
National Aeronautics and
Space Administration
NASA
EXPLORE SCIENCE
Headquarters Viewpoint
STUC | Nov 12, 2019
Michael Garcia, HST Program Scientist
NASA HQ, Astrophysics Division
Science Mission Directorate
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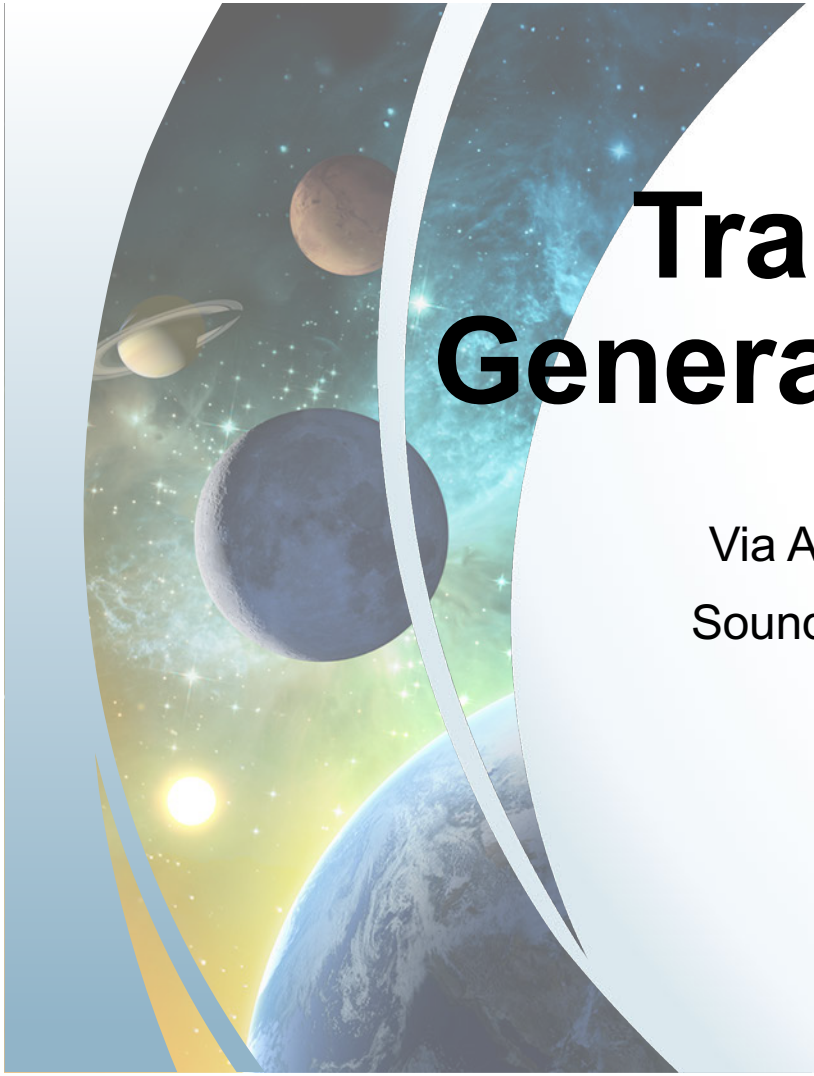


Training the next Generation of NASA PIs

Via Astrophysics Sub-orbital program:

Sounding Rockets, CubeSats, Balloons

Proposal Evaluation:
Additional Factors for SubOrbital Proposals

Suborbital includes sounding rockets, balloons, cubesats and ISS attached payloads.

For suborbital proposals, specific additional factors to be considered include:

- the proposal's scientific merit (see previous page)
- the degree to which the proposed work advances the technology readiness level (TRL) of a detector or supporting technology,
- **the degree to which the proposed work advances the readiness of junior researchers (postdocs or graduate students) to assume leadership roles on future NASA space flight projects.**

Training in the Colorado Suborbital Program

Senior Faculty & Mission PI:

Prof. James Green
PI of HST/COS
PI of 10+ rockets

Early Career Faculty:

Asst. Prof Kevin France
PI of CHESS & SISTINE Rockets
PI of CUTE Cubesat

Research Scientist (PI-training):

Dr. Ambily Suresh,
CUTE Cubesat

Research Prof. Brian Fleming
PI of SPRITE cubesat,
INFUSE APD Rocket

Ph.D. Student Training:

