

Community Engagement

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Support and engage current users

Inform the astronomy community

Increase the size of user community

Facilitate research (*with focus on archival*)

Support and engage current users

- Support of Help Desk (Calls for proposals, data analysis and reprocessing, funding...)
- Inform GOs about project scheduling status
- Annual user surveys (2022 survey for July)
- Maintain website with announcements and information about opportunities, capabilities, publications, flight schedules, data processing information, reports, ..
- **New webpages: legacy programs, multi-observatory programs, pipeline resources, all recorded talks**

Legacy Program Completion						
Proposal	Project Name	PI	Instrument	Award (hrs)	% Complete	Remaining (hrs)
07_0077	FEEDBACK	Tielens	GREAT	96	89%	11
07_0189	Galactic Center Map	Hankins	FORCAST	33	100%	0
08_0012	B Fields in Galaxies	Lopez-Rodriguez	HAWC+	156	52%	75
08_0038	HyGAL	Neufeld	GREAT	82	48%	42
08_0186	FIELDMAPS	Stephens	HAWC+	42	35%	27
09_0036	LMC+	Madden	FIFI-LS	20*	75%**	5
09_0054	B Fields in Galactic Center	Chuss	HAWC+	20*	19%**	16
09_0171	Lunar Water Survey	Lucey	FORCAST	69	26%	15
09_0215	SIMPLIFI	Pillai	HAWC+	20*	100%**	59

Support and engage current users

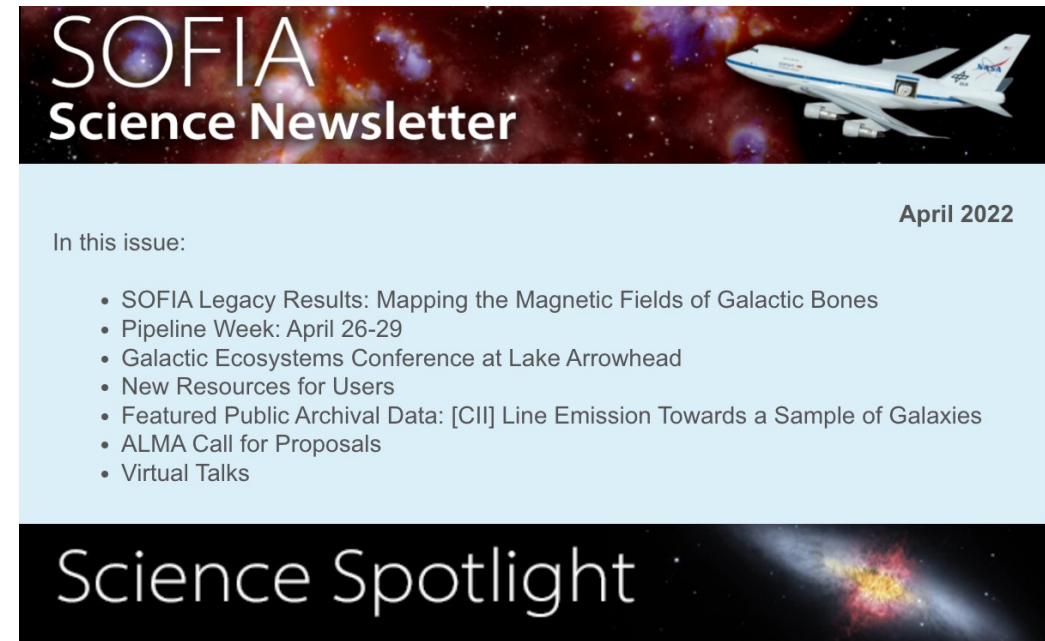
SOFIA conference, 'Galactic Ecosystems: Far Infrared Diagnostics and Opportunities

- Feb 28-March 4, 2022 , at Lake Arrowhead in California. In partnership with ALMA
- **First in-person US astronomy conference in two years**
- ~60 in person participants + 30 online
- Presentations showcased the latest results from multi-wavelength surveys of stellar cores, star forming regions and extragalactic ISM (SOMA, FEEDBACK, HYGAL, PHANGS, GALFA, GALMAG, SIMPLIFI)
- Planning for a community conference September 2023



