind | |  | 0.05 | |  | |  | |  |  | 0.05 |  |  | |  | |  | |
|  | **Ghadimi, Ava Total** | | | | |  | **0.05** | |  | |  | |  |  | **0.05** |  |  | |  | |  | |
| **UA Total** | | |  |  | | **0.25** | **0.20** | | **0.05** | | **0.05** | | **0.60** | **0.55** | **1.70** |

**Faculty:**

Dawn Williams – Institutional Lead, Analysis Coordinator

Marcos Santander – Multimessenger searches for neutrino sources

**Postdoc:**

Sandro Kopper – tau neutrino analysis, BSM double pulse analysis

**Ph.D. Students:**

Samantha Pedek – vetting monthly domcal runs

Tau neutrino FFT algorithm

Thesis /Analysis topics: TBD (still taking classes)

Sreetama Goswami – Monitoring with Moon shadow analysis (starting work, still taking classes now). Monitoring shifts (starting in 2019).

Ava Ghadimi: Correlated multiwavelength observations (in particular hard X-rays and gamma rays) with neutrino detections. Monitoring shifts (starting in 2019)

**UA General M&O (non-science) IceCube Responsibilities and Contributions:**

The Alabama Group’s major responsibilities and contributions towards maintenance and operations of the IceCube experiment include:

* Major responsibility for the following calibration group activities: flasher data collection and flasher analysis support, baseline and charge calibration
* Major responsibility for tau neutrino analysis

**Analysis:** The main analysis focus at the University of Alabama is searching for tau neutrinos and multimessenger searches for neutrino sources.

**Computing Resources**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **2018** | | **2019** | |
|  | **CPU Cores** | **GPU Cards** | **CPU Cores** | **GPU Cards** |
| **Pledged resources in the IceCube common cluster** |  | 6 (Tesla K20m) |  | 6 (Tesla K20m) |

**These GPUs are being used locally for flasher data ice model fitting and targeted muon simulation.**

**Upgrade**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Labor Cat.** | **Names** | **WBS L3** | **Tasks** | **Funds Source** | WBS 1.1 | WBS 1.2 | WBS 1.3 | WBS 1.4 | WBS 1.5 | WBS 1.6 | **Grand Total** |
| Project Office | Gen2 EHWD | Deep Ice Sensor Modules | Comms Power Timing | Calibration and Characterization | M&O Data Systems Integration |
| KE | Williams, Dawn | 1.5.2 Calibration Assemblies | LED Flasher Design and Testing | Inst. In-Kind |  |  |  |  | 0.05 |  | 0.05 |
|  |  | 1.5.4 Calibration Management | L2 Management of Calibration and Characterization | Upgrade Core |  |  |  |  | 0.25 |  | 0.25 |
|  | **Williams, Dawn Total** | |  |  |  |  |  |  | **0.30** |  | **0.30** |
| **UA Total** | | |  |  |  |  |  |  | **0.30** |  | **0.30** |