Dr. Chris Moore – Harvard/CfA,
Cubesats & rockets in HPD

Dr. Keri Hoadley – Caltech,
FIREBALL Balloon

Dr. Nick Kruczek – Colorado,
SISTINE Rocket, Grating SAT

Arika Egan,
CUTE Cubesat

Training in the CU Suborbital Program

Pre-tenure faculty/ early(-ish) career:

Junior Engineers: Ted Schulz, Stefan Ulrich, Nick DeCicco

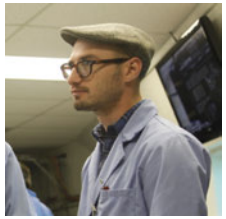
Research Scientist (PI-training):

Dr. Ambily Suresh

Research Prof. Brian Fleming (PI of SPRITE cubesat)

Ph.D. and M.S. Students:

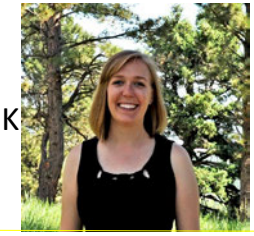
Dr. Nick Kruczek



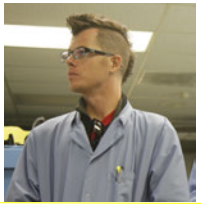
Nico Nell (AE)

Fernando Cruz-Aguirre

PI – K



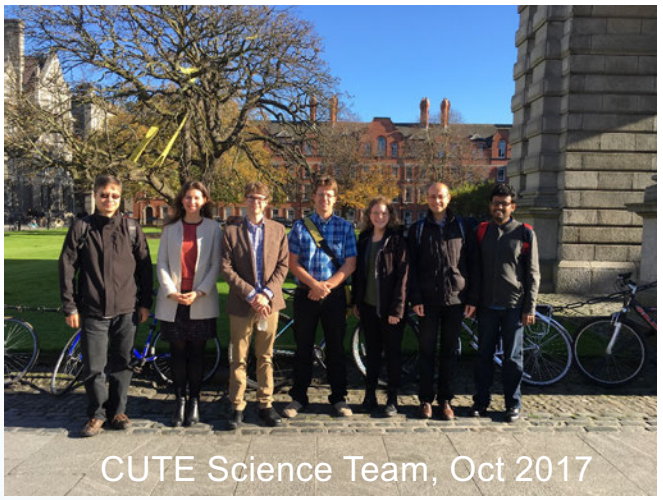
Dr. Allison Youngblood



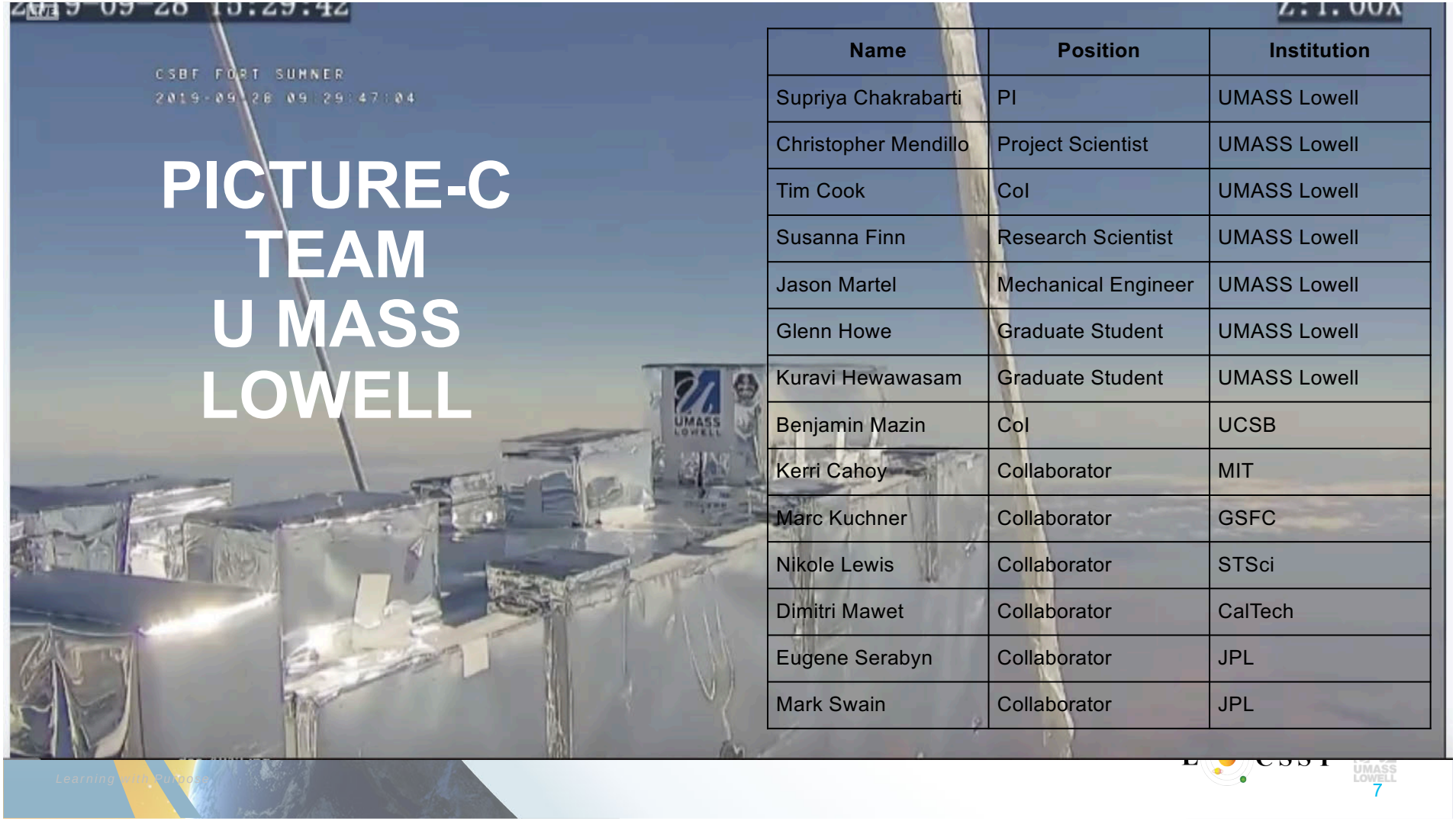
Student Training at the University of Colorado