Inform the astronomy community

- E-newsletter: ~ monthly communication of news, opportunities, and general information to 4000+ recipients. Each issue focuses on a legacy program.
- Large advertisement campaigns of Calls For Proposals (observation, SARP, Flash Calls)
- Bi-monthly Tele-Talks
- Use of social media to target Astronomers (including leveraging partner's accounts)
- Strategic Presence at community events (IRSTIG)



SOFIA Legacy Results: Mapping the Magnetic Fields of Galactic Bones

Most stars in spiral galaxies form within the galaxy's arms. Building the "skeletons" of these galaxies are galactic bones, long filaments that outline the densest parts of the arms. At the largest scales, the magnetic fields of a galaxy follow its spiral arms. Fields in the bones were accordingly believed to be aligned with respect to the bone, but the first results from from the FIELDMAPS SOFIA Legacy Program hint that this is generally not the case.

The Filaments Extremely Long and Dark: a MAgnetic Polarization Survey (FIELDMAPS) project, led by Ian Stephens (Worcester State University), is the first attempt to map the magnetic field of any galactic bone in its entirety. In G47, a giant filamentary bone within the Milky Way, Stephen's team was able to determine that the magnetic fields are strong enough to prevent gas in many areas from succumbing to gravitational collapse to form stars. [Read more.](#)

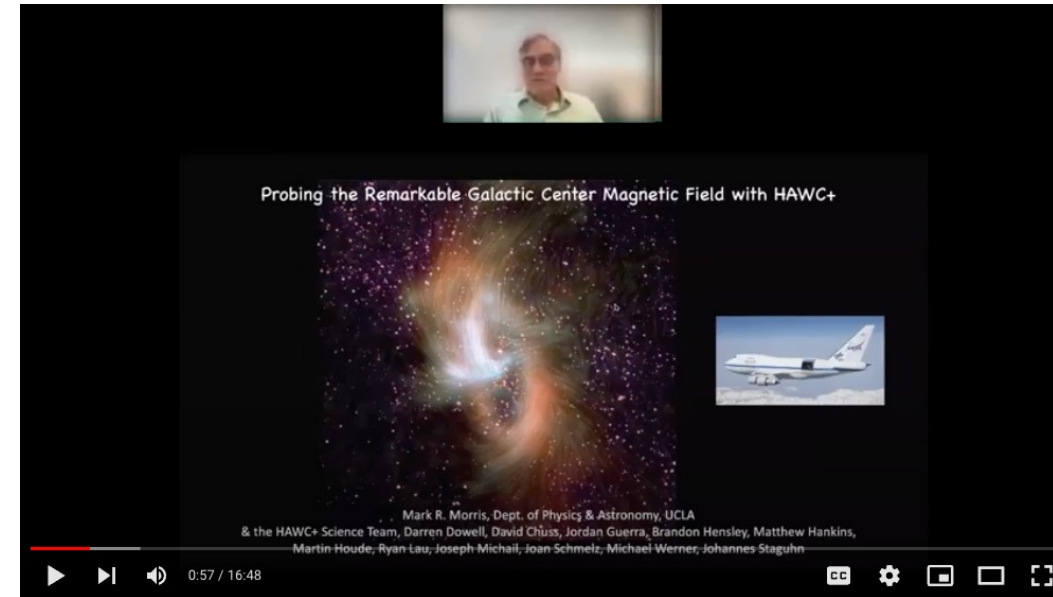
Science-ready data is already publicly available on 6 of the ten bones that the group plans to map (under Plan ID 08_0186 in the [IRSA Archive](#)). Advanced data products and data analysis codes will eventually be available on the [FIELDMAPS website](#).

Inform the astronomy community

Winter 2022 AAS

Scheduled and produced virtual events to replace AAS events.
Materials recorded and posted online.

