



---

# Science Productivity Metrics

William T. Reach

SOFIA Users Group #10

Nov 2016





# Measuring Productivity

---

## 1. Status of GI Projects

Allows interaction with GIs, assessment of needs, ability to determine corrections to policies

## 2. Publications

Measures rate of production of scientific results and their impact.

## 3. Production split by SI

Allows assessment of scientific production by instrument to inform decisions related to the instrument suite.



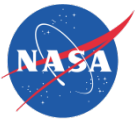


# 1. Status of Guest Investigator Projects

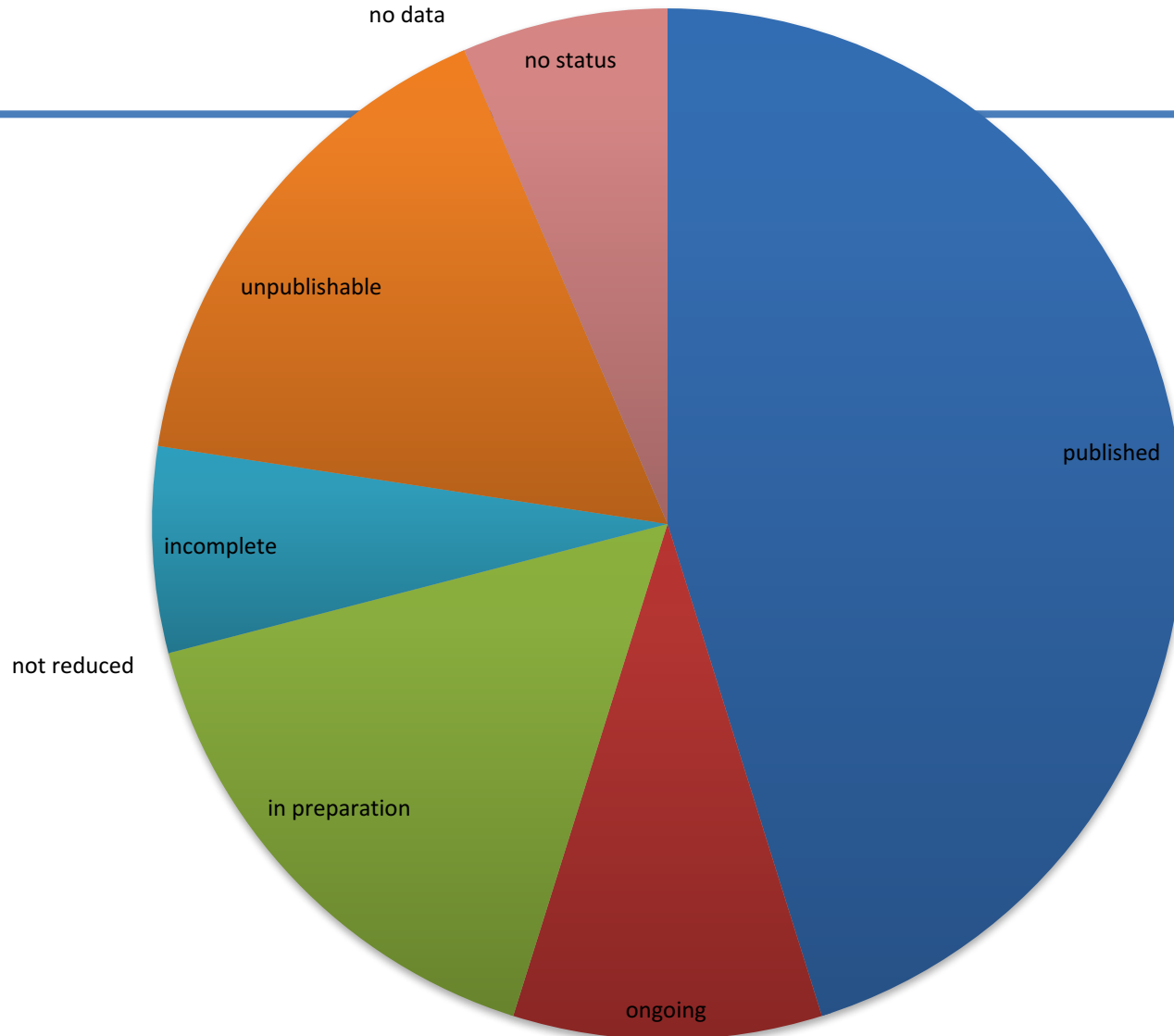
---

Each project dispositioned into one of these categories:

