ExoPAG 10:
Introduction and Motivation

ExoPAG 10 Meeting
Boston, MA
June 6, 2014

Scott Gaudi
(ExoPAG EC Chair)

EC Membership.

- Current EC members (as of April 2013).

Rus Belikov	NASA Ames
Nick Cowan	Northwestern
Jonathan Fortney	U.C. Santa Cruz
Scott Gaudi (*Chair)*	Ohio State
Dave Latham	SAO
Amy Lo	Northrop Grumman
Peter Plavchan	Caltech/NexSci
Gene Serabyn	JPL
Remi Soummer	Space Telescope Sci. Inst.
Maggie Turnbull	Global Science Institute
Lucianne Walkowicz	Princeton University
Doug Hudgins (*Ex officio)*	NASA Headquarters
James Kasting (*Ex officio)*	Penn State
Wes Traub (*Ex officio)*	JPL

Charter.

In June 2009, NASA formed the *Exoplanet Exploration Program Analysis Group* (ExoPAG), responsible for soliciting and coordinating community input into the development and execution of NASA's Exoplanet Exploration Program (ExEP). The ExoPAG serves as a community-based, interdisciplinary forum for analysis in support of activity prioritization and for future exploration.

- Articulate the key scientific drivers for exoplanet research.
- Evaluate the expected capabilities of potential ExEP missions for achieving the science goals of the program.
- Evaluate ExEP goals, objectives, investigations, and required measurements **on the basis of the widest possible community outreach**.
- Articulate focus areas for needed mission technologies.
- Identify related activities that enhance the ExEP mission portfolio such as ground-based observing, theory and modeling programs, and community engagement.

Methods & Activities.

- Solicit community input through ExoPAG meetings.
- Identify questions and inquiry areas.
- If needed, form Study Analysis Groups (SAGs) or Science Interest Groups (SIGs) to address these questions in depth.
  - Chaired by EC members (generally), but comprised of community members.
- Deliver conclusions and community input to NASA through the Astrophysics Subcommittee (APS) of the NASA Advisory Council (NAC).
  - Includes final reports from SAGs.

ExoPAG Meta-goal:

Develop a holistic, broad, unified, and coherent exoplanet plan for the next 5-10 years, with community consensus, focusing on areas where NASA can contribute.

Current SAGs, Part 1.

- SAG4: Planetary Measurements Needed for Exoplanet Characterization (Lisa Kaltenegger, Chair)
  - Draft report completed.
- SAG8: Requirements and Limits of Future Precision Radial Velocity Measurements (Dave Latham, Peter Plavchan, co-Chairs)
  - Kick-off “mini workshop” during ExoPAG 6
  - Presentations at ExoPAG 7, 8, 9, 10.
  - Report started, final report by end of year.
- SAG9: Exoplanet Probe to Medium Scale Direct-Imaging Mission Requirements and Characteristics (Rémi Soummer, Chair)
  - Reports at ExoPAG 8, 9, 10.
  - Scope revised, regular telecons, final report by end of the year.

Current SAGs, Part 2.

- SAG10: Characterizing the Climate of Transiting Planets with JWST and Beyond (Nick Cowan, Chair)
  - Announced and charter circulated on 12/12/13.
  - Kick-off “mini-workshop” during ExoPAG 9.
  - Outline of report started, final report by end of the year
- SAG11: Preparing for the WFIRST microlensing survey (Jennifer Yee, Chair)
  - Announced and charter circulated on 12/11/13.
  - Presentations at ExoPAG 8, 9, 10.
  - Discussion at Microlensing 18, regular telecons
  - Draft report completed.

ExoPAG 6, 7, 8, 9.

- Since June 2012:
  - ExoPAG 6: October 13-14, 2012, Reno, NV
  - ExoPAG 7: January 5+6, Long Beach, CA
  - ExoPAG 8: October 5+6, Denver, CO
  - ExoPAG 9: January 4+5, Washington, DC
- Primary topics/questions addressed:
  - What is the landscape of current and future missions?
  - What are the radial velocity requirements to support NASA's goals and current and future missions?
  - What do we need to characterize exoplanets and their host stars?
  - Update on the progress toward a high-contrast imager in space.
  - What do we need to do to prepare for WFIRST-AFTA exoplanet surveys?
  - What do we need to do to ensure a robust measurement of η_{Earth}?
  - What is the potential of JWST to characterize transiting planets?
- (most) Talks available online:

http://exep.jpl.nasa.gov/exopag/exopag#/agenda/

What we've learned.

- Continued investment in extracting science from Kepler is both worthwhile and critical.
- The telescope time needed for precision RVs to support NASA missions (Kepler, TESS, WFIRST-AFTA) will far exceed available resources.
- The frequency of habitable planets is not one number; need to specify distribution functions and/or agree upon a fiducial definition for a habitable planet.
- Need to determine overlap of RV surveys and ground-based direct imaging surveys with potential future direct imaging (space) missions.
- Need to determine what is needed to characterize exoplanets; need to figure out whether or not JWST can characterize habitable planets.
- Need to identify the future roles of astrometry and interferometry.

Recent and Upcoming Developments.

1. WFIRST-AFTA blessed for future study, with coronagraph baselined, coronagraph architectures selected.
2. Science and Technology Definition Teams interim reports released.
3. Kepler reaches end of its primary mission; future: primary mission closeout + K2.
4. Gaia, JWST, TESS, CHEOPS, PLATO (?) are here or imminent.
5. Mid-decadal and next Decadal Review.

Joint COPAG/ExoPAG Meeting.

- June 5
- SAG Reports:

  SAG 6: COR Science enabled by a WFIRST coronagraph

  SAG 7: COR Science enabled by operations overlap with HST
- Reports from committees:

  Beyond JWST

  ATLAST

  Starshade STDT

  Coronograph STDT

Goals of ExoPAG 10.

- Continue work on previous questions.
  - SAG reports.
- New mission: PLATO.
- “Mini Workshop” on direct imaging technology.
- Astrometry, redux.
- Toward a broad, unified, and coherent exoplanet plan.

We want your input!

Welcome, and thanks for coming.