Suborbital Research Programs:
end-to-end mission experience

Hands-on training
in space hardware



CUTE Science Team, Oct 2017



PICTURE-C TEAM U MASS LOWELL

Name	Position	Institution
Supriya Chakrabarti	PI	UMASS Lowell
Christopher Mendillo	Project Scientist	UMASS Lowell
Tim Cook	CoI	UMASS Lowell
Susanna Finn	Research Scientist	UMASS Lowell
Jason Martel	Mechanical Engineer	UMASS Lowell
Glenn Howe	Graduate Student	UMASS Lowell
Kuravi Hewawasam	Graduate Student	UMASS Lowell
Benjamin Mazin	CoI	UCSB
Kerri Cahoy	Collaborator	MIT
Marc Kuchner	Collaborator	GSFC
Nikole Lewis	Collaborator	STSci
Dimitri Mawet	Collaborator	CalTech
Eugene Serabyn	Collaborator	JPL
Mark Swain	Collaborator	JPL

FIREBALL-2

Science:

- 1st wide-field, multi-object UV imaging spectroscopy
- 1st emission constraints on z=0.7 LAE, CGM, CQM

Technology:

- 1st High Efficiency UV Photon-counting detector
- Low red-leak demonstration of EMCCD
- High-efficiency/low-scatter anamorphic UV grating
- Wide-field imaging UV spectrometer
- Precision 4-axis pointing system for balloon gondola

Training:

- FB-1/FB-2: 9 GRAs, of which 5 are women
- FB-2: 3 Post-doctoral scholars, all women

