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

**Scope of Work**

**University of Delaware**

**Tom Gaisser**

**Ph.D Scientists** (Faculty Scientist/Post Doc Grads): **7** (4 3 2)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Labor Cat.** | **Names** | **WBS L3** | **Tasks** | **Funds Source** | **WBS 2.1** | **WBS 2.2** | **WBS 2.3** | **WBS 2.4** | **WBS 2.5** | **Grand Total** |
| Program Management | Detector Maintenance & Operations | Computing & Data Management | Triggering & Filtering | Data Quality, Reconstruction & Simulation Tools |
| KE | GAISSER, TOM | Administration | Executive Com.; Institutional lead | Inst. In-Kind | 0.20 |  |  |  |  | 0.20 |
|  | **GAISSER, TOM Total** | |  |  | **0.20** |  |  |  |  | **0.20** |
|  | SECKEL, DAVID | TFT Coordination | TFT Board | Inst. In-Kind |  |  |  | 0.10 |  | 0.10 |
|  |  | Administration | Pubcom member |  | 0.05 |  |  |  |  | 0.05 |
|  |  | Data Acquisition | DAQ Monitoring | Inst. In-Kind |  | 0.05 |  |  |  | 0.05 |
|  | **SECKEL, DAVID Total** | |  |  | **0.05** | **0.05** |  | **0.10** |  | **0.20** |
|  | STANEV, TODOR | Administration | Pubcom member | Inst. In-Kind | 0.10 |  |  |  |  | 0.10 |
|  | **STANEV, TODOR Total** | |  |  | **0.10** |  |  |  |  | **0.10** |
|  | EVENSON, PAUL | Administration | Managing solar and heliospheric  aspects of IceTop | Inst. In-Kind | 0.05 |  |  |  |  | 0.05 |
|  | **EVENSON, PAUL Total** | |  |  | **0.05** |  |  |  |  | **0.05** |
| SC | TILAV, SERAP | IceTop Operations | Coordinate IceTop Operations | NSF M&O Core |  | 0.75 |  |  |  | 0.75 |
|  |  | Data Quality | Data monitoring | Inst. In-Kind |  |  |  |  | 0.10 | 0.10 |
|  | **TILAV, SERAP Total** | |  |  |  | **0.75** |  |  | **0.10** | **0.85** |
| PO | GONZALEZ, JAVIER | Simulation Programs | Simulation Production Site Manager for UD | Base Grants |  |  |  |  | 0.25 | 0.25 |
|  |  | Reconstruction / Analysis Tools | Software maintenance: Event reco and corsika reader | Base Grants |  |  |  |  | 0.20 | 0.20 |
|  | **GONZALEZ, JAVIER Total** | |  |  |  |  |  |  | **0.45** | **0.45** |
|  | DEMBINSKI, HANS | Reconstruction / Analysis Tools | Code review strike team;  IceTop simulations | Base Grants |  |  |  |  | 0.30 | 0.30 |
|  |  | Education & Outreach | MasterClass lead | Base Grants | 0.10 |  |  |  |  | 0.10 |
|  | **DEMBINSKI, HANS Total** | |  |  | **0.10** |  |  |  | **0.30** | **0.40** |
| GR | PANDYA, HERSHAL | Simulation Programs | sim-services | Base Grants |  |  |  |  | 0.10 | 0.10 |
|  | KOIRALA, RAMESH | TFT Coordination | Two station trigger | Base Grants |  |  |  | 0.10 |  | 0.10 |
|  | **UD GR Total** | |  |  |  |  |  | **0.10** | **0.10** | **0.20** |
| **UD Total** | |  |  |  | **0.50** | **0.80** |  | **0.20** | **0.95** | **2.45** |

**Faculty:**

Tom Gaisser – Executive Committee, cosmic rays and neutrinos

Paul Evenson – Managing Solar and heliospheric aspects of IceTop

David Seckel – TFT board / DAQ monitoring, Scintillators, Gen2 R&D

Todor Stanev – Atmospheric muons/neutrinos; Pubcom member

**Scientist:**

Serap Tilav - IceTop data quality; IceTop operations; scintillators

Analysis: Primary spectrum and composition

**Post-docs:**

Javier Gonzalez – Air shower reconstruction and simulation code. In charge of IceTop simulations across the Collaboration and reporting to Simulation Coordination Panel; IceTop simulation code maintenance; online IceTop data filtering code maintenance. Gen2 R&D

Analysis topics: Cosmic-ray physics with surface muons

Hans Dembinski – Event reconstruction and simulations; Event viewer software, member of IceCube software strike team

Analysis: Cosmic-ray physics with surface muons

**Ph.D. Students:**

Ramesh Koirala – Data monitoring shift, IceTop two-station trigger and filter verification.

Analysis: Spectrum in the knee region with small showers in IceTop

Hershal Pandya – Data monitoring shift; CORSIKA reader maintenance, simulation verification.

Analysis: Gamma ray and cosmic-ray composition with IceCube; muon production depth

**Computing cluster:**

UD is part of the IceCube system of distributed computing. The IceCube cluster at UD is used primarily for simulation (CORSIKA) production of air showers and development of simulations of coincident events seen by both the surface and in-ice components of IceCube. In 2008 the Bartol Research Institute of the University of Delaware provided funds for a substantial upgrade of our computer cluster, and the cluster has been upgraded from time-to-time since then. After the current upgrade, the IceCube portion of the Bartol-UD cluster now consists of 272 computing cores (28 nodes), 200 with 2GB/core, 40 with 3GB/core and 32 with 4GB/core. There is a total of 90TB of disk space divided across 3 disk servers. The UD share of the cost if upgrades amounted to about $40,000 in total.