



IceCube Resource Coordination

Paolo Desiati
desiati@wipac.wisc.edu

Software & Computing Advisory Panel (SCAP)
January 27-28, 2021

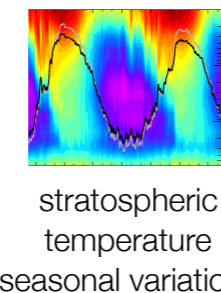
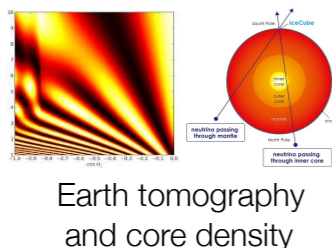
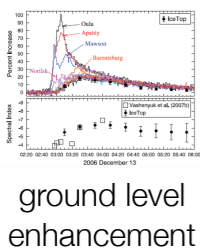
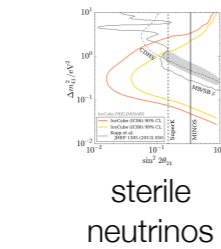
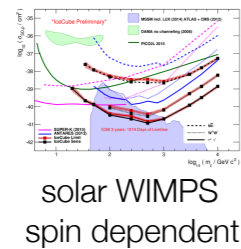
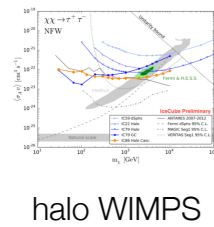
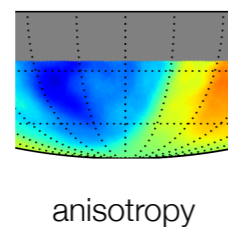
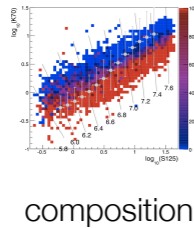
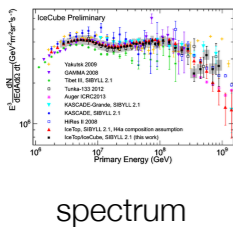
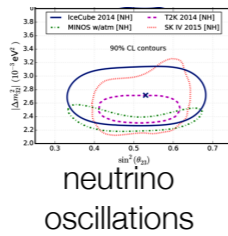
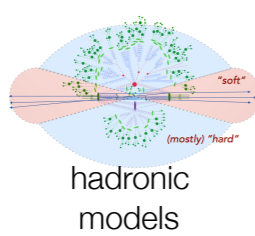
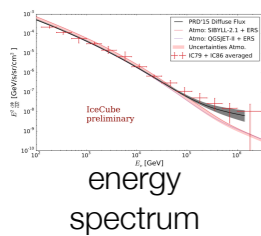
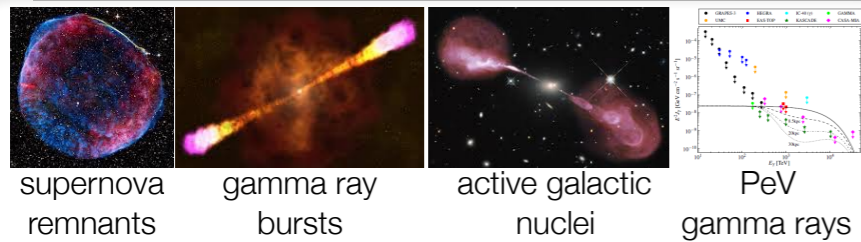


SCAP 2018

recommendations

- 2018-1** IceCube high level management is strongly urged to **review the organizational structure of the M&O software and computing domain**. In particular, management is invited to name a manager dedicated to maintain and execute an overall, global vision of this area (a “Global Computing Coordinator” reporting to the IceCube Neutrino Observatory Director of Operations.)
- 2018-2** IceCube high level management is strongly urged to **review the functions of the ICC committee pertaining to the coordination between computing and analysis**. In particular, management is invited to define a small, dedicated coordination group, co-chaired by the Global Computing Coordinator and the Analysis Coordinator, which would be responsible for preparing issues and recommend actions and priorities, to be brought for review and approval by the ICC.
- 2018-3** IceCube high level management is strongly urged to **empower the Global Computing Coordinator with the ability to dialog with responsables of collaborating institutions in order to harvest additional resources for the software and computing domain**. This should be done through the definition of specific work items to be accomplished within well-defined periods of time, in a spirit similar – but not limited to – the way the Software area has been recently refocused.

