

Laboratory Astrophysics Division of the American Astronomical Society

Annual Report

August 31, 2021



Executive Committee Members

Chair: Murthy Gudipati – Jet Propulsion Laboratory, California Institute of Technology
Vice Chair: Stefanie Milam, NASA Goddard Space Flight Center
Past Chair: Phillip Stancil – University of Georgia
Treasurer: Christiaan Boersma – NASA Ames Research Center
Secretary: Rachel L. Smith – NC Museum of Natural Sciences; Appalachian State University
Member at Large (Molecules): Brett McGuire – Massachusetts Institute of Technology
Member at Large (Particles): Dawn Williams – University of Alabama
Member at Large (Plasmas): Mike Hahn – Columbia University
Member at Large (Planetary): Silvia Protopapa – Southwest Research Institute
Member at Large (Atoms): Joan Marler – Clemson University
Member at Large (Dust & Ices): Edith Fayolle – NASA JPL
Member at Large (Nuclear): Carla Frohlich – North Carolina State University

Overview

The Laboratory Astrophysics Division (LAD) came into being at the AAS Anchorage meeting of June 2012. The 8th election (2021) resulted in the election of the new vice-chair and two new Members -at-Large in the areas of Molecules and High Energy Particles. The winners were announced at the LAD business meeting held during the virtual annual LAD/AAS joint meeting in June 2021. LAD currently has 239 members (including AAS staff and 8 affiliate members). This number is very similar to the one we had at the time of the last Division report. The LAD listserv has 711 subscribers, slightly larger than the last Division report (699). On March 30, 2021, our total financial balance was \$34,960, compared to \$29,335 and \$33,950, at the end of CY2019 and CY2020, respectively. For the first quarter of CY2021, our revenue from dues and contributions totaled \$1,010, compared \$1,922 during the same period last year.

LAD executive committee has been holding regular monthly virtual meetings to discuss the progress made in the previous month(s) and forthcoming action items. For the near-term and immediate action items email and/or phone conversations are used. Most of the monthly meetings focus on LAD/AAS meetings and sessions, the LAD awards and prizes, webpage and LAD logo improvements, as well as means to engage the community with LAD. We also established communication between LAD and AAS administrative staff through LAD Secretary to enable coherent and effective communication.

Additional focus of LAD coming years is (a) to increase its membership through the membership drive with the help of AAS, and (b) to interface with other AAS divisions, including organizing joint meetings that enable cross-discipline collaborations.

Highlights for 2020 - 2021

LAD officers and committee members have been publicizing LAD and the research involving laboratory astrophysics at a number of national and international meetings to encourage the community of users and providers to join LAD. Turning all meetings to virtual due to COVID-19 had a significant impact on recruiting new members.

January 2021 LAD Sessions at the AAS Winter Meeting:

For the first time LAD has successfully organized two sessions at the 237th AAS 2020 virtual winter meeting. Our strategy is to bring current activities in astrophysics and planetary sciences to the AAS meetings, focusing on the critical role LAD community could play. These two sessions have attracted general AAS members as well as the members of the divisions.

One session was focused on “*New Lunar explorations*” – with renewed interest of NASA for the human explorations of Moon and beyond, this session provided a summary of our present understanding of the Moon and the role of laboratory research in future explorations. Clive Neal gave a summary of Lunar science beyond the Moon, Thomas Orlando spoke on laboratory studies enabling lunar science, and Jessica Barnes spoke about the sample return, curation, and analysis with the example of the analysis of lunar Apollo samples curated for over 40 years.

The other session was on “*Kuiper Belt Objects (KBOs)*” – how understanding of these primitive bodies provides clues into the formation of our solar system as well as the origin of life on Earth. Allan Stern, PI of NASA’s New Horizons mission to Pluto and KBOs presented the highlights of the mission, while Stefanie Milam discussed future laboratory and observational opportunities of JWST mission for small body research. Nir Goldman discussed how building blocks of life could be produced when such primitive bodies had impacted Earth during early stages of the solar system formation. Based on this success, LAD proposed two sessions for the 239th AAS 2022 winter meeting that have been approved by the AAS (details below). We are looking forward to a successful conclusion of these sessions.

June 2021 LAD Sessions at the AAS Summer Meeting: A series of six sessions were held at the virtual 2021 LAD Annual Meeting: “*Bridging Laboratory and Astrophysics*” organized by the LAD Committee. The lead organizer for the 2021 meeting was the (then) Vice-Chair Murthy Gudipati with help from Secretary Rachel Smith and (then) Chair Phillip Stancil. The sessions were organized around six different themes:

Venus Science & Sample Return; Turbulence; Fundamental Nuclear and Atomic Data for Compact Objects; Astrochemistry I; Astrochemistry II; and Planetary Bodies and Exotic Molecules.

The highlight of the LAD Venus session was that the invited speakers are the PIs of two Discovery missions that were proposed at the time of invitation and both were selected just a week before the June 2021 meeting. There was excitement in the well-attended audience and the speakers.