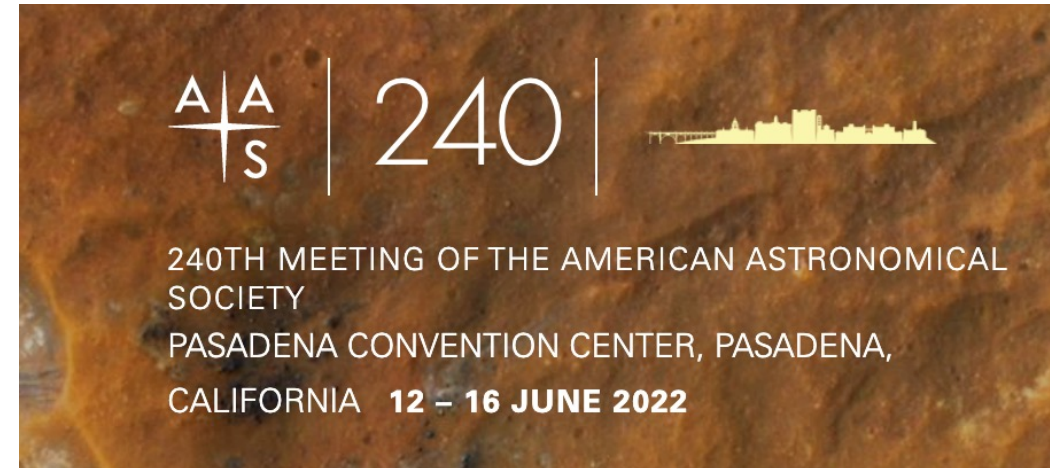
- Town Hall (Meixner)
- Webinar Cycle 10 (Moulet)
- Special session on Galactic center with 6 invited speakers
- Press release (Sutter)
- Best thesis / best paper talks (Bonne / Lopez-Rodriguez)



Inform the astronomy community

Summer 2022 AAS

- Booth, printed materials, historical swag
- New printed enewsletter
- Splinter session “Mid and Far-IR observations: leveraging science across the spectrum”: 4 speakers, panel
- SOFIA Townhall
- 3 Theater presentations: SARP, GREAT Legacy, HAWC+ Legacy
- 24 contributed presentation
- 1 press conference, 1 hyperwall talk (FORCAST legacy). Presence at the NASA booth



Inform the astronomy community

SOFIA Blog

- 21 posts in less than a year. Both on scientific results and milestones.
- Good support for press / social media diffusion

SOFIA spotlights

- Monthly In depth pieces contributed by authors, for information to the astronomy community
- Compiled in semi-annual printed newsletter

Make No Bones About It: SOFIA Maps the First Magnetic Fields of a Galactic Bone in Their Entirety

April 5, 2022



by Anashe Bandari

Most stars in spiral galaxies form within the galaxy's arms. Building the "skeletons" of these galaxies are galactic bones, long filaments that outline the densest parts of the arms.

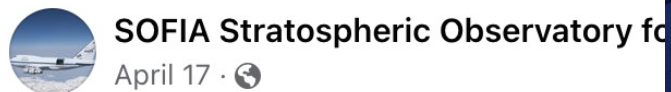
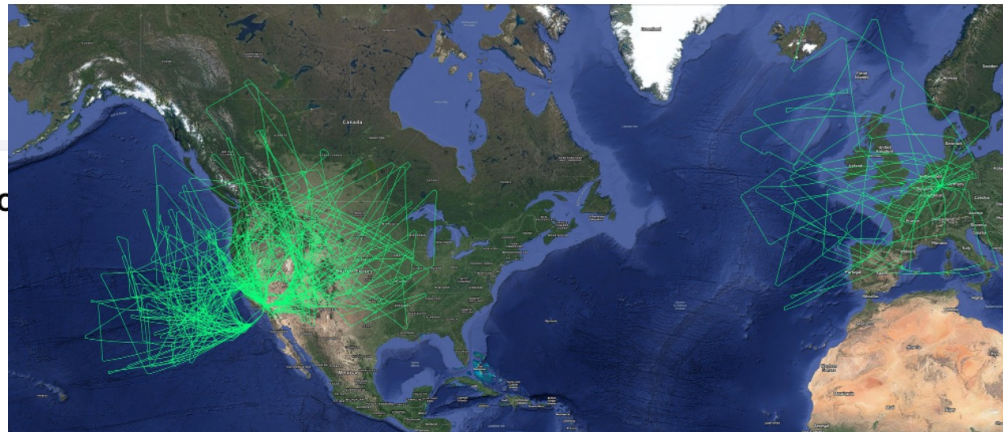
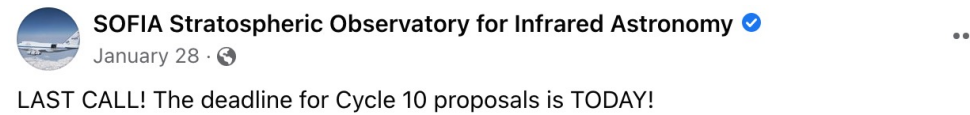