science goals



energy range - 10 GeV - 1 EeV

particle types - neutrinos, muons, cosmic rays, γ rays

search types - astrophysical sources, particle physics, exotic

analyses - through-going, cascades, starting, DM, heliophysics

simulation production & data processing
computing infrastructure
software releases

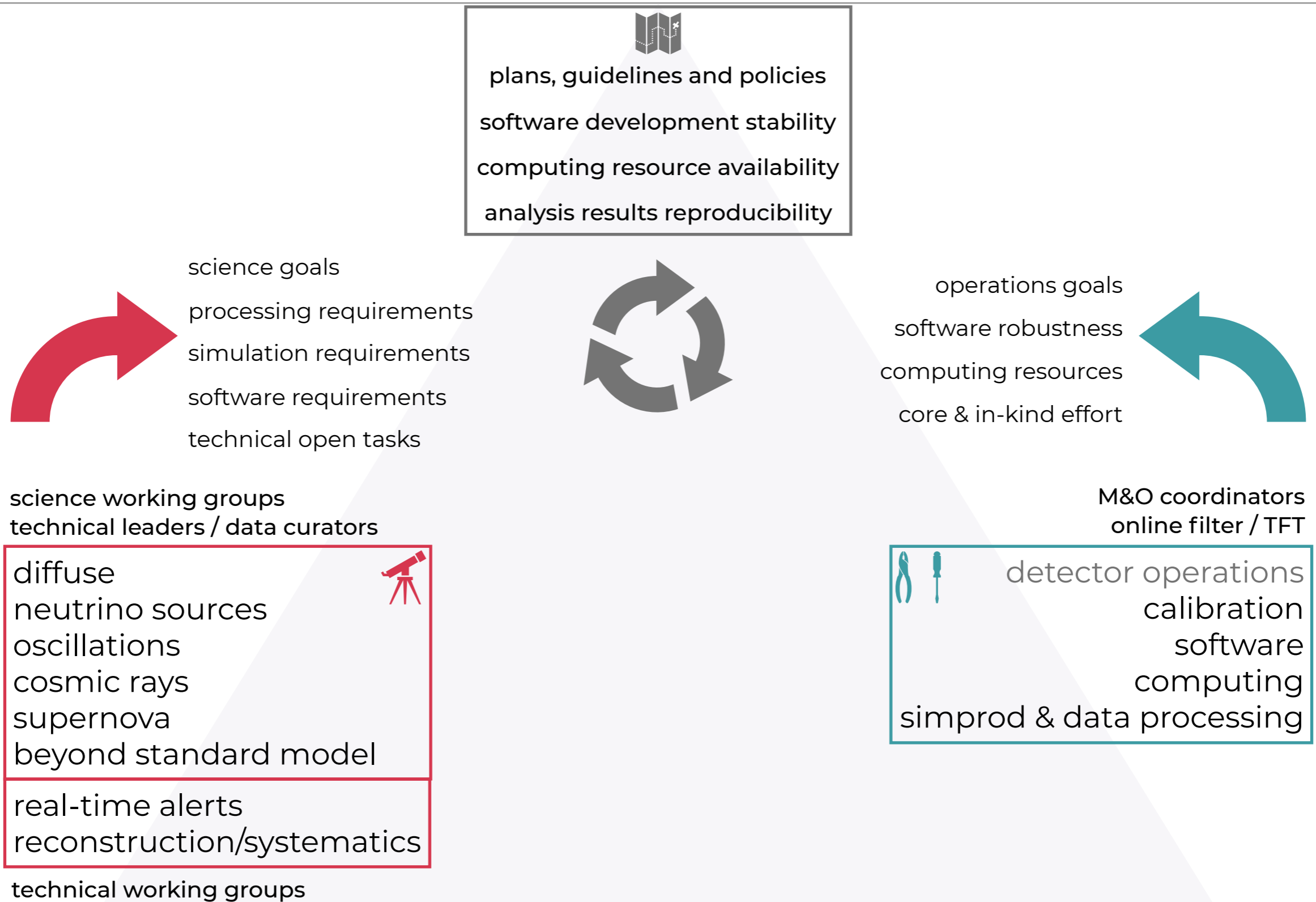
understanding of detection medium
and of DOM absolute/relative sensitivity