- **Published:** refereed journal article using data
- **Ongoing:** will be combined with upcoming observations
- **In preparation:** GI working on draft/plans to write
- **Not reduced:** calibrated data not yet available
- **Incomplete:** less than half of proposed observations complete, or GI indicates cannot publish subset
- **Unpublishable:** GI or SMO believe scientific results will never be obtainable with the acquired data

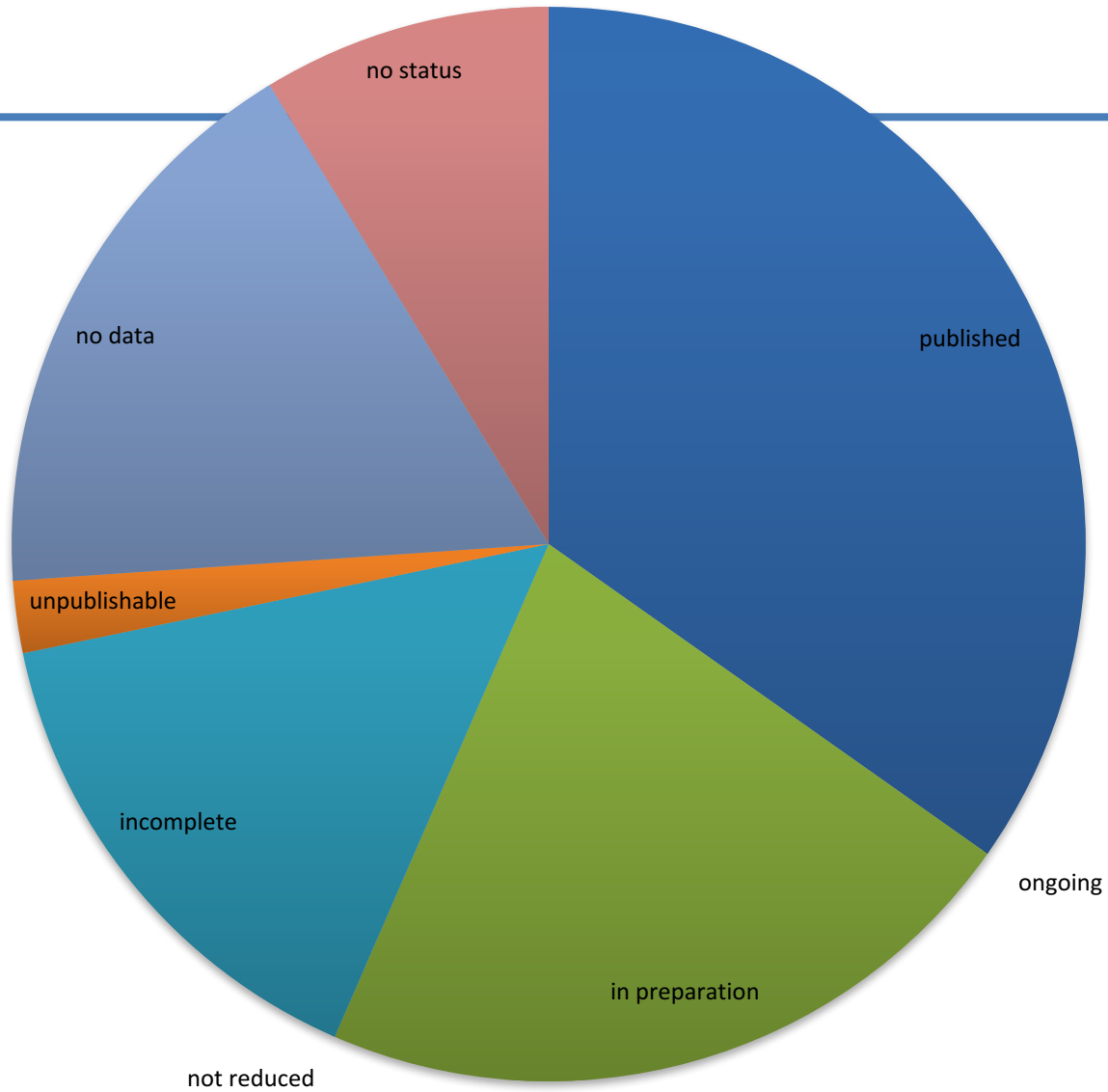


# Basic Science



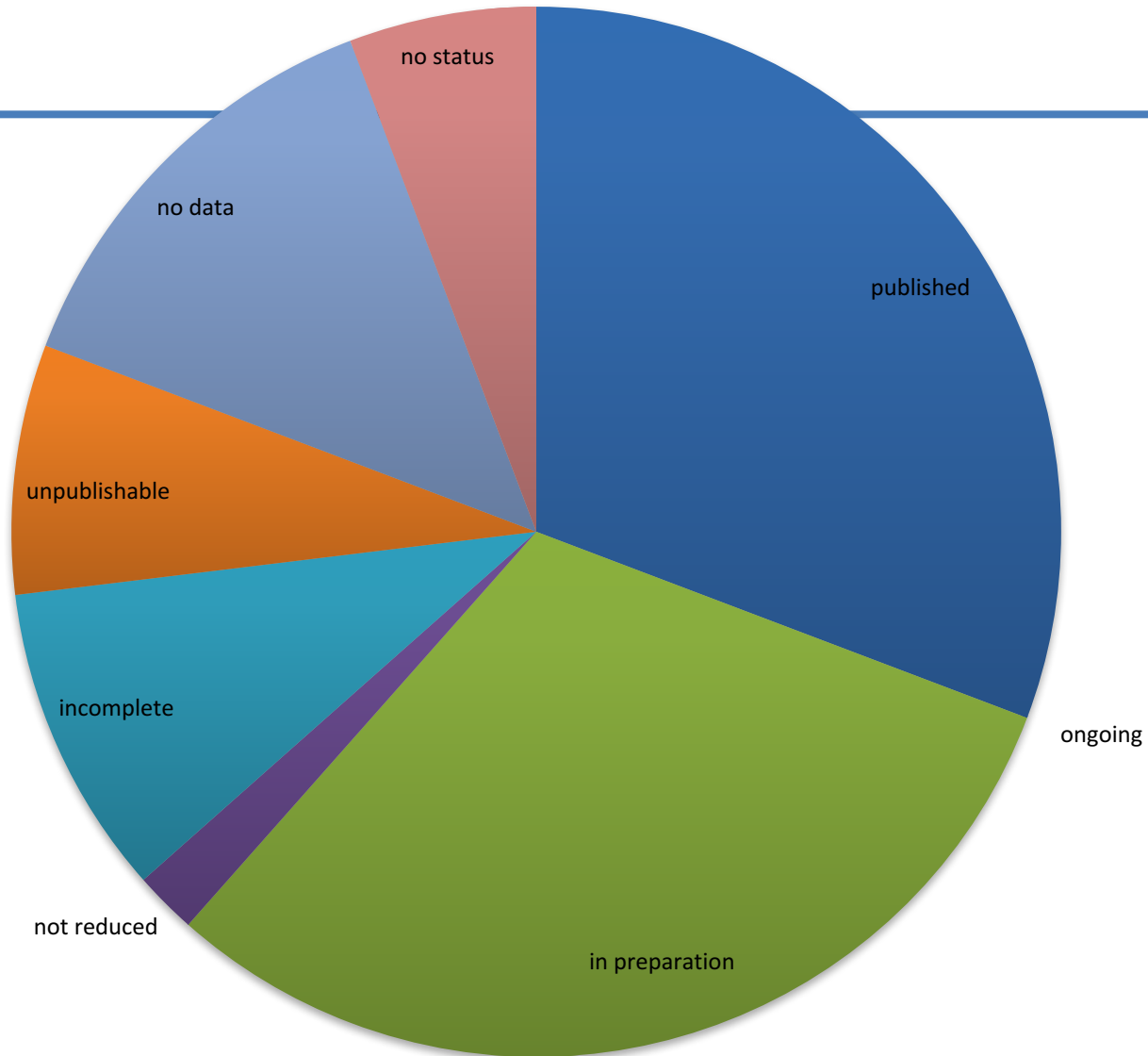


# Cycle 1



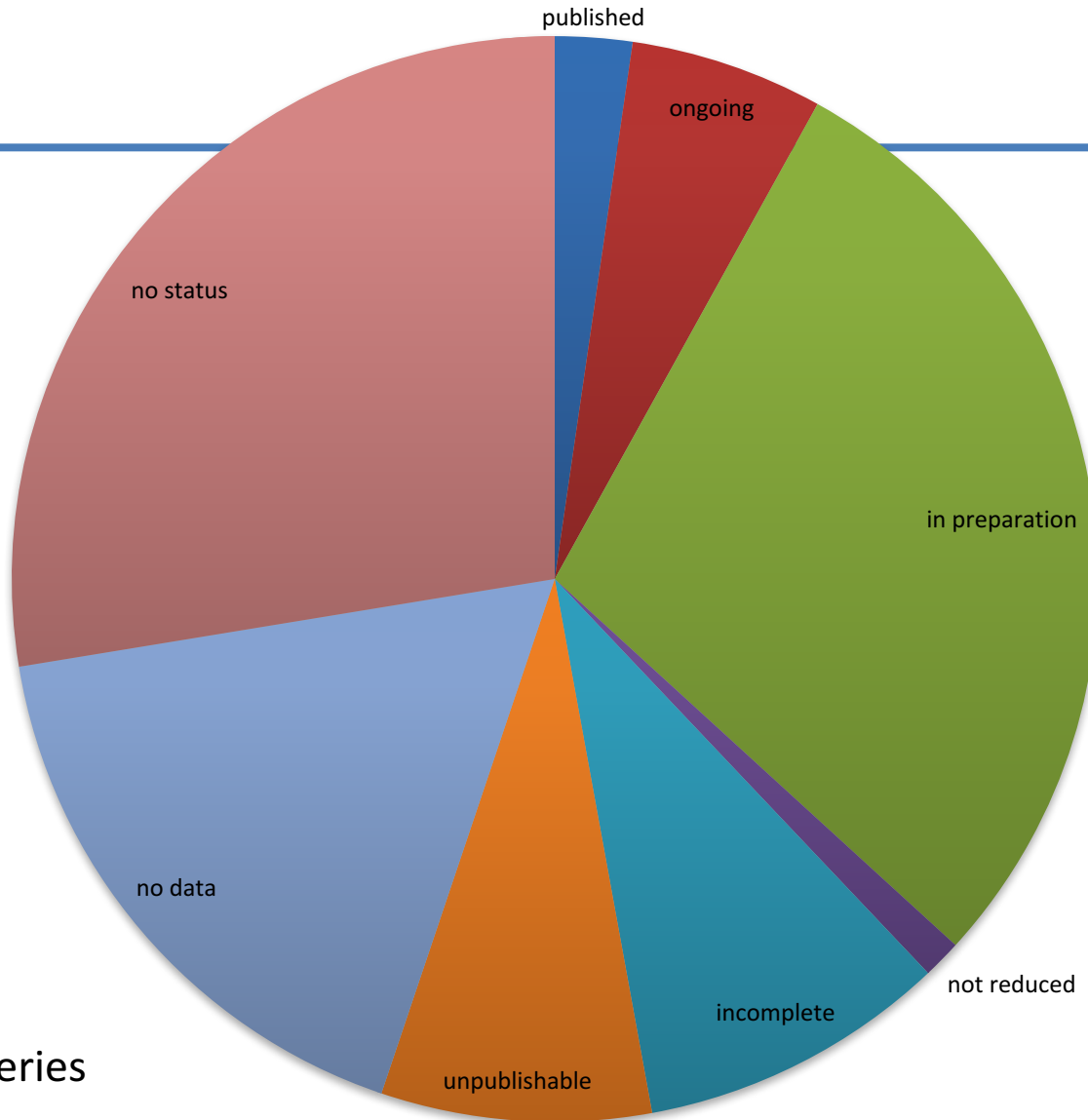


# Cycle 2





# Cycle 3

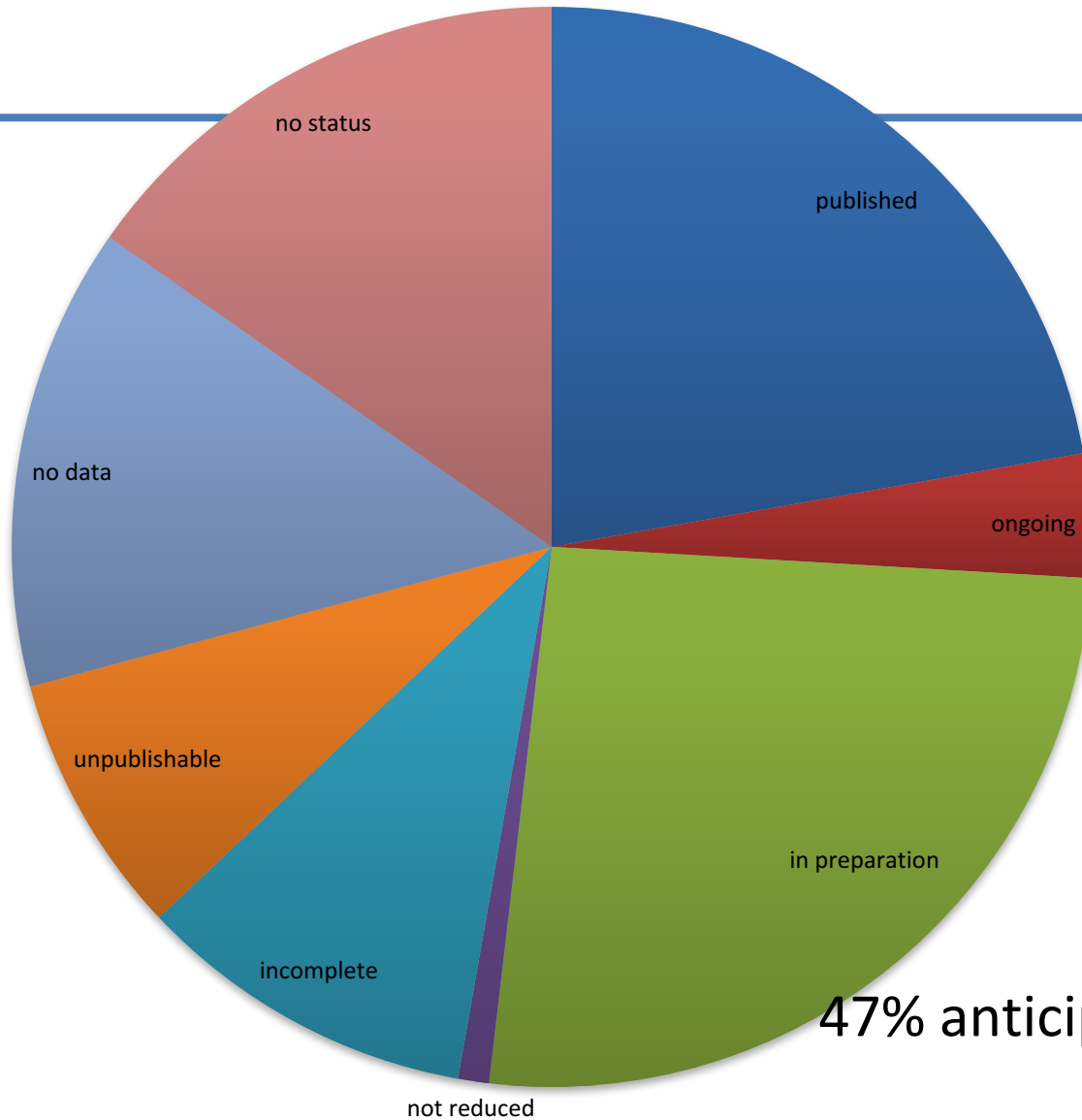


15 “no status”:  
Did not reply to queries





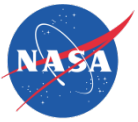
# through Cycle 3



47% anticipated published







