

Astro 2020



Decadal Survey on Astronomy and Astrophysics

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The National Academies of Sciences, Engineering, and Medicine are private, nonprofit institutions that provide independent advice to the nation on pressing science issues.

For each of our studies, committee members are chosen for their expertise and experience, and they serve pro bono to carry out the study's statement of task. The final report will represent the consensus view of the committee and will go through extensive peer review.

Astro2020 Co-Chair: Fiona Harrison



- Research interests: high energy astrophysics, compact objects, active galaxies, instrumentation
- Professor, Caltech (1995 - present)
- PI, NASA's NuSTAR mission
- Former Chair, NAS Space Studies Board
- Member JWST Independent Review Board
- Member Astro2010 survey committee
- Member NAS, AAAS

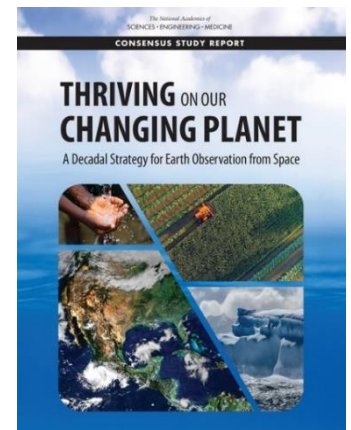
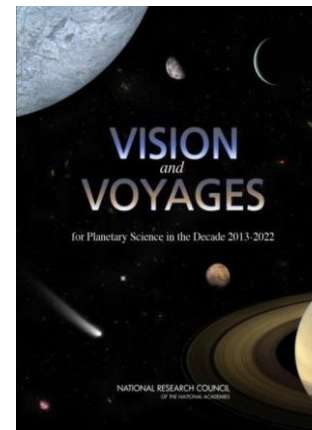
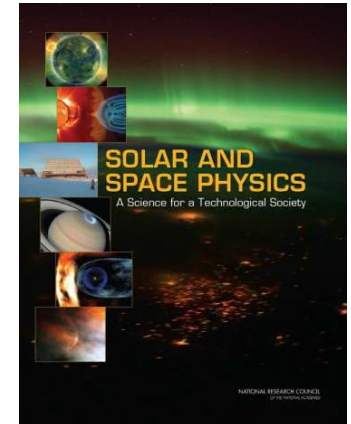
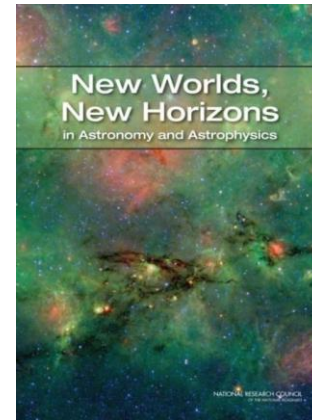
Astro2020 Co-Chair: Rob Kennicutt



- Research interests: multi-wavelength extragalactic astronomy, star formation and ISM in galaxies, cosmic distance scale
- Professor, University of Arizona
- Professor, Texas A&M University (TAMU)
- Emeritus Professor, University of Cambridge
- Former Editor-in-Chief, *Astrophysical Journal*
- Member Astro2010 survey committee
- Member NAS, AAAS, Fellow of the Royal Society

What is a Decadal Survey?

- **Undertaken by the National Academies of Sciences, Engineering, and Medicine for NASA, NSF and DOE and led by community members** who analyze and prioritize science questions for the next decade.
- **Provides prioritized recommendations** for government investment in research and facilities, including space and ground-based activities.
- **Required by US Congress** under the 2005 and 2008 NASA Authorization Acts, including an evaluation of risks/budgets for major missions. Also reaffirmed in NASA Transition Authorization Act of 2017.