internal data repository

calibration systematics

reproducibility

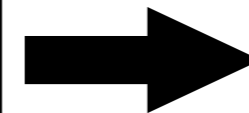
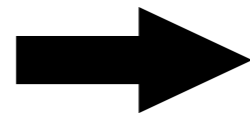
bottom-up approach



bottom-up approach

input from the ICC

WGs requirements
M&O infrastructure
available workforce



monitor implementation
track milestones
learning new skills



science working groups
technical leaders / data curators



technical working groups

M&O coordinators
online filter / TFT



WG technical leads

technical tasks in the science WGs

simulation production plan - data processing (L3+)

analysis software strategies - reconstruction algorithms

open tasks

data curator

in charge of coordinating the process leading to the completion of the **internal data repository** for WG analyses

Role/Area	Tech Lead	Affiliation	Data Curator	Affiliation	Tech Material
Neutrino Sources WG	Michael Larson	UMD	Steve Sclafani	Drexel University	Nu Sources Datasets
	Hans Niederhausen	TUM			
Oscillations WG	Philipp Eller	PSU			
Diffuse WG	Maximilian Meier	Uni. Dortmund			Diffuse Technical
Cosmic Rays WG	Katherine Rawlins	U. Alaska			
Beyond Standard Model WG	Carlos Argüelles	Harvard University			
Supernova WG	Segev BenZvi	University of Rochester			

M&O coordination and WG technical leads

M&O coordinators match resources needed to achieve the science goals

provide feedback and guidelines for consolidation

[simulation production plan](#) (Juan Carlos Díaz Vélez)

request, refinement, priority, computing allocation

data processing (Rob Snihur)

L1 & L2 (as established and coordinated by the TFT)

L3+ from WG Tech Leads

M&O coordination and WG technical leads (cont.)

software (Alex Olivas)

seasonal *combo* release

development repository - plan and priorities

computing (Benedikt Riedel & IT team)

IceCube distributed resources (SoW-pledged)

external resources to satisfy growing demand

(GPU, Machine Learning)

ICC coordination in-kind task

- works with M&O coordinators to **identify service tasks**
 - introductory, maintenance (continuous) and special tasks (time-framed)
- works with WG Tech Leads to **identify open tasks**
 - aimed to support data analyses (time-framed)
- works with institutional leaders to establish **SoW pledges** to support M&O
 - collaborators to pledge on tasks & computing resources that are needed
 - some important task too complex to assign students / postdocs
- [IceCube Impact Award](#) - recognition to students / postdocs for their work

ICC coordination in-kind task

Ric Evans (UW-Madison)

- o rolling out *new SoW procedure*
- o web-based MoU dashboard
- o IceCube M&O / Upgrade
- o assign service / open tasks
- o provides framework to track milestones

MoU DASHBOARD – IceCube M&O

UW (UW-Madison)