A map shows the direction of magnetic fields in the G47 bone overlain atop an image of the G47 filament as seen by the Herschel Space Observatory. The red and yellow areas are high-density regions of dust and gas. Credit: G47: ESA/Herschel/PACS/SPIRE/Ke Wang et al. 2015; Polarization map: Stephens et al., 2021

Inform the astronomy community

Social media (Facebook, Twitter, Instagram)

- Coordinated campaigns with partners
- Diffusing blog posts / spotlights / products
- Announcements



It's #HaikuPoetryDay!

Infrared visions
Of space from Earth's stratosphere —
SOFIA takes flight!

Can you come up with a SOFIA haiku of your own? Share it with us! 🚀



Yesterday, the @ehtlescope revealed the first image of #OurBlackHole at the center of the Milky Way!

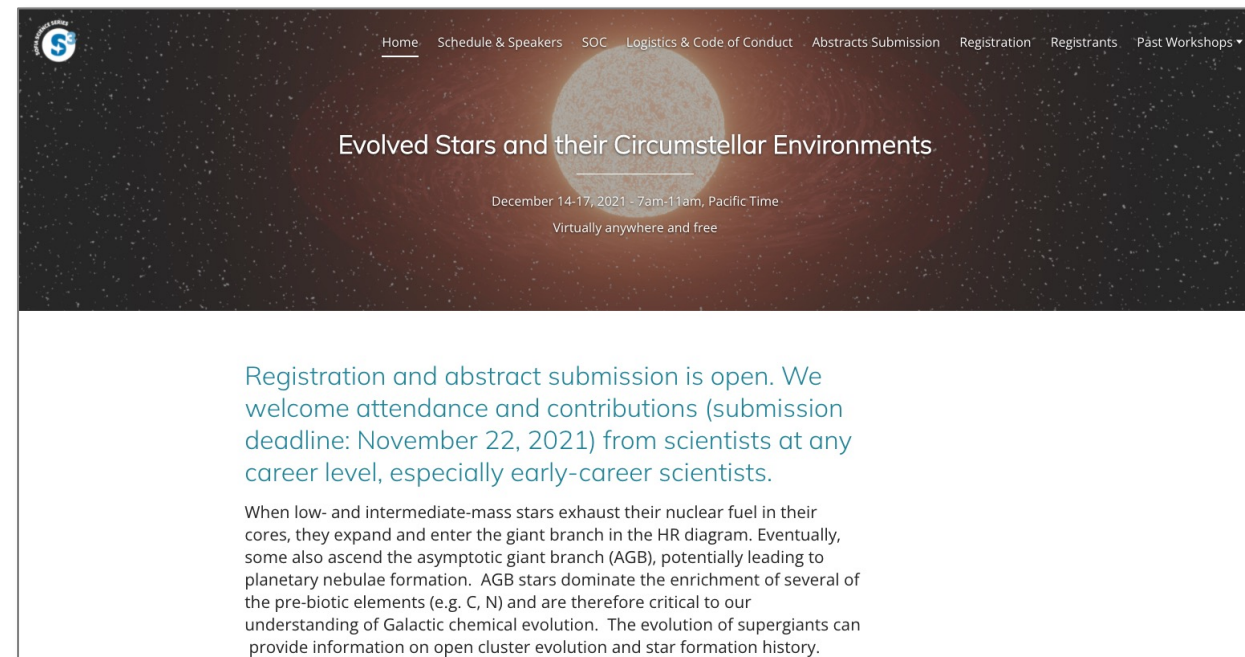
SOFIA has studied this region, too! The magnetic fields measured by SOFIA may help prevent matter from slamming into the black hole, explaining why it is relatively quiet.



