

## Overview / Objectives

- Present the WBS for IceCube M&O.
- Give various views of labor resources in M&O.
- Show task-level breakdown with names and funding source.
- Explain bi-annual process of updating plan
- Describe coordination committee that plans and allocates resources.





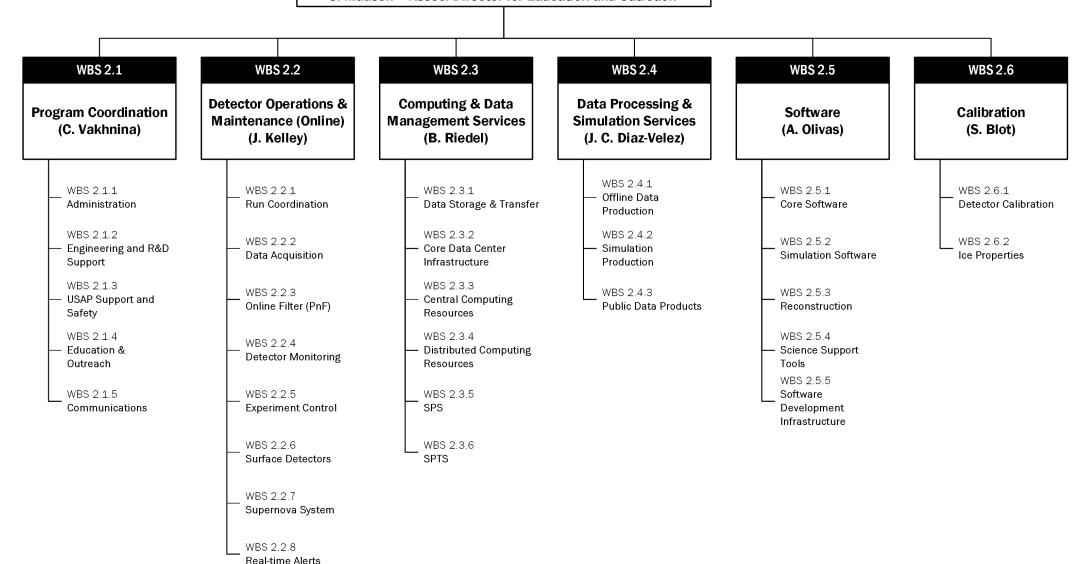
### **IceCube Neutrino Observatory**

F. Halzen - Pl

K. Hanson – Director of Operations

A. Karle – Assoc Director for Science and Instrumentation

J. Madsen - Assoc. Director for Education and Outreach







## WBS Dictionary

IceCube Management and Operations

WBS Dictionary

Detailed IceCube M&O MoU Staffing Matrix by WBS and tasks

IceCube M&O Staffing Matrix

**Previous versions** 





WBS L2	NSF M&O Core	NSF Base Grants	U.S. Institutional In-Kind	Europe & Asia Pacific In-Kind	Grand Total
2.1 Program Management	5.08	0.40	4.26	6.40	16.14
2.2 Detector Operations & Maintenance	13.48	1.98	3.75	9.05	28.26
2.3 Computing And Data Management Services	7.85	0.05	1.38	2.00	11.28
2.4 Data Processing & Simulation Services	3.50	0.95	1.05	3.25	8.75
2.5 Software	4.05	1.90	5.93	11.15	23.03
2.6 Calibration	1.05	1.30	1.75	3.90	8.00
Grand Total	35.01	6.58	18.12	35.75	95.46