PHDS/AUTHORS FACULTY

HEADCOUNTS ARE REQUIRED

UW'S SOW TABLE

+ ADD NEW DATA Filter by Labor Category

	WBS L2	WBS L3	INSTITUTION
x	2.1 Program Coordination	2.1.1 Administration	UW
x	2.1 Program Coordination	2.1.1 Administration	UW
x	2.1 Program Coordination	2.1.1 Administration	UW
x	2.1 Program Coordination	2.1.1 Administration	UW
x	2.1 Program Coordination	2.1.1 Administration	UW
x	2.1 Program Coordination	2.1.1 Administration	UW
x	2.1 Program Coordination	2.1.1 Administration	UW
x	2.1 Program Coordination	2.1.1 Administration	UW
x	2.1 Program Coordination	2.1.1 Administration	UW
x	2.1 Program Coordination	2.1.2 Engineering and R&D Support	UW
x	2.1 Program Coordination	2.1.2 Engineering and R&D Support	UW
x	2.1 Program Coordination	2.1.2 Engineering and R&D Support	UW
x	2.1 Program Coordination	2.1.2 Engineering and R&D Support	UW
x	2.1 Program Coordination	2.1.2 Engineering and R&D Support	UW
x	2.1 Program Coordination	2.1.2 Engineering and R&D Support	UW
x	2.1 Program Coordination	2.1.3 USAP Support & Safety	UW
x	2.1 Program Coordination	2.1.3 USAP Support & Safety	UW
x	2.1 Program Coordination	2.1.4 Education & Outreach	UW

+ ADD NEW DATA SHOW TOTALS SHOW HIDDEN COLUMNS SHOW ALL ROWS

TABLE LAST REFRESHED



internal data repository

analysis reproducibility

https://wiki.icecube.wisc.edu/index.php/Internal_Data_Repository

final event datasets
used in the analysis

analysis software
used to produce the final sample from Level 2/Level 3 datasets
common software

analysis workflow
and instructions to reproduce established list of final results



conclusions

- o IceCube has established a **bottom-up** approach
 - o analysis WGs establish science goals and make requests
 - o M&O coordinators provide professional effort and infrastructure
 - o collaborators provide in-kind effort to be pledged as needed
 - o M&O coordinators set guidelines and recommendations to WGs
 - o the ICC establishes operation plans
 - o available computing resources are the upper constraint

additional material

IceCube Coordination Committee

The ICC is in charge of coordinating operational support (calibration, software, data processing & simulation production, computing) to aid the IceCube collaboration reach its science goals

allocate computing resources and identifying the needed effort

meets every month on Wednesdays at 9:00am US Central Time & at collaboration meetings

ICC calls material [available](#)

bi-weekly calls with collaboration on operations and science topics: material [available](#)

IceCube Coordination Committee composition

M&O - Detector Operations	John Kelley	UW-Madison
M&O - Calibration	Martin Rongen Allan Hallgren	RWTH Aachen, Germany Uni Uppsala, Sweden
M&O - Computing	Benedikt Riedel	UW-Madison
M&O - Software	Alex Olivas	Uni Maryland
M&O - Simulation Production & Data Processing	Juan Carlos Díaz Vélez	UW-Madison
WG Tech Lead - Neutrino Sources	Michael Larson Hand Niederhausen Steve Sclafani (data curator)	Uni Maryland Tech. Uni Munich, Germany Drexel Uni
WG Tech Lead - Oscillations	Philipp Eller	Penn State Uni
WG Tech Lead - Diffuse	Maximilian Meier	Tech Uni Dortmund, Germany
WG Tech Lead - Cosmic Rays	Katherine Rawlins	Uni Alaska, Anchorage
WG Tech Lead - Beyond Standard Model	Carlos Argüelles	Harvard Uni
WG Tech Lead - Supernova	Segev BenZvi	Uni Rochester, NY

IceCube Coordination Committee composition

TFT Board	Naoko Kurahashi Roger Moore	Uni Drexel Uni Alberta, Canada
Real-Time Alerts Upgrade - Syst. Integ. L2	Erik Blaufuss	Uni Maryland
Upgrade - Calibration L2	Dawn Williams	Uni Alabama
Upgrade - Simulation L3	Tom Stuttard	NBI, Denmark
WIPAC Director	Kael Hanson	UW-Madison
Assoc. Director for Science & Instrumentation	Albrecht Karle	UW-Madison
Resource Coordinator	Catherine Vakhnina	UW-Madison
IceCube Collaboration PI	Francis Halzen	UW-Madison
IceCube Spokesperson	Darren Grant	Michigan State Uni
Analysis Coordinator	Ignacio Taboada Anna Franckoviak	Georgia Tech DESY, Germany
ICC Chair	Paolo Desiati	UW-Madison