Community growth

SOFIA Science Series Workshop: 'Evolved Stars and their Circumstellar Environments' (Dec 14-17, 2021)

- Great engagement, ~100 attendees each day
- 29 contributed talks
- 8 invited speakers
- 4 moderated discussions
- 1 panel discussion on observational synergies

A screenshot of the workshop website. The top navigation bar includes links for Home, Schedule & Speakers, SOC, Logistics & Code of Conduct, Abstracts Submission, Registration, Registrants, and Past Workshops. The main header features the workshop title "Evolved Stars and their Circumstellar Environments" with a date "December 14-17, 2021 - 7am-11am, Pacific Time" and the text "Virtually anywhere and free". Below the header, there is a paragraph in blue text stating: "Registration and abstract submission is open. We welcome attendance and contributions (submission deadline: November 22, 2021) from scientists at any career level, especially early-career scientists." A second paragraph in black text provides a scientific overview: "When low- and intermediate-mass stars exhaust their nuclear fuel in their cores, they expand and enter the giant branch in the HR diagram. Eventually, some also ascend the asymptotic giant branch (AGB), potentially leading to planetary nebulae formation. AGB stars dominate the enrichment of several of the pre-biotic elements (e.g. C, N) and are therefore critical to our understanding of Galactic chemical evolution. The evolution of supergiants can provide information on open cluster evolution and star formation history."

Community growth

SOFIA School (Feb 2-4, 2022)

- ~200 attendees on Slack and WebEx, majority early career
- 19 engaging talks from community members and SOFIA staff
- Focus on interpretation techniques
- All talks available online
- Direct communication with attendees on their projects / ideas
- Additional talk on FORCAST imaging in March



Community growth

Goal: increase awareness of SOFIA, increase number of users of SOFIA resources

Methods: identify untapped scientific strengths, inform sub-communities about recent results and opportunities/capabilities, provide information and training enabling engagement

Next events

- 1 day AGN with mid and far-IR workshop (August 2022)
- Splinter AAS session on synergies
- 2023 SOFIA School, focused on fundamental processes (possible partnership with IPAC)

Facilitate Research

Cookbooks

- Re-organized cookbook series as Jupyter notebooks under 'readthedocs' framework
- Expanded to 14 cookbooks
- Now Including EXES (all instruments covered)

Python	Description
FORCAST: Basic Photometry	<i>Aim:</i> Aperture photometry using FORCAST imaging data. <i>Tools:</i> astropy, photutils
FORCAST: Grism Inspection	<i>Aim:</i> Inspection of FORCAST grism data. <i>Tools:</i> astropy, DS9
FORCAST: Grism Line Analysis	<i>Aim:</i> Basic line fluxes and line fitting of grism data. <i>Tools:</i> astropy
FORCAST: Grism Custom Extraction	<i>Aim:</i> Extract grism data with a user-defined aperture. <i>Tools:</i> astropy
HAWC+: Data Inspection	<i>Aim:</i> Basic inspection and analysis. <i>Tools:</i> astropy
EXES: Data Inspection	<i>Aim:</i> Basic inspection and plotting spectra. <i>Tools:</i> astropy
EXES: Telluric Correction	<i>Aim:</i> Model and remove atmosphere using PSG model.
EXES: Velocity Calculation	<i>Aim:</i> Estimate velocity shift of spectral lines. <i>Tools:</i> astropy
GREAT: Data Inspection (python)	<i>Aim:</i> How to view GREAT spectra. <i>Tools:</i> astropy
GREAT: Reproject data to GREAT res.	<i>Aim:</i> Reproject other datasets to GREAT pixel map. <i>Tools:</i> astropy, reproject
Other	Description
SOFIA: data retrieval	<i>Aim:</i> Download SOFIA data through the IRSA.
FORCAST: Photometry (detailed)	<i>Aim:</i> Detailed description of aperture photometry.
FIFI-LS: Cube Analysis	<i>Aim:</i> Basic cube analysis. <i>Tools:</i> SOSPEX
GREAT: Data Inspection (CLASS)	<i>Aim:</i> How to view GREAT spectra. <i>Tools:</i> CLASS