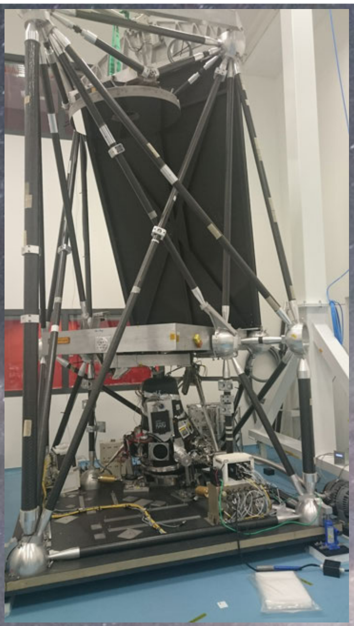


Image Credit:
Phillipe Balard

...cience/...ology Pa...nder for ... probes, L...OIR

FIREBALL-2

Faint Intergalactic Redshifted Emission Balloon

Probing Galaxy and CGM Lyα Emission with Multi-Object Spectroscopy

Goals

(1) Discover & map Circum-galactic medium to explore IGM-galaxy co-evolution

(2) Pathfind UV integral field spectroscopy

(3) Pathfind next generation high performance UV detectors

Caltech

Columbia University in the City of New York

NASA JPL Jet Propulsion Laboratory California Institute of Technology

LAM Laboratoire d'Astrophysique de Marseille

cnes

Caltech
Christopher Martin- PI
Keri Hoadley –PS/PM
Zeren Lin
Marty Crabill+
Hung Pham
Nicole Lingner
Patrick Morrissey
Matt Matuszewski
Donal O'Sullivan

JPL
Shouleh Nikzad
Gillian Kyne
April Jewell
Tim Goodsall
Todd Jones
John Hennessey
Alex Carver
Michael Hoenk
Sam Chang+

LAM/CNES
Bruno Milliard
Vicent Picouet
Samuel Quiret
Didier Vibert
Didier Ferrand
Marc Jacquet
Frederi Mirc+
Robert Grange

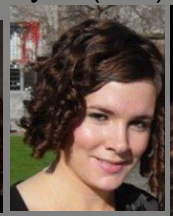
Columbia
David Schiminovich
Nicole Melso
Lauren Corlies
Jose Zorilla
Julia Gross
Michele Limon
Sam Gordon
Hwei Ru Ong+

U. Arizona
Erika Hamden
Simran Agarwal
A. R. Khan

Keri Hoadley

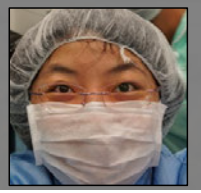
Erika Hamden U. Arizona

Gillian Kyne (JPL)



Shouleh Nikzad

Zeren Lin (GRA)



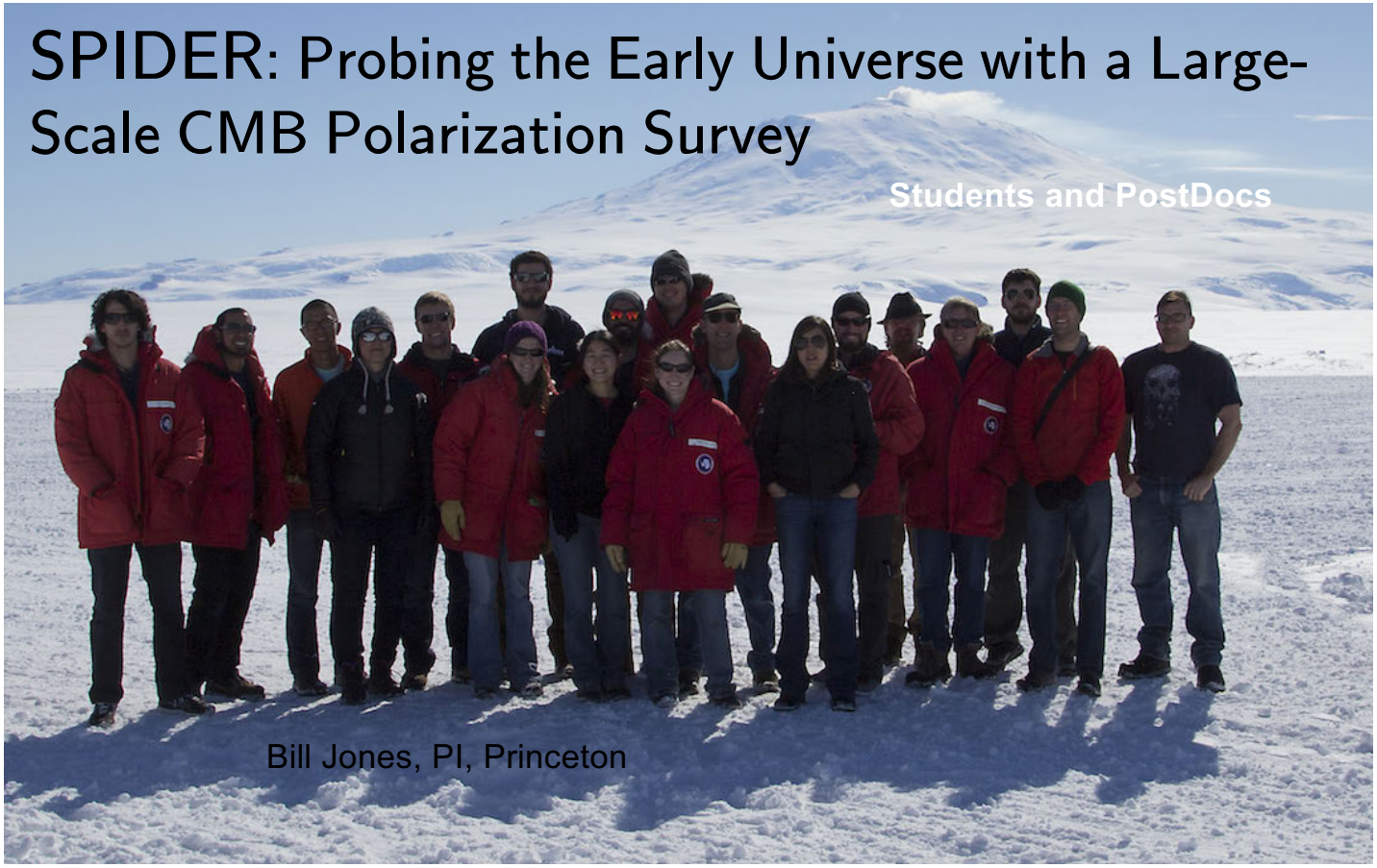
An Incredibly Talented Team:

