

2019 KAVLI WORKSHOP ON  
GROUND-SPACE COORDINATION

# ATTENDEES

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David Ciardi, NASA

Shawn Domagal-Goldman, NASA

Christophe Dumas, TMT

Debra Elmegreen, Vassar

Kelly Fast, NASA

Cynthia Froning U. Texas

B.-Scott Gaudi, Ohio State

Richard Green, U. Arizona

Heidi Hammel, AURA

Steve Howell, NASA

Anne Kinney, NSF

Laura Kreidberg, Harvard

Charles Lawrence, NASA-JPL

Nancy Levenson, STScI

Hilton Lewis, Keck

Jennifer Lotz, Gemini

Chris Martin, The Kavli Foundation

Pat McCarthy, GMT0

Karen Meech, UH-IfA

Margaret Meixner, Johns Hopkins

Matt Mountain, AURA

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Josh Peek, STScI

Mario Perez, NASA

Marshall Perrin, STScI

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Laurent Pueyo, STScI

Ken Sembach, STScI

Robert Simcoe, MIT

Elizabeth Tasker, JAXA

Jason Tumlinson, STScI

Michael Turner, The Kavli Foundation (U. Chicago)

Alycia Weinberger, Carnegie DTM

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# ORIGINAL MOTIVATION

- Assess the need for enhanced ground/space coordination
- Use exoplanets/search for life as case exemplar
- Look at barriers to coordination, opportunities for new models
- Look at Agency roles, observatory roles, community roles

# WHAT HAPPENED NEXT

- Focus became against the backdrop of Great Questions in general. “How alive is the Universe?” and “How did it get that way?”
- Early theme: The Great Questions we are asking require responses bigger than any one division or agency can provide

# OBSERVATIONS: COMMUNITY

- The nature of how we work, how we reward, and how we plan is not generally compatible with tackling large, interdisciplinary problems or coordinating science

# OBSERVATIONS: NSF

- NSF 'Big Ideas' do not necessarily incorporate NSF's own facilities and existing resources and do not explicitly connect w/ relevant science opportunities at other agencies.

# OBSERVATIONS: NASA

- NASA's space-based missions do not generally incorporate or identify necessary ground-based assets needed to accomplish the mission, and by extension do not budget for this component
- Aim to support mission success, more efficiently, more effectively

# GRAND CHALLENGES NEED GRAND FACILITIES

- Story of life needs large direct imaging/spectra missions in space and ~30m telescopes on the ground
- Fundamental questions require them to work together, and for other facilities to enable them.



# COORDINATED OBSERVATIONS

- Top level requirements:
  - Ability to submit proposals requesting observing time across facilities
  - Ability to trigger observations rapidly
  - Ability to request time-coordinated observations

# BARRIERS

- The scale of the science has outgrown the current funding model and mechanism
- Example: the era of \$30M instruments on the ground

# BARRIERS

- Double, triple, quadruple jeopardy in proposal writing and reviews hampers ground/space coordination

# EARLY CAREER WORKFORCE DEVELOPMENT & DIVERSITY CONSIDERATIONS

- Key Projects engage wider communities
- Better archives widen access
- Extending the PI development efforts at NASA recommended
- Technology development on the ground (and small missions in space) help build instrumentalists of the future.

# CULTURE CHANGES

- PI-driven operations model works against collaborations and larger projects, and perpetuates duplication of science, facilities, and instrumentation

# CULTURE CHANGES

- Data archives must make data that is accessible, usable, and reliable
- Ground-based facilities are slow to catch up to space (and aren't incentivized to do so)
- Do we need an archive mandate?

# CULTURE CHANGES

- Need new incentive models for instrument builders, software engineers