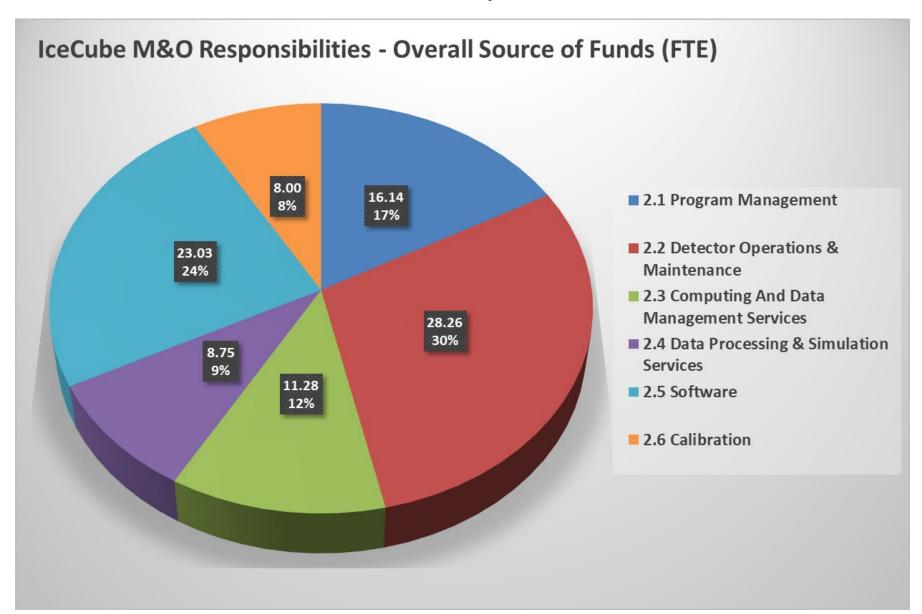


IceCube M&O MoU's are posted at:

DocuShare: https://docushare.icecube.wisc.edu/dsweb/View/Collection-6627



## FY2019 IceCube M&O Responsibilities







### **WBS 2.1 Program Management**

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
2.1 Program  Management	2.1.1 Administration	2.7 FTE	0.2 FTE	2.4 FTE	4.3 FTE	9.6 FTE
	2.1.2 Engineering and R&D Support	1.1 FTE	0.3 FTE	0.8 FTE	0.9 FTE	3.1 FTE
	2.1.4 Education & Outreach	0.8 FTE		1.1 FTE	1.2 FTE	3.1 FTE
	2.1.3 Usap Support & Safety	0.2 FTE				0.2 FTE
	2.1.5 Communications	0.3 FTE				0.3 FTE
2.1 Program Management Tot	:al	5.1 FTE	0.4 FTE	4.3 FTE	6.4 FTE	16.1 FTE





## **WBS 2.2 Detector Operations and Maintenance**

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
2.2 Detector Operations & Maintenance	2.2 Detector Operations & Maintenance	1.6 FTE			0.1 FTE	1.7 FTE
	2.2.1 Run Coordination	3.6 FTE				3.6 FTE
	2.2.2 Data Acquisition	3.2 FTE		0.5 FTE		3.7 FTE
	2.2.3 Online Filter (Pnf)	0.5 FTE	0.9 FTE	0.9 FTE	5.1 FTE	7.3 FTE
	2.2.4 Detector Monitoring	2.1 FTE	0.6 FTE	0.9 FTE	2.2 FTE	5.8 FTE
	2.2.5 Experiment Control	0.8 FTE				0.8 FTE
	2.2.6 Surface Detector Operations	1.6 FTE		0.8 FTE	1.1 FTE	3.5 FTE
	2.2.7 Supernova System			0.5 FTE		0.5 FTE
	2.2.8 Real-Time Alerts	0.3 FTE	0.5 FTE	0.3 FTE	0.6 FTE	1.6 FTE
2.2 Detector Operations &	Maintenance Total	13.5 FTE	2.0 FTE	3.8 FTE	9.1 FTE	28.3 FTE





## **WBS 2.3 Computing & Data Management Services**

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
2.3 Computing And Data  ■ Management Services	2.3.0 Computing And Data Management	0.9 FTE		0.1 FTE		1.0 FTE
	2.3.1 Data Storage & Transfer	2.2 FTE				2.2 FTE
	2.3.2 Core Data Center Infrastructure	1.3 FTE				1.3 FTE
	2.3.3 Central Computing Resources	0.6 FTE		1.3 FTE	1.4 FTE	3.3 FTE
	2.3.4 Distributed Computing Resources	1.6 FTE	0.1 FTE		0.6 FTE	2.3 FTE
	2.3.5 Sps Operations	0.7 FTE				0.7 FTE
	2.3.6 Spts Operations	0.6 FTE				0.6 FTE
2.3 Computing And Data Ma	nagement Services Total	7.9 FTE	0.1 FTE	1.4 FTE	2.0 FTE	11.3 FTE