Survey Scope

- Ground and space-based observations, theory, computation, lab astrophysics
- Ground-based solar astronomy
- Gravitational-wave observations related to astronomy and astrophysics
- Multi-messenger astronomy and astrophysics
- Exoplanets & Astrobiology
 - Informed by recent NAS studies: *Exoplanet Science Strategy* and *Astrobiology Strategy for the Search for Life*
- Consider implementation and scope of WFIRST, Athena, LISA
 - Need not be ranked
- Excluded: direct dark matter detection, microgravity research, fundamental physics, projects under construction (JWST, DKIST, LSST, DESI)

Statement of Task Highlights

- Review current state of astronomy and astrophysics
- Identify compelling science challenges for future
- Develop research strategy to advance scientific frontiers in 2022-2032
 - Recommend and rank high priority activities
 - Consider international and private landscape
 - Consider timing, cost, and risk
- Develop decision rules for robust program
- Assess the state of the profession
 - Provide specific, actionable and practical recommendations

Perspective from Sponsoring Agencies

- All 3 agencies (NASA, NSF, and DOE) & the National Academies want to see ambitious programs backed by strong science cases
- Need for clear decision rules
- NASA will deliver 4 flagship & 10 probe concepts for further evaluation

Notional Decadal Survey Timeline Shown at Jan AAS

The government shutdown has impacted this schedule, rebuild in progress

- Co-Chairs Announced - End of November 2018
- Survey committee identified & appointed - Spring 2019
In progress
- Panels formed - Late Spring, 2019
- Panel deliberations - Late CY2019
- Survey deliberations and report writing - Spring 2020
- Public report released - Late 2020
- Presentations to stakeholders - continuing after public report released

Science White Papers

Available at nas.edu/astro2020

- Science whitepapers showed robust interest from all segments of the community
 - Received ~**590 submissions** (vs. 337 for Astro2010)
 - Other communities (e.g., ESA VOYAGE 2050, Canada LRP2020) have adopted the same approach
 - Astro2020 is encouraging student journal club discussions, early career participation
 - Widespread discussion of papers ongoing

Activity, Project, or State of the Profession Considerations (APCs) White Papers

- ~300 Notices of Intent (NOI) received
 - Responses help with panel planning/expertise
- An NOI is not required before submitting an APC
- **5-10 page APCs will be due ~July 1**; announcement soon
 - APC White papers serve as useful guides for organizing requests for further info, and for defining inputs needed for the TRACE process.
 - Probe mission concepts should submit an APC white paper regardless of NASA sponsored study funding.
 - Large mission concepts (HabEx, LUVOIR, Lynx, Origins) should submit an APC white paper.

Survey Committee and Panels

- Steering committee ~20 members including co-chairs
 - Responsible for Decadal recommendations and final report
 - *>450 nominations were received*
 - *Nominations are in the approval process at NAS*
- Panel structure
 - 6 Science panels
 - 5 Programmatic panels for projects and activities
 - 2 State of the Profession panels
 - SoP 1: the health and climate of the field and its participants - including education, career paths, diversity and inclusion, public policy, etc.
 - SoP 2: the research portfolio - including laboratory astrophysics, computation, general technology development, etc.
 - Final details TBD

Technical, Risk, & Cost Evaluation (TRACE)

- Independent evaluation of project/activity concepts to help the committee assess feasibility
- Formerly known as “CATE”
- TRACE contractor will provide an analysis of technology development needs and an estimated cost range
- Contractor required to have expertise on ground-based projects (can use a sub-contractor)
- Concepts to be evaluated are early stage (pre-Phase A)
- Request for Information closed- Contractor selection will be completed by end of April

Community Engagement

- White papers
- Expand survey updates and information flow
 - Chairs' updates via Astro2020 website, Town Halls at AAS, etc.
 - **Mailing list signup at nas.edu/astro2020**
 - Live and web-based Town Halls
 - Local Town Hall meetings by survey committee members
 - Continuously updated FAQ page
 - Ongoing outreach to early-career community
 - National Academies held Early-Career Astro2020 Workshop (2018) and Chairs met with leaders to review recommendations.
 - Submit feedback at astro2020@nas.edu

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Questions?

Please type your questions into the Zoom chat box

Learn more: nas.edu/astro2020