SUPERBIT
Bill Jones PI
Prinecton

Steve Benton
Aurelien Fraisse
Mathew Galloway
Ajay Gill
John Hartley
David Lagattuta
Jason Leung
Steven Li
Vy Luu
Susan Redmond
Javier Romualtez
Mohamed Shabaan

10 Grad Students,
2 PostDocs,
And an army of undergrads!

SPIDER: Probing the Early Universe with a Large-Scale CMB Polarization Survey



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SPIDER: Pro
Scale CMB Po
Postdoc/Researcher
Industry
Faculty
Suborbital Program Goals:
1. Science
2. Personnel Development
3. Space Technology
NASA
NSF
CSA ASC
NSERC CRSNG
JPL
the David & Lucile Packard FOUNDATION
CASE WE
UNIVE
TORONTO
Imperial College London

The SPRITE CubeSat Team

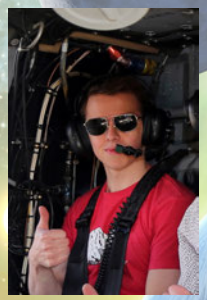
Brian Fleming
(PI)

Dmitry Vorobiev
(Co-I)

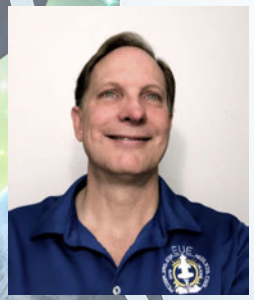
Caitlin Cash
(Grad Student)

Jack Williams
(EE)

Kevin France
(Co-I)

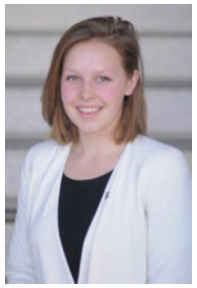


Stefan Ulrich
(ME)



Rick Kohnert
(LASP SE)

Insert Name Here
(2nd Grad Student)