- EXES
 - How do I get an absolute flux calibration of EXES data?
- FORCAST
 - Why are the USPOT exposure times higher than before (before Cycle 10)?
 - How can we check for memory/persistence issues?
 - Should I worry about saturating the FORCAST detector?
 - How do I find the on-sky angle of the FORCAST grism slit?
 - What is the FORCAST photometric uncertainty?
 - Has a COMA aberration correction been done on the data?
 - Is there a ghost in my data?
 - How many dithers do I need for photometry?
 - Can subtract the PSF from my image?
- FIFI-LS
 - How to get an upper limit on a FIFI-LS detection?
 - Should I use FIFI-LS or GREAT for [CII]?
 - What is the beam/psf size of FIFI-LS?
 - What is the pixel size of FIFI-LS data?
- The Data and Data Analysis
 - What is the boresight?
 - What is the best way to access the FITS header information?
 - How to get the PWV from the header
 - What version of redux was used to reduce my data?
 - What do the quality assurance comments mean, and should I be worried?
 - How do I find out if the data products are the raw or calibrated files?
 - I can't tell if my detection is real or noise, what can I do?

Facilitate Research

FAQs

- New resource, based on HelpDesk analysis
- Now mostly FORCAST/FIFI-LS – upcoming: GREAT
- Instrument Scientists can contribute directly to the FAQ list – repository of staff knowledge

Facilitate Research

Public pipeline support

- New website section on public pipeline
- Tutorials provided by pipeline team
- Pipeline week (April 2022): series of 4 webinars by staff members. introduction, FORCAST grism, FIFI-LS atm. correction, HAWC+. Recordings online

▼ [Tutorials](#)

Below are step-by-step tutorials for running *sofia_redux* for FIFI-LS data, FORCAST Imaging and Spectroscopy data, and FLITECAM Imaging and Spectroscopy data. These tutorials include instructions for how to download the example data from IRSA and notes for each step of the pipeline. For instructions on how to install *sofia_redux*, please follow the link to the [GitHub repository](#), or to the [pipeline documentation](#) system.

- [FIFI-LS Tutorial: M82](#)
- [FORCAST Imaging Tutorial: Europa](#)
- [FORCAST Spectroscopy Tutorial: NGC 7009, The Saturn Nebula](#)
- [FLITECAM Imaging Tutorial: NGC 2023](#)
- [FLITECAM Spectroscopy Tutorial: BD +30 3639](#)
- HAWC+: Coming soon!

Facilitate Research

Synergies Within the Infrared Archive SOFIA Summer Series 2022

Archival opportunities

- Announcement and advertisement of SARP
- Informational webinar (May 2022) and Summer AAS presentation
- Compilation of Webb/ALMA complementary data
- Summer series (May-June) on how infrared archival data from different instruments can be used together to leverage scientific information.

Synergies Within the Infrared Archive			
Event	Event date	Speaker	Affiliation
The rate, Amplitude, and Duration of Outbursts from Class 0 Protostars in Orion using Spitzer, WISE, SOFIA, and Herschel	Fri, May 13 2022, 9:00 - 10:00am PDT	Wafa Zakri	U. Toledo
Multifrequency high spectral resolution observations of HCN toward the circumstellar envelope (CSE) of Y Canum Venaticorum (Y CVn)	Fri, May 20 2022, 9:00 - 10:00am PDT	Ed Montiel	SOFIA/USRA
Synergies within the infrared archive: AGNs	Fri, May 27 2022, 9:00 - 10:00am PDT	Irina Smirnova-Pinchukova	MPIA
Synergies within the infrared archive: PAHs	Fri, Jun 3 2022, 9:00 - 10:00am PDT	Collin Knight	UWO
Synergies within the infrared archive: Nearby Galaxies	Fri, Jun 10 2022, 9:00 - 10:00am PDT	Fiorella Polles	SOFIA/USRA