# Implications of Project Status Study

---

- About half of SOFIA observations anticipated to be published by the Guest Investigators
  - Opportunity for archival research?
  - 18% deemed unpublishable by Inst Sci, or highly incomplete
  - 14% did not receive data
  - about 15% appear publishable
- Science Center wants to increase publication rate
  - Offering increased support to guest investigators
    - Funding was significantly increased Cycle 4
  - Adding staff to User Support, to enable instrument scientists to remain involved after observations are taken
  - *Suggestions from the SUG are welcome*





## 2. Publications

---

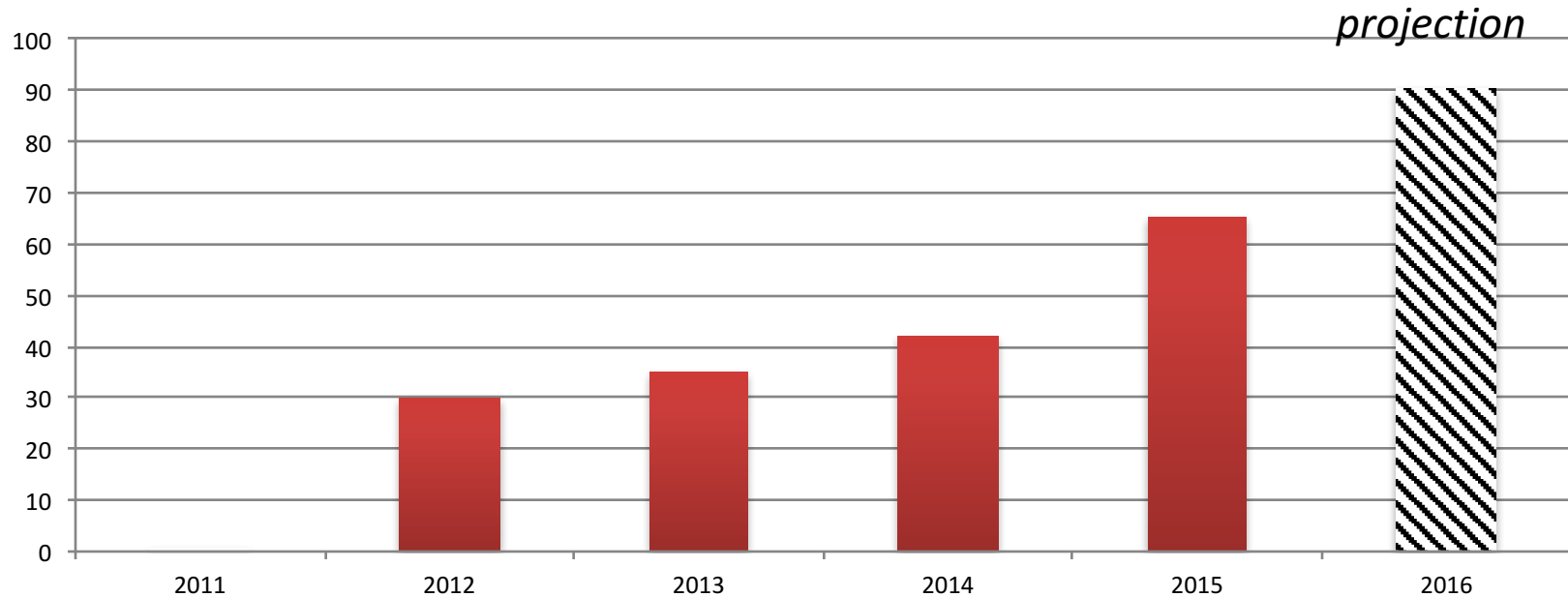
- Publication tracking is on our website
  - <https://www.sofia.usra.edu/Science/publications>
  - <https://dcs.sofia.usra.edu/dataRetrieval/SofiaPublications.jsp>
  - Allows tracking and linkage to features of Data Cycle System
- Target publications per hour
  - Metric in the SOFIA Outreach Plan: 20 hrs/paper
  - Count all science flights with 8 hrs/flight
  - Through end of 2015: Already at 18.9 hrs/paper
  - Maintaining rate, with 808 RH expect 43 papers from Cycle 4