## **WBS 2.4 Data Processing & Simulation Services**

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
2.4 Data Processing & ■ Simulation Services	2.4.1 Offline Data Production	0.2 FTE	0.5 FTE	0.5 FTE	1.7 FTE	2.8 FTE
	2.4.2 Simulation Production	3.0 FTE	0.5 FTE	0.6 FTE	1.6 FTE	5.7 FTE
	2.4.3 Public Date Products	0.3 FTE				0.3 FTE
2.4 Data Processing & Simulation	ion Services Total	3.5 FTE	1.0 FTE	1.1 FTE	3.3 FTE	8.8 FTE





### **WBS 2.5 Software**

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
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<b>■ 2.5 Software</b>	2.5.1 Core Software	1.7 FTE		1.1 FTE	1.1 FTE	3.9 FTE
	2.5.2 Simulation Software	1.1 FTE	0.5 FTE	1.1 FTE	2.4 FTE	5.0 FTE
	2.5.3 Reconstruction	0.6 FTE	1.5 FTE	3.4 FTE	7.3 FTE	12.8 FTE
	2.5.4 Science Support Tools			0.3 FTE		0.3 FTE
	2.5.5 Software Development Infrastructure	0.8 FTE				0.8 FTE
	2.6.2 Ice Properties				0.6 FTE	0.6 FTE
2.5 Software Total		4.1 FTE	1.9 FTE	5.9 FTE	11.4 FTE	23.3 FTE





### **WBS 2.6 Calibration**

WBS L2	WBS L3	NSF M&O Core	Base Grants	US In-Kind	Non-US In-kind	Grand Total
■2.6 Calibration	2.5.3 Reconstruction				0.4 FTE	0.4 FTE
	2.6.1 Detector Calibration	1.1 FTE	0.6 FTE	0.9 FTE	2.9 FTE	5.4 FTE
	2.6.2 Ice Properties		0.8 FTE	0.9 FTE	0.4 FTE	2.1 FTE
2.6 Calibration Total		1.1 FTE	1.3 FTE	1.8 FTE	3.7 FTE	7.8 FTE





## FY2019 M&O Responsibilities

MoU v.25.1 January 2019	U.S. Head Count	U.S. FTE	Non-U.S. Head Count	Non-U.S. FTE
Key Personnel	34	9.95	33	9.10
Scientists	29	8.38	17	1.75
Post Docs	29	5.55	17	4.05
Grad Students *	40	11.18	62	19.86
Other Professionals **	28	24.65	1	1.00

- Grad Students' Full Time Employment equals to 0.50 FTE
- Other professionals include engineers, data science, software engineers, winterovers, program mngt





## In-kind Resource Management

- Subaward management described in "M&O Financial ..."
- In-kind
  - 2x per year, MoU SoW updates solicited
  - ICC chair, Software Coordinator, Computing Coordinator work with institutional PIs to match labor with collaboration needs:
    - Basic requirement for detector monitoring shifts
    - Software simulation / reconstruction algorithms, general analysis tools, strike team
    - Calibration
    - Occasionally detector maintenance
  - And distributed computing resources (B. Riedel talk)
  - Reported at collaboration meetings

	UW	Non-UW
CPU	63%	37%
GPU	57%	43%





#### University of Wisconsin – Madison

R. Blank, Chancellor

N. Drinkwater, Interim Vice Chancellor for Research and Graduate Education (VCRGE)

### **National Science Foundation**

#### International Oversight and Finance Group

**Foreign Funding Agencies** 

#### Wisconsin IceCube **Particle Astrophysics** Center (WIPAC)

- K. Hanson, Executive Director
- K. Chorlton, HR, Bsnss & Admin
- S. Bravo Gallart, Communications
- D. Comerford, Busnss IT Support

#### IceCube Neutrino Observatory

F. Halzen, Principal Investigator K. Hanson, Director of Operations

A. Karle, Associate Director for Science & Instrumentation

J. Madsen, Associate Director for **Education & Outreach** 

#### Science Advisory Committee

B. Barish, Caltech, Chair

**Software & Computing Advisory Panel** 

M. Delfino, PIC, Chair Education & Outreach **Advisory Panel** 

#### **Collaboration Board**

Spokesperson & Executive Committee Chair, D. Grant (MSU)

