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

**Scope of Work**

**University of Rochester**

**Segev BenZvi**

**Ph.D Scientists** (Faculty Scientist/Post Doc Grads): **1** (1 0 2)

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| **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 | BenZvi,  Segev | Supernova System | Supernova DAQ |  | 0.05 |  |  |  |  | 0.05 |
|  |  | Administration | Supernova Working Group Co-convener  ICB member  PubComm Chair | 0.05  0.05  0.10 |  |  |  |  |  | 0.20 |
|  |  | Education and Outreach | IceCube MasterClass | 0.05 |  |  |  |  |  | 0.05 |
|  | **Segev BenZvi Total** | |  | **0.25** | **0.05** |  |  |  |  | **0.30** |
| GR | Griswold,  Spencer | Supernova System | Supernova DAQ |  | 0.10 |  |  |  |  | 0.10 |
| Simulation Software | Supernova and transient simulations |  |  |  |  | 0.10 |  | 0.10 |
|  | Detector Monitoring | Monitoring shifts |  | 0.05 |  |  |  |  | 0.05 |
|  | **Spencer Griswold Total** | |  |  | **0.15** |  |  | **0.10** |  | **0.25** |
| GR | Cross,  Robert | Supernova System | Supernova DAQ |  | 0.15 |  |  |  |  | 0.15 |
|  |  | Detector Monitoring | Monitoring shifts |  | 0.05 |  |  |  |  | 0.05 |
|  | **Robert Cross Total** | |  |  | **0.20** |  |  |  |  | **0.20** |
| **Rochester Total** | | |  | **0.25** | **0.40** |  |  | **0.10** |  | **0.75** |

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| **Labor Cat.** | **Names** | **WBS Level 3** | **Tasks** | **WBS 1.1** | **WBS 1.2** | **WBS 1.3** | **WBS 1.4** | **WBS 1.5** | **WBS 1.6** | **Grand Total** |
| Project Office | Gen2 Enhanced  Hot Water Drill | Deep Ice  Sensor Modules | Comms, Power,  and Timing (CPT) | Characterization  and Calibration | M&O Data  Systems Integ. |
| GR | Griswold,  Spencer | D-Egg camera system | Camera firmware development |  |  | 0.10 |  |  |  | 0.10 |
|  | **Spencer Griswold Total** | |  |  |  |  |  |  |  | **0.10** |
| **Institution Name Total** | | |  |  |  | **0.10** |  |  |  | **0.10** |

**Faculty:**

Segev BenZvi

M&O

* Development of Supernova DAQ and simulation tools
* Co-convener of Supernova Working Group
* Member of ICB
* PubComm Chair
* Education and Outreach (IceCube MasterClass)

**Graduate Students:**

Robert Cross, Spencer Griswold

M&O

* SNDAQ development and release management
* Development of supernova and transient simulation software (ASTERIA)
* Winterover training and primary winterover contact for SNDAQ
* Data Monitoring Shifter
* SNEWS shifts

Upgrade

* Firmware development for the Arduchip/ArduCAM and IMX225 sensor for the D-Egg camera

Analysis

* Development of fast algorithms for sub-threshold transient searches
* Calculation of upper limits of Galactic supernova rate since the start of IceCube operations