# Publication rate

## Cumulative Publications



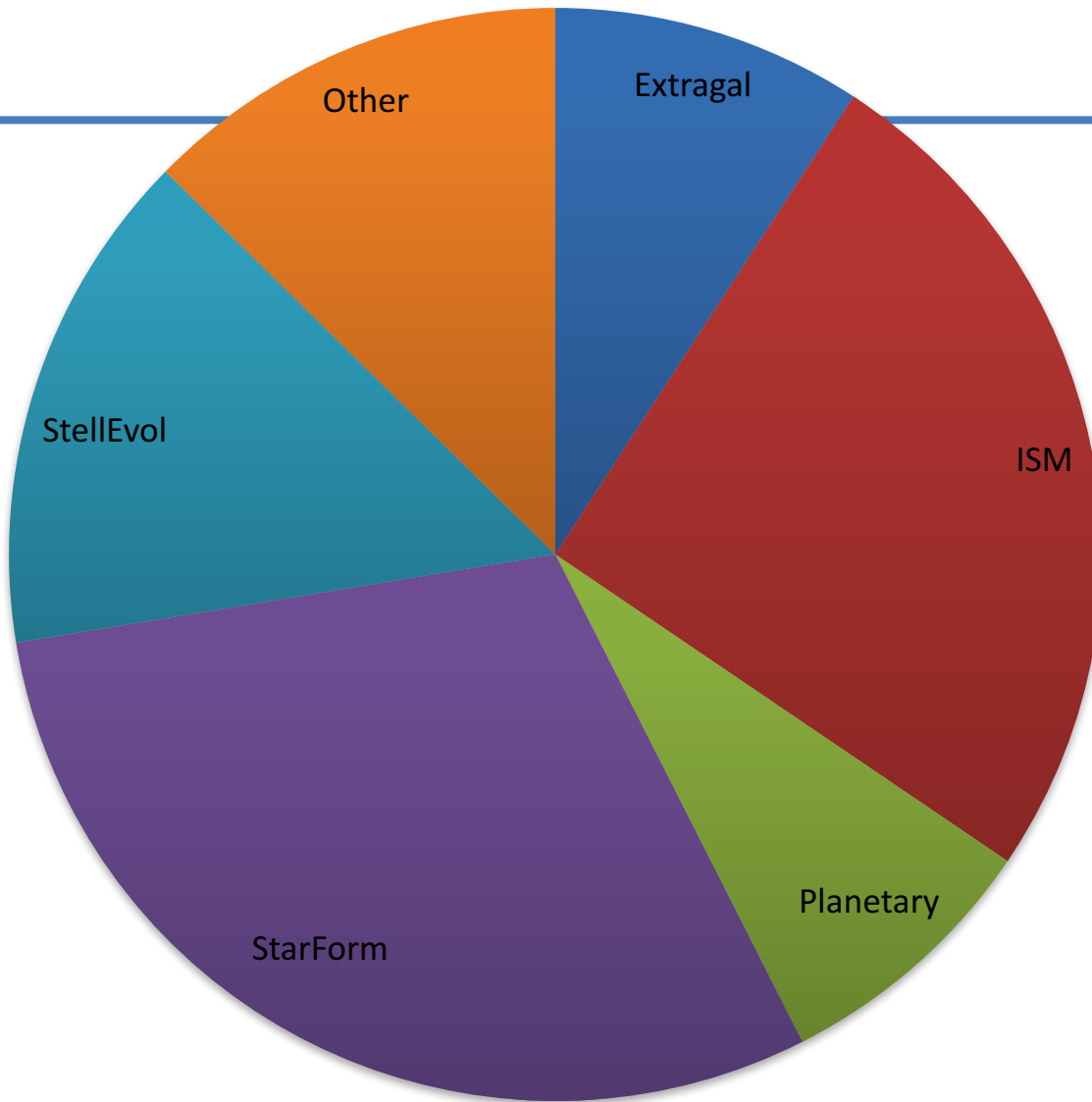
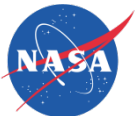
Projection for 2016 scales to 12 months from actuals as of 10/28/2016



