



Stratospheric Observatory
for Infrared Astronomy

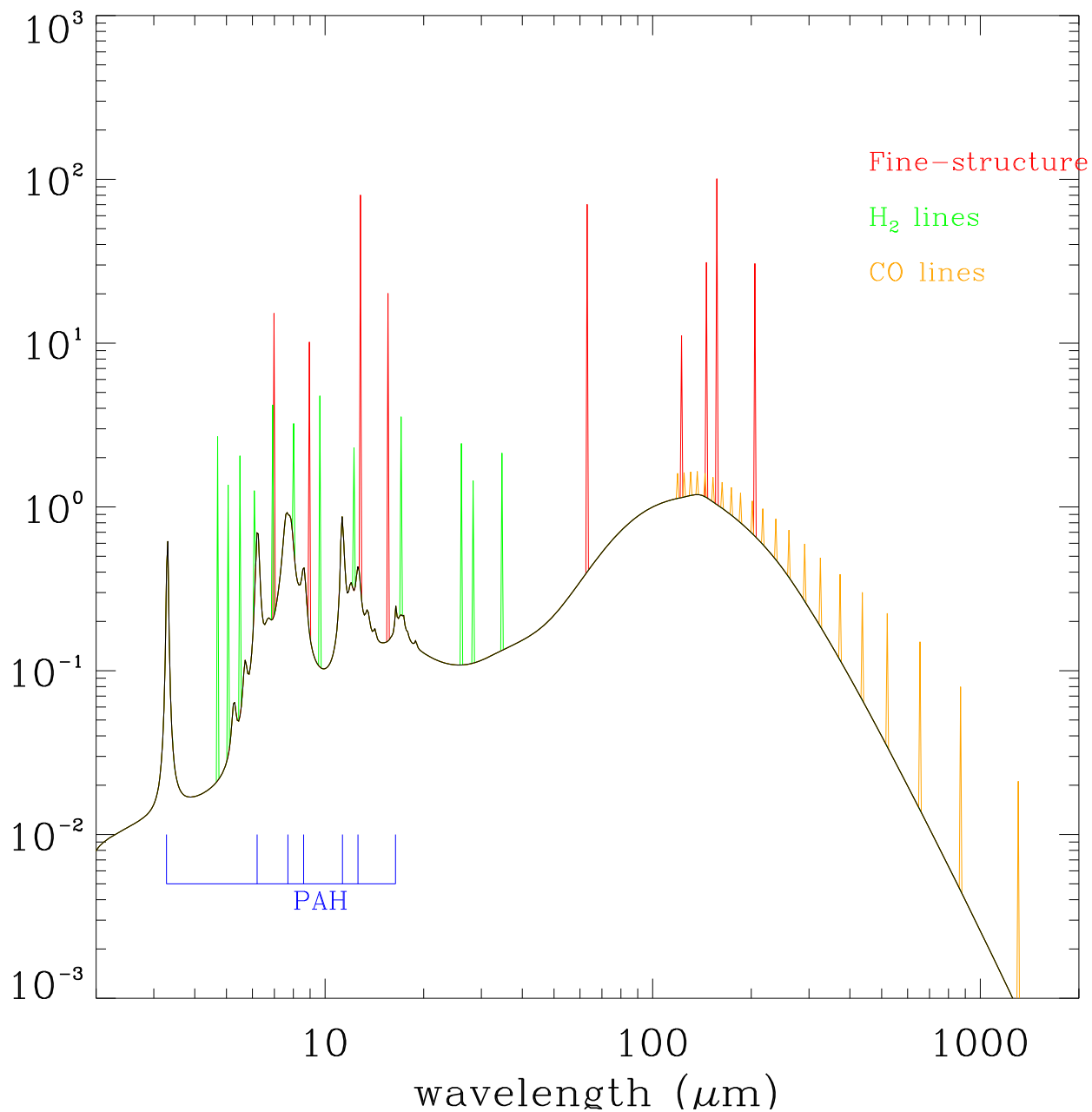
SENIOR REVIEW UPDATE



SOFIA Users Group

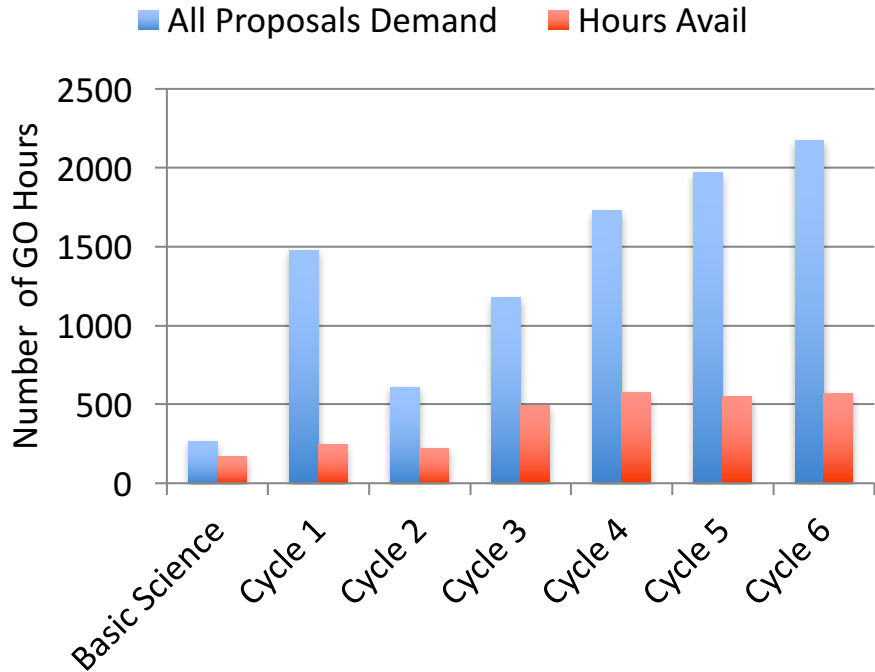
Kimberly Ennico Smith
SOFIA Project Scientist

