The U.S. Contributions to SONG

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...on behalf of the U.S. SONG consortium...

March 29, 2010
SONG – Third Workshop
Beijing, China
The U.S. Team

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  James Neff
  Joe Carson
  George Chartas
  Laura Penny
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- Bernie McNamara (NMSU)
  Jon Holtzman
  Tom Harrison
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- Travis Metcalfe (HAO)
  Michael Thompson
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- Frank Hill (NSO/NOAO)
- Joyce Guzik (LANL)
- Marc Pinnsonneauault (OSU)
- Andrew Gould
- Scott Gaudi
- Sara Seager (MIT)
- Jesper Schou (Stanford)
- Dimitar Sasselov (CfA)
- Scot Kleinman (Gemini Obs.)
  Atsuko Nitta-Kleinman

... in consultation with Denmark and colleagues worldwide
Outline

1. Current Proposal
   - What funding agencies want
   - Sites

2. U.S. Complimentary Projects

3. Future

4. Conclusions
Current Proposal

- What funding agencies want
  - Sites

U.S. Complimentary Projects

Future

Conclusions
Intellectual merit
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White paper for Astro 2010 decadal survey

“...astroseismology is the next frontier in stellar astrophysics ...”
Intellectual merit

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- convection, low-metallicity stars, helium abundances,
  (internal) rotation, rigorous tests of theory of stellar evolution
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- small planet/large orbit detections, planetary-formation theories and statistics, context for our own solar system
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- small planet/large orbit detections, planetary-formation theories and statistics, context for our own solar system
- GRB afterglow, Doppler imaging, solar oscillation measurements, etc.
Broad scientific impacts

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- public outreach
Our strategy - merit

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- follow up observations with consortium resources - Charleston’s robotic photometric telescope at Fairborn Obs., robotic 0.5m in the U.S. Virgin Islands, NMSU’s 1m and 3.5m, etc.
Our strategy - impacts

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- expand partners as the telescopes come online - equal access to all SONG data for members
Things to address

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- how to make asteroseismology, in particular, suitable for undergraduates in the classroom
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Possible U.S. locations
Network integration
Mauna Loa Solar Observatory, Hawaii
Mauna Loa

- Operated by the High Altitude Observatory (HAO)/National Center for Atmospheric Research (NCAR)
- 3400 meters
- currently only a daytime facility
- we will need a part-time night astronomer for SONG
- mostly instruments for chromospheric and coronal studies + GONG
- hundreds of publications from these data
Kitt Peak National Observatory, Arizona
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- operated by the National Optical Astronomy Observatory (NOAO)
- 2100 meters
- large collection of night and daytime telescopes
- WIYN and NSO McMath-Pierce/SOLIS
Apache Point Observatory, New Mexico

Latitude 32° 46' 49" N            Longitude 105° 49' 13" W
Elevation 2788 meters
Apache Point

- operated by New Mexico State University and the Astrophysical Research Consortium (ARC)
- 2788 meters
- Sloan Digital Sky Survey (SDSS), ARC 3.5m, and the NMSU 1m
- shares the mountain top with the NSO
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- *GONG + Solar Dynamics Observatory (SDO)* for solar measurements and calibrations in the daytime
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- “recruit” from the Kepler U.S. science teams since the science objectives overlap
Alternatives

- retrofit of existing 1m telescopes (like NMSU)

- other sources of funding besides NSF

- additional instruments for U.S. SONG nodes to attract other potential collaborators
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- suggestions wanted!