Author △ ▽	Title	Date △ ▽	Publication	Science Topic △ ▽	Keywords	Instruments △ ▽	Program	Data Source	Image	Files	Links
Croiset, B.	Mapping PAH sizes in NGC 7023 with SOFIA	2016-03	Croiset et al. (2016) A&A, 590, 26	Interstellar medium		FLITECAM FORCAST	02_0056	CYCLE 2			[astro-ph] [ADS] [Teletalk]
Shenoy, D	Searching for Cool Dust in the Mid-to-Far Infrared: the Mass Loss Histories of The Hypergiants mu Cep, VY CMa, IRC 10420, and rho Cas	2016-03	2016 AJ, 151, 51 [DOI]	Stars and stellar evolution		FORCAST	02_0031	CYCLE 2		PDF	[ADS] [astro-ph]
Encrenaz, T	A map of D/H on Mars in the thermal infrared using EXES aboard SOFIA	2016-02	A&A, 586A, 62 [DOI]	Solar System	Mars	EXES		SI GTO		PDF	[ADS]
Gray, M	The physics of water masers observable with ALMA and SOFIA: model predictions for evolved stars	2016-02	2016 MNRAS 456, 374-404 [DOI]	Interstellar medium		GREAT		THEORY		PDF	[ADS] [astro-ph]
Gusdorf, A.	Challenging shock models with SOFIA OH observations in the high-mass star-forming region Cepheus A	2016-01	2016 A&A 585, A45 [DOI]	Interstellar medium		GREAT	01_0113	CYCLE 1		PDF	[ADS]
Wiesemeyer, H	Far-infrared study of tracers of oxygen chemistry in diffuse clouds	2016-01	2016 A&A, 585, A76 [DOI]	Interstellar medium		GREAT	01_0185	CYCLE 1		PDF	[ADS]
Wyrowski, F	Infall through the evolution of high-mass star-forming clumps	2016-01	2016 A&A 585, 149 [DOI]	Star formation		GREAT	01_0174	CYCLE 1		PDF	[astro-ph] [ADS]
Ricacher, C.	First supra-THz Heterodyne Array Receivers for Astronomy with the SOFIA Observatory	2015-12	accepted to IEEE Instrumentation	Other				INSTRUMENTATION			[astro-ph] [ADSpre]
Lau, R.	An Apparent Precessing Helical Outflow from a Massive Evolved Star: Evidence for Binary Interaction	2015-12	2016 ApJ, 818, 117 [DOI]	Stars and stellar evolution		FORCAST	70_0001	SI GTO		PDF	[ADS] [astro-ph]
Laurini, S.	Spectroscopically	2015-12	A&A 584, A70	Star		GREAT		GREAT		PDF	[ADS]



# Papers by Scientific Category





### 3. Productivity by Science Instrument

- GREAT and FORCAST dominate time and publications
- EXES and FIFI-LS relatively new but lagging
  - FIFI-LS Principal Investigator engaging team to publish GTO papers during current gap in flights (fall '16 to spring '17)

<b>SI</b>	<b>#Papers</b>	<b>Flights</b>	<b>Hours/Pa per</b>
FORCAST	31.5	78	16.8
GREAT	43	66	10.4
HIPO	2	4	13.6
FLITECAM	1.5	11	50
FIFI-LS	0	35	$\infty$
EXES	2	15	51





# Summary: Measuring Productivity

---

## 1. Status of GI Projects

Implemented mitigations to improve GI project completion.  
Beginning to collect status for Cycle 3.

## 2. Publications

Slow by steady increase in SOFIA publications.

## 3. Production by Science Instrument

Publications arise predominantly from FORCAST and GREAT, which have established communities.

FIFI-LS had late development of calibration procedure and still lacks data from Water Vapor Monitor.