November 16, 2017

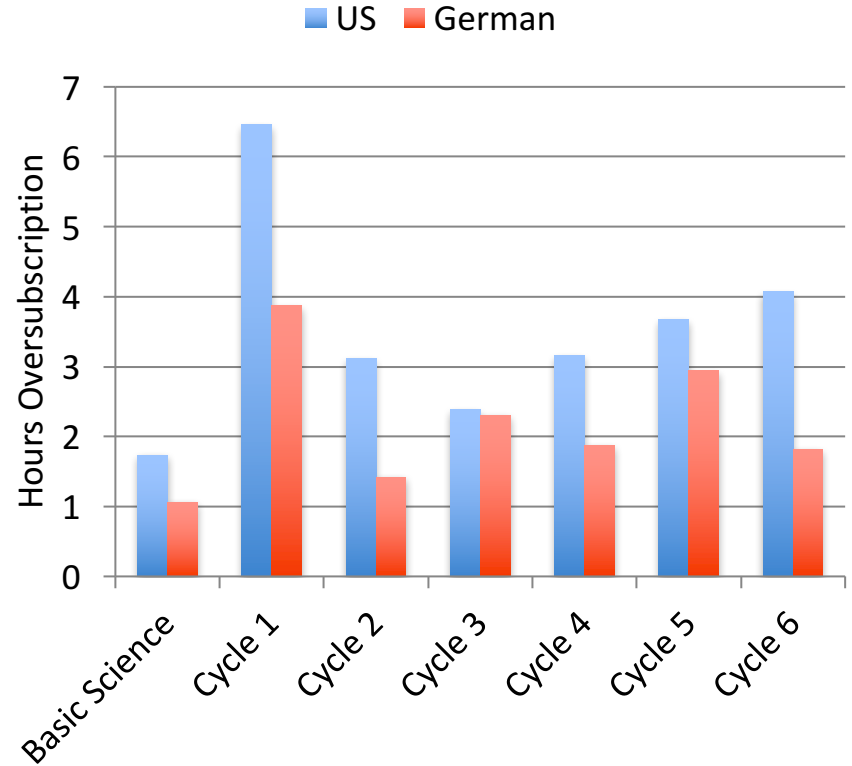


Oversubscription Rate – as of Cycle 6

Hours Requested / Hours Available

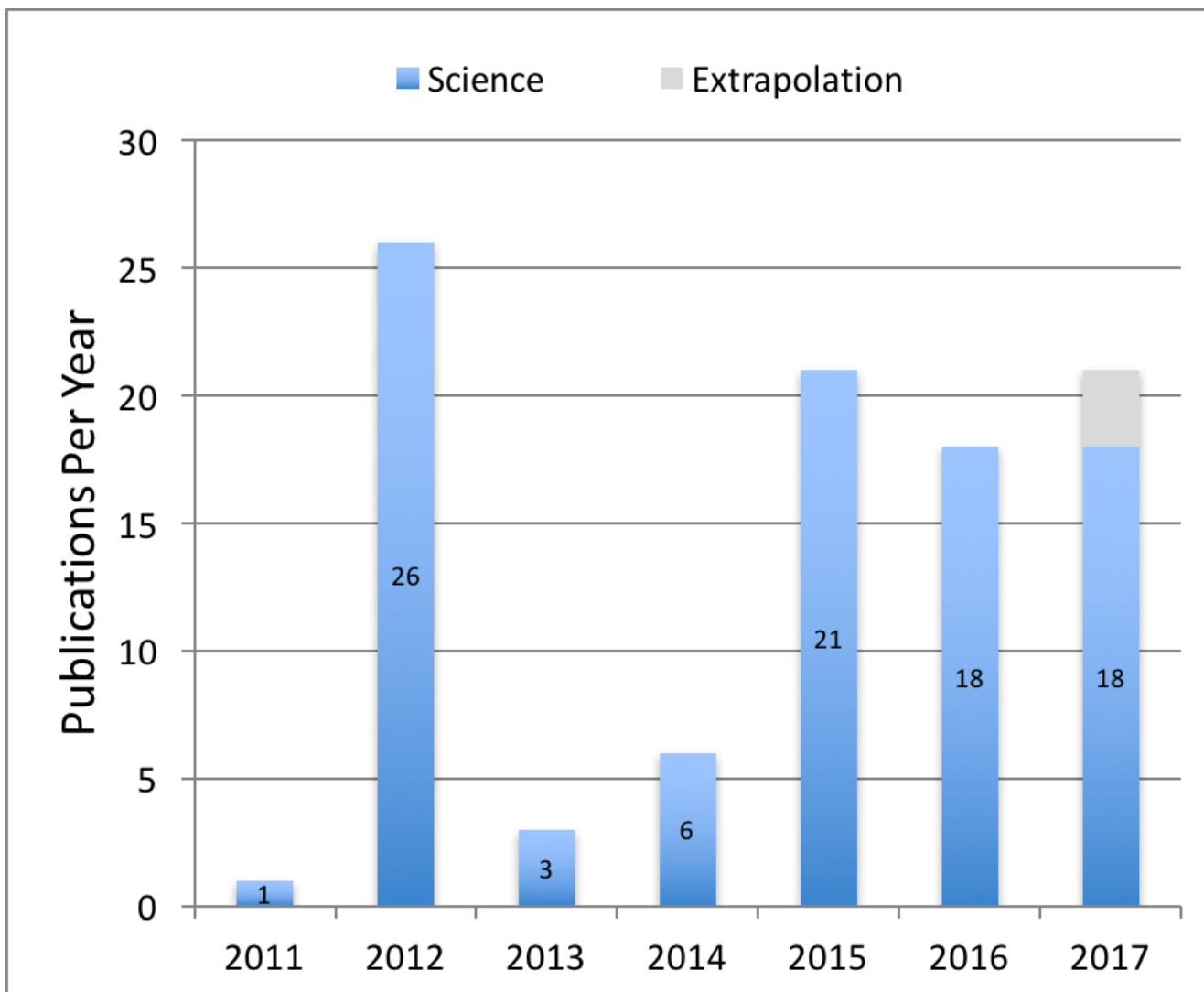


- Remains healthy



Publication Rate – as of October 30, 2017

Publications are not appearing as expected



- We had anticipated we would reach 30 publications this year with Cycle 3 results, based on an increased rate in 1st quarter of 2017. **We will not reach that expectation.**
- As a result, significantly more publications in 2018 than in 2017 are even more critical.