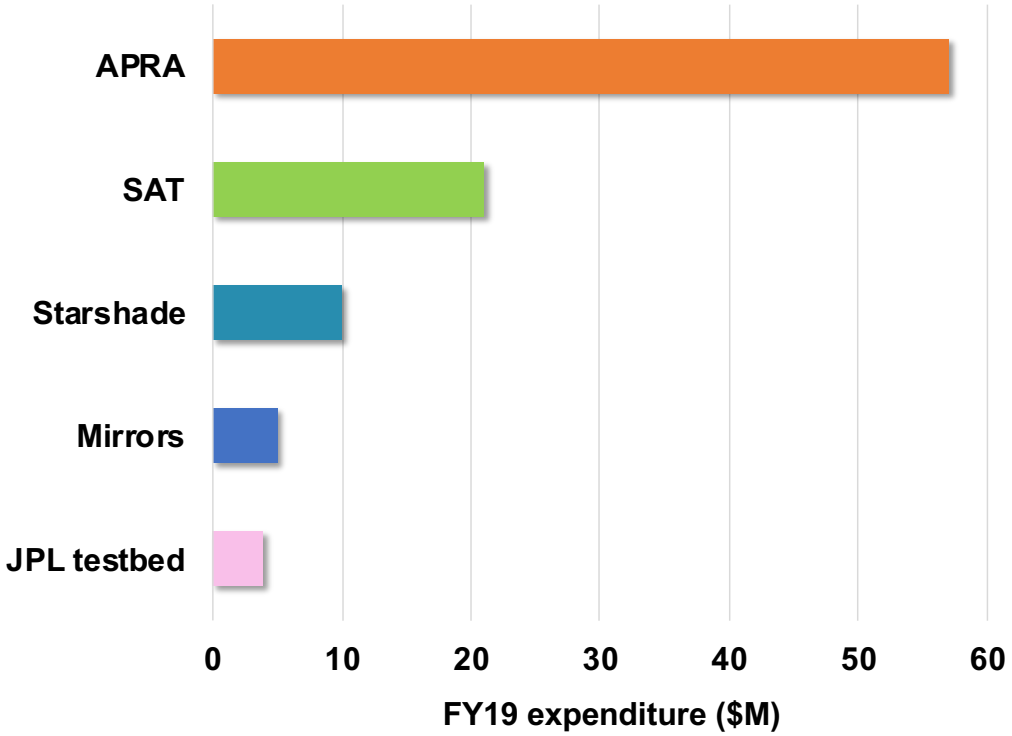
Laura Murray
(Undergrad)

Small Projects Program

More coming –
especially
undergrads!
EE and ME are also
early career

External Co-Investigators:
Anne Jaskot (Williams College),
Stephan McCandliss (JHU),
Sanchayeeta Borthakur (ASU),
John O'Meara (W.M. Keck Obs.),
Jason Tumlinson (STScI),
Ravi Sankrit (STScI),
Michael Rutkowski (MSMU),
Manuel Quijada (GSFC),
John Hennessy (JPL),
Ossy Siegmund (SS)

Low-TLR Technology Development: $97M in FY19



APRA	$57M, covers TRL 1-9.
SAT	$21M, competed and directed. COR = 9M; PCOS = $7M; ExEP = $5M. Covers TRL 3-6.
STAR SHADE	$10M, NASA-directed investment.
MIRRORS	$5M, segmented mirror ROSES solicitation.
JPL TESTBED	$4M, JPL high-contrast imaging testbed.

Note: NASA also invests $35M in technology development for Athena and LISA.

NASA's Astrophysics Balloon Program

Balloons provide low-cost, quick response, near space access for:

- Conducting cutting-edge research
- Developing technologies to enable future spacecraft science missions
- Advancing lighter-than-air platform technologies
- Enabling hands-on training of the next generation of scientists and engineers
- Now offering super-pressure balloons as a new capability

COSI launch from Wanaka, NZ on a Super-Pressure Balloon on May 17, 2016.

Most recently successfully launched all 8 large payloads during the Ft. Sumner, NM Campaign.

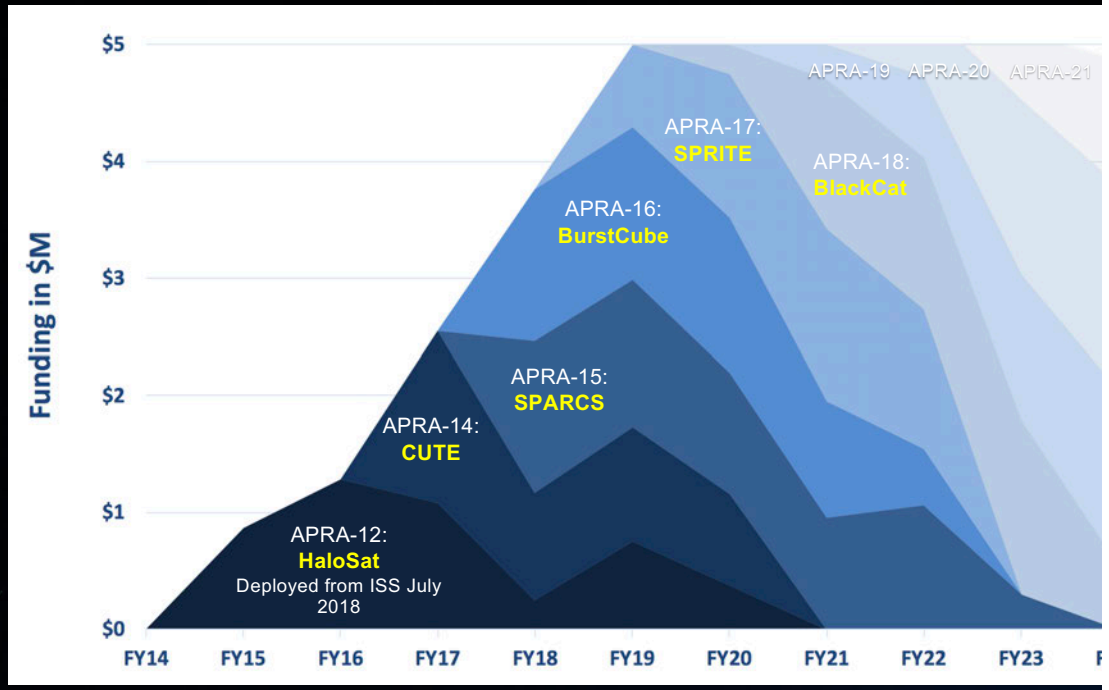
Super-Pressure Balloon Flights from Wanaka, NZ enable multi-day (night) astrophysics observation in the Southern Hemisphere.