Publication Com. Chair, M.Ackermann (DESY) Speakers Com. Chair, J. Kiryluk (SUNY) Future Upgrades Coordinators,

T. DeYoung (MSU) & M. Kowalski (DESY)

#### **Maintenance & Operations**

Detector M&O -J. Kellev. UW Manager

M. Kauer (UW) Run Coordination, DAQ, D. Glowacki (UW)

Supernova DAQ, S. BenZvi (Rochester) Processing & Filtering, E. Blaufuss (Maryland)

S. Tilav (Delaware) IceTop Operations, IceCube Live. M. Frère (UW)

S. Blot (DESY) / K. Mase (Chiba) Calibration -

Data Processing & Simulation Serv – J.C. Diaz-Velez (UW)

Offline Data Production, R. Snihur (UW) Simulation Production, K. Meagher (UW)

Program Coordination - C. Vakhnina (UW)

**Collaboration Simulation Production Centers:** 

Belgium: IIHE-Brussels; Canada: Alberta; Japan: Chiba Germany: DESY, Aachen, Dortmund, Wuppertal, Mainz US: UW (NPX, GZK, CHTC, OSG), UMD, UDEL, LBNL/NERSC, PSU, Alabama

South Pole Logistics, R&D Support – J. Haugen (UW)

Quality & Safety - M. Zernick (UW)

Computing & Data Management - B. Riedel,

**UW Manager** 

S. Klein (LBNL)

Data Storage Systems & Cybersecurity, S. Barnet (UW

South Pole System & Test System, R. Auer (UW)

Data Transfer and Archive P. Meade (UW) Data Management, J. Bellinger (UW)

Distributed Computing, V. Brik (UW)

Data Processing, A. Sheperd (UW)

Networking and Facilities, S. Barnet (UW) Production Software. D. Schultz (UW)

K. Leffhalm (DESY) Data Archive at DESY, Data Archive at LBNL,

**Software** – A. Olivas (Maryland)

IceTray Framework/Development, D. LaDieu (Maryland)

Simulation Software, A. Olivas (Maryland) Offline Processing Software, C. Kopper (MSU)

#### Coordination Committee Chair,

P. Desiati (UW)

Resource Coordination.

C. Vakhnina (UW)

TFT Coordination.

A. Hallgren (Uppsala)

Real-Time Oversight Committee

E. Blaufuss (Maryland)

#### **Technical & Science Working Groups**

Analysis Coordinator -D. Williams (Alabama)

Analysis Working Groups:

iffuse

Neutrino Sources

Beyond Standard Model

Osmic Rays

scillation Supernova

echnical Working Groups:

Real time Calibration

Systematics & Reconstrctn **Systematics Coordinator** 

## Bridge Between Collaboration and M&O

- ICC manages scientific needs of collaboration:
  - High priority tasks assigned to in-kind labor from MoUs,
  - Software strike team
  - Coordination of passX
  - New re-org of WG technical leads to serve as PoC on ICC
- Coordinates in-kind resource pledges:
  - Labor → high priority tasks or software strike team
  - Distributed computing resources
- Maps needs to resources.





## Composition and Execution

- Membership evolution of L2 Board in MREFC
  - ICC Chair P. Desiati
  - M&O Resource Coordinator C. Vakhnina
  - Each Level 2 coordinator
  - TFT Chair A. Hallgren
  - ROC Chair E. Blaufuss
  - Analysis Coordinator D. Williams
  - Science Working Group Technical Leads
- Monthly teleconference Wed 9.00 am
- Bi-weekly teleconference Tue 10.30 am open for general technical discussion leading up to ICC.





# Summary

- IceCube M&O Program receives significant contributions of in-kind labor from the IceCube Collaboration, heavily in WBS 2.5 Software and 2.6 Calibration
- Also, significant in-kind contributions of Distributed Computing
- The Collaboration updates the Scope of Work and M&O Responsibilities in the MoU's twice a year.
- All resources are coordinated by IceCube Coordination Committee (ICC)