It is one year to Senior Review

Your scientific interest hangs on SOFIA

- Due dates for clustering papers in a ApJ/A&A journal
- Letters can be faster to publish
- Need pipelines not to delay
- Force faster pipeline processing for high priority Cycle 5/6 data

The Landscape, The Challenge, The Opportunity

- One of the costs of saving SOFIA from cancellation in the US in 2014 was to agree to put it in Senior Review after a 5-year prime mission.
- 5-years is what Great Observatories like Hubble and Chandra have as a prime mission, so this is reasonable and not a snub to SOFIA.
- Yes that was not part of the original deal, but neither was SOFIA being cancelled by the US politicians.
- NASA is building new SOFIA instruments as fast as we can and are fully committed to a long, productive science lifetime for SOFIA.
- **Convincing the US science community that SOFIA is worth the cost of continuing is a challenge to the joint US-German SOFIA community.**
- **SOFIA needs to produce something it has not yet produced prior to the Senior Review.**

Senior Review 2019

What we know and what we do not know

- Anticipate a Call For Proposal in late summer 2018 with a 30 page plus budget proposal due in mid/late January 2019
- Senior Review Proposals on 3 year cadence
 - We submit a 3 year + 3 year look ahead plan and budget
- We do not know yet if the oral presentation in Feb/March 2019 will be panel or stand-alone
- We do know we need to showcase new results at the oral that are not in the written proposal
 - **Must exercise now speed up access/analysis of data from Business as Usual**

What steps have we taken?

- Hired a Capture Manager October 2017
- Assembled a core team
 - Kick Off Oct 24-26
 - Telecons 2x weekly
 - Monthly face-to-face
- Identified key science areas of exploration dominating the 2019-2025 time frame
 - Presented them to the SIS Nov 14-15
 - Assembling names and guidance to “context experts” to provide 5-6 pages, reworking the schedule to move these earlier (end of January)
- Established list of tasks and deliverables
 - Examples: JWST/SOFIA science actuals, Re-evaluation of instrument complement in extended mission through SIAG process, Cost-reduction operations
- Created a baseline schedule

Core Team



Roles & Areas Tasked

Bill Reach	Science Vision, Sci Ops, Community Engagement
Bob Frey	Capture Manager
Bruce Margon	Experienced Senior Review; Professional Astronomer not FIR expert
Eddy Zavala	Programmatics, Operations and Cost
Hal Yorke	Science Vision
Holger Jakob	German Partner Infusion
Kimberly Ennico	Science Implementation, Cross-community connections
Naseem Rangwala	Community, Science Implementation
Nick White	Messaging, Strategy

SOFIA's Greatest Hits (1/2)

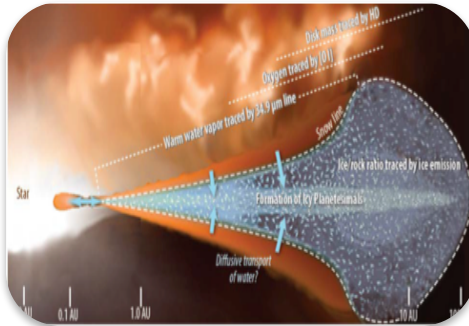
Science Topic	Result	SOFIA Observation
Astrochemistry	Collapse timescale (~1 million yrs) for dense interstellar cores (Nature result) much greater than the expected free fall time.	GREAT: Detection of Para-H ₂ D ⁺ APEX: Detection of Ortho-H ₂ D ⁺ (Breunken, S. et al. 2014 Nature, 516, 219)
	First detection of SH in the ISM – out of equilibrium chemistry despite being in a cold region.	GREAT: SH detection (Neufeld, D. et al. 2012, A&A, 542, L6)
	Detection of water in a massive young stellar object (protostar) in absorption (AFGL 2591)	EXES: H ₂ O detection (Indriolo, N. et al. 2015, ApJL, 802, L14)
	1st discovery of ortho D ₂ H ⁺ in the ISM, a missing piece to computing the time-scales in the earliest phase of star formation	GREAT: Detection of ortho-D ₂ H ⁺ (Gluck, CB et al. 2017A&A...600A..94G)
Dust formation	First discovery of dust in older supernova remnant that survived the passage of shock. This supports hypothesis that supernovae are responsible for formation of dust in early universe (~1 Gyr after the big bang).	FORCAST: Observation of Sgr A east (Lau, R. et al. 2014 Science 348, 413)
High mass star formation	Infall of material on high mass star forming region	GREAT: NH ₃ (Wyrowski, F. et al. 2016, A&A, 585, A149.; Wyrowski, F. et al. 2012, A&A 542, L15)
Exoplanetary debris disk	IR excess due to dust processed by an inner asteroid belt rather than from a colder KB.	FORCAST: Epsilon Eridani (Su, K. et al. 2017, ApJ AJ, 153, 5)