In spite of being a virtual meeting, there were a good number of invited, contributed, and iPoster Plus presentations (47, compared to 51 in 2020). Invited talks were 16, including one plenary and prize/award talks. We had a high number (31) of requests for contributed talks and iPoster Plus, but due to limited time availability only 6 were accepted for oral presentation and the remaining 25 were assigned to iPoster Plus sessions.

January 2022 LAD Sessions at the AAS Winter Meeting: As of July 2021, we have been approved for two science splinter meetings at the winter AAS: “Laboratory Astrophysics Division: Mars Habitability Session” (Session 1084) and “Laboratory Astrophysics Division: Experimental and Theoretical Needs for the James Webb Space Telescope” (Session 1083). The Mars session will include invited presentations with contributed talks and the JWST session will be a panel of observers and experimentalist/theorist discussing the needs for data analysis and interpretation. A reception event is also being planned and will be co-sponsored by Ball Aerospace to recruit new members and exploit the Webb community that may participate in the special session.

Plenary, Prizes, and Awards CY2021: At the Summer 2021 Virtual AAS meeting, Karin Öberg (Harvard University) delivered the plenary lecture on the “*Origins of Astrochemical Complexity*”, which was

extremely well-attended. Exemplifying how observations and laboratory research work hand-in-hand, Karin highlighted the advancements that have been made in our understanding of the molecular complexity in protoplanetary environments – thanks to recent telescopes like ALMA and laboratory work.

The winner of the 2021 Laboratory Astrophysics Prize was Geoffrey Blake of the California Institute of Technology. As an observational and laboratory astrophysicist, Geoff's talk at the 2021 Annual AAS/LAD virtual meeting was aptly titled "*Tales from a Life in Laboratory and Observational Molecular Astrophysics*".

The 2021 Early Career Award went to Javier Garcia of the California Institute of Technology. His award talk at the 2021 Annual AAS/LAD virtual meeting was titled "*From Atoms to Black Holes: Modeling Dense Astrophysical Plasmas*".

The 2021 Dissertation Prize went to Jennifer Bergner (Ph.D. at Harvard University) from the University of Chicago. She gave her prize talk "*Oxygen Insertion Chemistry: A Low-temperature Channel to Organic Molecule Production*" at the 2021 Annual AAS/LAD virtual meeting.

LAD By-Laws

LAD Secretary Rachel Smith led the revision of the LAD By-Laws, which were approved unanimously by LAD membership who voted, and were subsequently approved by the AAS. Major revisions included details on membership, officers, prizes, and branding. These are now posted on the LAD website.

Ongoing Activities:

A number of nominations are under consideration for next year's prizes, including the Laboratory Astrophysics Prize, the Early Career Award, and the Dissertation Prize. The first two are expected to be evaluated by the LAD Honors Committee at the beginning of September in two separate committees chaired by Phillip Stancil and Murthy Gudipati.

AAS Journals continued to coordinate with LAD on the monthly blast of Laboratory Astrophysics papers sent out to LAD listserv members. Laboratory Astrophysics articles published each month in the AAS journals are compiled with the goal of sending the blasts before the 15th of each month. LAD has monthly Zoom meetings with the entire Executive Committee to confer on action items and strategic planning.

LAD Events' Chronology:

- Sep 2020: Nominations due for Laboratory Astrophysics Prize (LAP) and Early Career Award (ECA)
- Sep 2020: Honor Committee formed
- Sep 2020: Call sent out for Dissertation Prize
- Oct 2020: AAS Leadership Meeting
- Nov 2020: Completed proposed sessions and speakers for 2020 LAD meeting
- 31 Dec 2020: Nominations for Dissertation Prize due
- Jan 2021: Prepared press releases for LAP and ECA winners.
- Jan 2021: LAP and ECA awards announced
- Jan 2021: Dissertation Prize winner selected
- Jan 2021: Finalized summer meeting plans
- Feb 2021: Ask IT staff update LAD membership list to prepare for upcoming election
- Feb 2021: Beginning of 16-week election period. Sent out call for the vice-chair position and two open Members-at-large seats (in Molecules & Particles). Form Nominations Committee.
- Mar 2021: Prepared press release for Dissertation Prize
- Mar 2021: Dissertation Prize Announced

- Apr 2021: Close of nomination period. Candidate slate received from Nominating Committee
- May 2021: Voting began
- End May 2021: Voting ended and winners informed.
- June 2021: Had AAS IT update the LAD Executive Committee mailing list
- June 2021: LAD session proposals submitted and approved by AAS in July 2021 for the AAS 239th winter meeting.
- July 2021: Sent out final call for nominations for the 2021 Laboratory Astrophysics Prize (LAP) and Early Career Award (EAC) nominees
- 15 July 2021: Closing date for LAP and EAC nominations
- Aug 2021: Created list of nominees and their institutions and letter writers and their institutions to guide in the formation of an Honors Committee free of any conflicts of interest
- Aug 2021: Honors Committee formed
- Sept 2021: To Select LAP and EAC winners