ExoPAG Report

NAC Astrophysics Subcommittee Telecon
November 19, 2013

Scott Gaudi
(ExoPAG EC Chair)
EC Membership.

• Current EC members.

Scott Gaudi (Chair) Ohio State
Nick Cowan Northwestern
Aki Roberge NASA Goddard
Tom Greene NASA Ames
Lisa Kaltenegger MPIA
Amy Lo Northrop Grumman
Dave Latham SAO
Peter Plavchan Caltech/NexSci
Gene Serabyn JPL
Remi Soummer STScI
Jonathan Fortney U.C. Santa Cruz
Wes Traub (Ex officio) JPL
Doug Hudgins (Ex officio) NASA Headquarters
James Kasting (Ex officio) Penn State
Activities since April 2013.

- Progress with current SAGs.
- Developed case for two new SAGs.

- One meeting:
  - ExoPAG 8, October 5+6, Denver, CO

- Planning for next meeting:
  - ExoPAG 9, January 4+5, Washington, DC
Current SAGs.

- SAG4: Planetary Measurements Needed for Exoplanet Characterization – Lisa Kaltenegger
  - Draft report completed, final report delivered by ExoPAG 9.

- SAG8: Requirements and Limits of Future Precision Radial Velocity Measurements – Dave Latham, Peter Plavchan
  - Presentations at ExoPAG 6, 7 and 8
  - Report started, final report by ExoPAG 9 (?)

  - Announced and official charter sent on 3/7/2013.
  - First report at ExoPAG 8
ExoPAG 8.

- October 5+6, Denver, CO
  - Weekend prior to the 45th DPS Meeting
- Began with a moment of silence for our missing NASA colleagues.
- Topics:
  - Update on existing SAGs.
  - Mini-workshop: Update on the progress toward a high-contrast imager in space.
  - What do we need to do to prepare for WFIRST–AFTA exoplanet surveys?
  - Mini-workshop: What do we need to do to ensure a robust measurement of $\eta_{\text{Earth}}$?
- Toward a broad, unified, and coherent exoplanet roadmap.
- (Some) talks available online:
Suggestions for New SAGs.

• SAG10: Characterizing the Climate of Transiting Planets with JWST and Beyond (Nick Cowan, Chair)
  - Which critical measurements will be too expensive or inaccessible to JWST, and can these be obtained with planned ground- or space-based observatories?

• SAG11: Preparing for the WFIRST microlensing survey (Jennifer Yee, Chair)
  - What scientific programs can be undertaken now to ensure the success of the WFIRST microlensing mission and maximize its scientific return?
Toward an Exoplanet Roadmap.
Goal.

To develop a holistic, broad, unified, and coherent exoplanet roadmap for the next 5–10 years, with community consensus, focusing on areas where NASA can contribute.
Why?

• Thesis: A community consensus going into the mid-decadal review, and particularly the next decadal survey, will improve the chances that our priorities will be executed and/or highly ranked.
Science Roadmap

2010-2020
- A Complete Exoplanet Census

2020-2030
- Characterization of a Diversity of Other Worlds

2030-2040
- Our Nearest Neighbors: Surveying Nearby Planetary Systems and Searching for Habitable Climates

Mission Roadmap

Ground-Based Mission-Supporting Observations

- TESS
- JWST
- Spitzer
- Kepler

- Transit Char. Mission?

- Astrometry Mission?

F-DIM: (Flagship Direct Imaging Mission)
| What is the frequency and diversity of planetary systems? (Demographics) | RV | HST | Spitzer | Kepler | Gaia | TESS | JWST | WFIRST+C | Transit Char. Mission | F-DIM | Astrometry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Obtain a complete statistical census of planets in the Galaxy. | X | X | | | | | | | | | |
| Survey the closest planetary systems. | | X | X | X | X | | X | | X | X | X |
| (Measure the frequency of potentially habitable planets) | | | X | X | | | | | | | |
| Characterize a diverse set of planetary atmospheres. | | | | | | | | | | | |
| Characterize exoplanets orbiting the closest stars. | X | X | | | | | | | | | |
| (Understand the interiors, surfaces, and atmospheres of Earthlike exoplanets.) | | | | | | | | | | | |
| Is there life on other planets? | | | | | | | | | | | |
| Measure the frequency of potentially habitable planets. | X | | | | | | | | | |
| Understand the interior, surfaces, and atmospheres of Earthlike exoplanets. | | | | X | | | | | | |
| Find nearby potentially habitable planets. | X | | | | | | | | | |
| Discover habitable climates on nearby planets. | | X | | | | | | | |
| Search for surface and atmospheric biomarkers. | | | | | | | | X | | |