SOFIA's Greatest Hits (2/2)

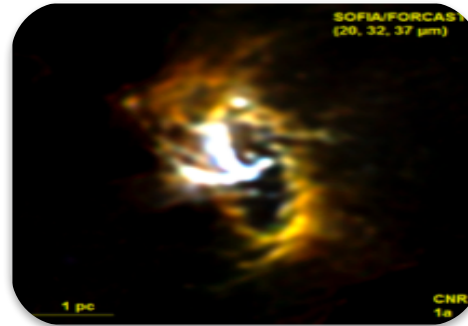
Science Topic	Result	SOFIA Observation
Atmospheres of outer solar system	Evolution (time with season) and properties (haze and asymmetries) of atmospheres	FLIPO: Two Pluto occultations FLIPO: Triton occultation
	Enhanced D/H on Mars provide isotopic evidence of vanished surface water	EXES: D/H (Encrenaz, T. et al. 2016, A&A, 586, A62)
	First direct measurement of atomic oxygen in Mars' mesosphere	GREAT: O (Rezac, L. et al. 2015 A&A, 580, L10)

SOFIA Today is aligned to advance these fields...

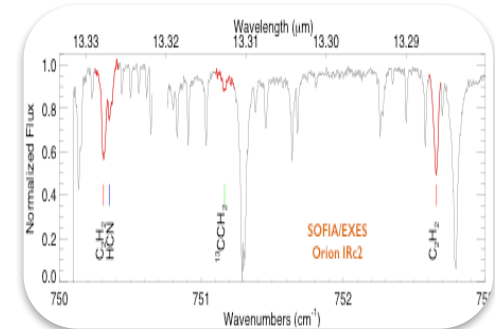
IR Photometry, High-Resolution Spectroscopy, Polarimetry



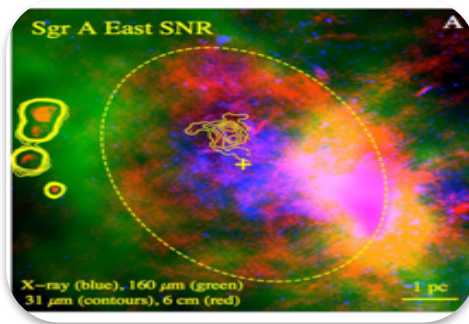
Evolution of planetary systems



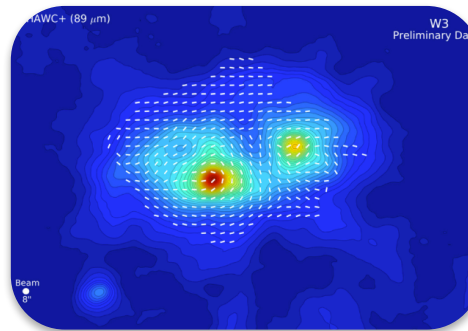
Physics of extreme environments



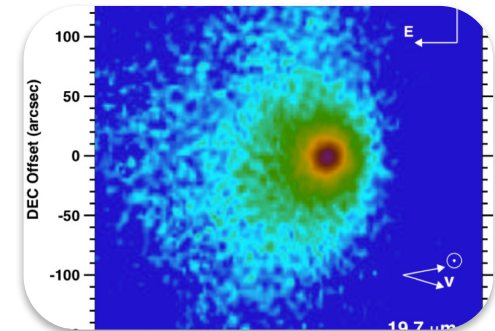
Formation of complex molecules



Dust in the universe



Role of magnetic fields



Composition of planetary atmospheres & comets

How can the SUG help?

- We, the SOFIA Science Center & Program Office, welcome your input
- Advocate for the Observatory, not just at SUG meetings
 - **Give more talks.** Give talks with science context, not just skim the capability description. SOFIA Science Center & Program Office can provide updated content. What do you need?
 - **Encourage publications by your peers with SOFIA data (highest priority!)**
 - Help organize/advertise/run Community Day workshops in Spring 2018
 - Share with SOFIA Science Center & Program Office info you learn about events/activities in the field that touches SOFIA science
- If you meet 2x yearly, there will be 2 more SUGs before our submission
- We will ask members to be on Senior Review proposal review groups (Blue #1, Blue #1, Pink, Red, ...)