8-12	>3	>300	>40
LAUNCHES PER YEAR	**CAMPAIGNS PER YEAR**	**STUDENTS PER YEAR**	**INSTITUTIONS PER YEAR**

NASA's Astrophysics CubeSat Initiative

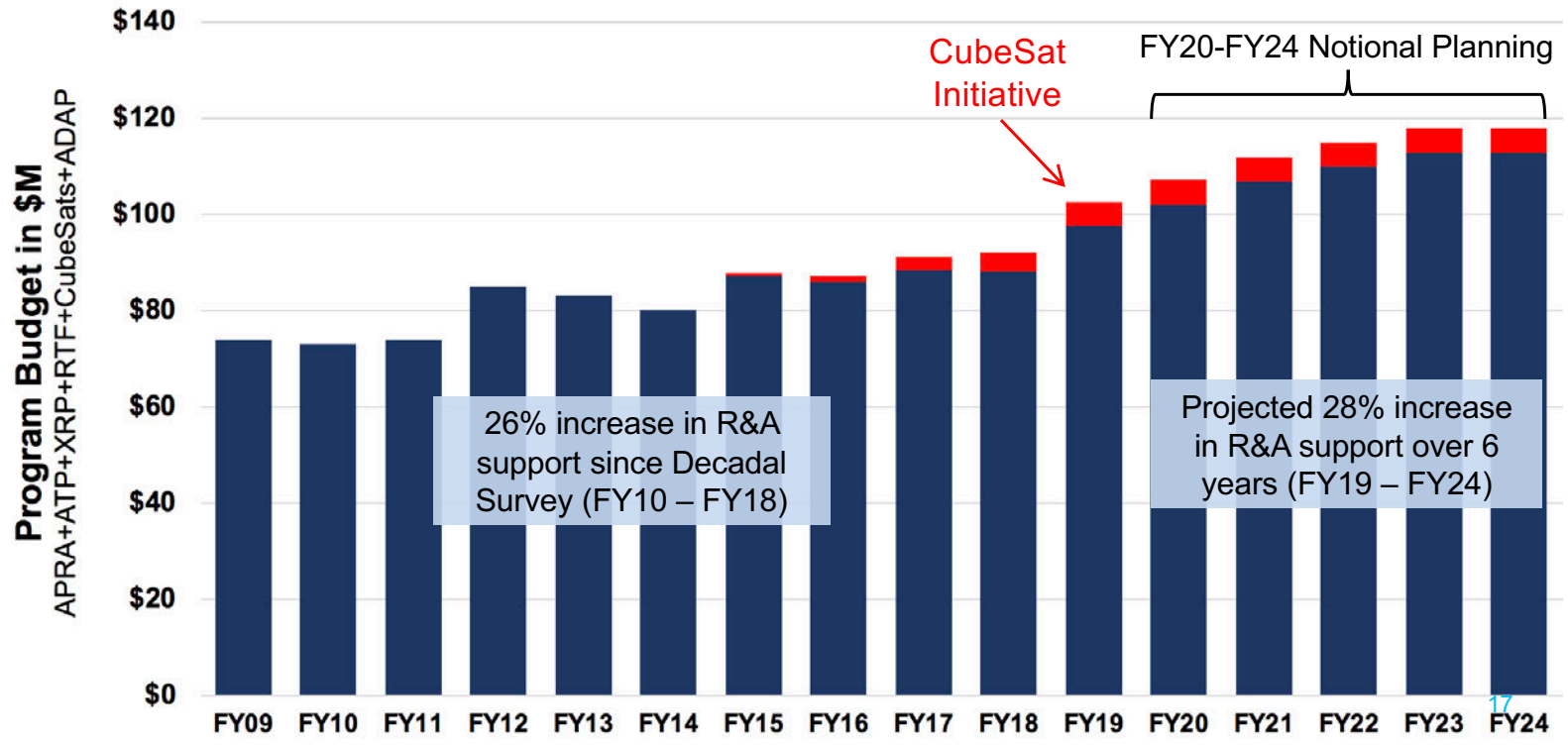
NASA's Astrophysics Division is investing approximately $5M annually in a new CubeSat initiative.

HaloSat, our first CubeSat, is in orbit and is producing excellent data.



Growth in R&A Funding ($M)

Program	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
R&A	$74	$73	$74	$85	$83	$80	$87	$86	$89	$88	$98	$102	$107	$110	$113	$113
CubeSat							$0.9	$1.2	$2.5	$3.9	$5	$5	$5	$5	$5	$5
Total	$74	$73	$74	$85	$83	$80	$88	$87	$91	$92	$103	$107	$112	$115	$118	$118



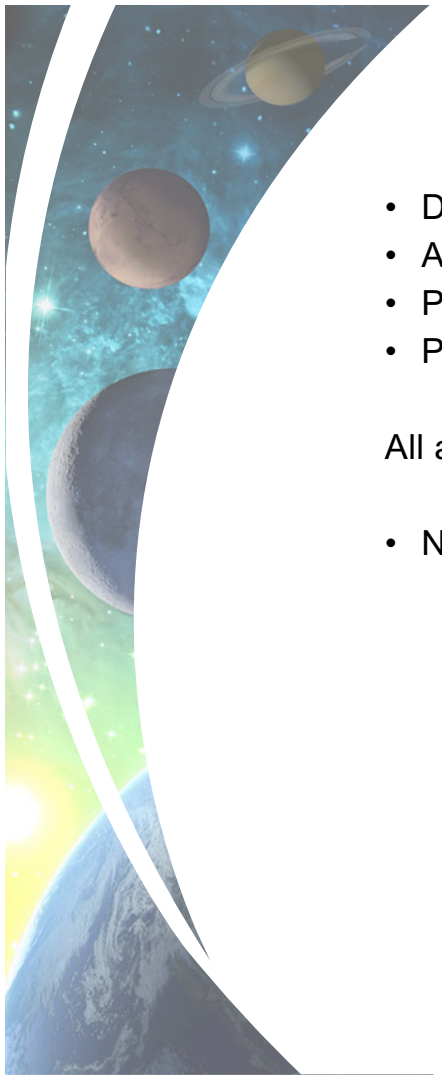
Building An Excellent Workforce

NASA achieves excellence by relying on diverse teams, both within and external to NASA, to most effectively perform NASA's work

NASA Science Mission Directorate

- Developed a PI resources webpage at https://science.nasa.gov/researchers/new-pi-resources
- Introduced pre-reviews of mission peer review panels to ensure diversity
- Added a code of conduct requirement for SMD-funded conferences to ROSES 2019
- Included career development positions and associated evaluation criteria as part of AOs
- Implemented a Code of Conduct and implicit bias training for all ROSES peer reviews
- Adopting dual anonymous reviews for all GO programs, and piloting them for other R&A programs, following successful demonstration by STScI for Hubble GO program
- Presented a national symposium by SMD AA Thomas Zurbuchen on lessons learned regarding mission proposal success
- Announced a workshop for potential mission PIs, see https://science.nasa.gov/researchers/pi-launchpad
- Is developing award terms and conditions mandating reporting harassment, similar to NSF's
- Is presenting information sessions at major conferences, including the Honolulu AAS Meeting, to support people developing their first proposal
- Tasked the Astro2020 Decadal Survey to "Assess the state of the profession. Identify areas of concern and importance [regarding] the future vitality and capability of the astronomy and astrophysics work force. Where possible, provide specific, actionable and practical recommendations to the agencies"

NASA is looking forward to specific, actionable, and practical recommendations



Astrophysics Division Hiring

- Deputy Division Director
- Associate Division Director for Flight Projects
- Program Scientist(s)
- Program Executive(s)

All advertisements have closed

- NASA will be calling for IPA applications in the Fall