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CHAPTER VII

THIRTIETH GENERAL ASSEMBLY

SPECIAL PRESENTATIONS

1. Invited Discourses and Public Talk

The following Invited Discourses are overview talks given by scientists who are highly eminent in their fields.

Wednesday, 22 August: "The new exploration of the Universe through gravitational-wave observations" by Marica Branchesi, Gran Sasso Science Institutue, L'Aquila, Italy

Thursday, 23 August: "Galaxy Evolution in 3D" by Lisa Kewley, Australian National University, Weston Creek ACT, Australia

Monday, 27 August: "Observing Planet Formation" by Sean Andrews, Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts, USA

On August 24, Robert Williams, Past President from the Space Telescope Science Institute and Distinguished Osterbrock Professor of the University of California Santa Cruz, USA, gave a public lecture on "Probing the Distant Universe with the Hubble Space Telescope."

2. Launch of IAU 100th Anniversary Celebration

The inaugural celebration of 100 years of the IAU took place on Tuesday August 28, with music, an IAU video, and new ideas and expectations presented by Luiz Felipe Santiago Rodriguez and Olesky Golubov. Past President Catherine Cesarsky presented her "Reflections on 100 years of IAU."

Note added in 2023: Prof. Cesarsky's full speech, with photos, was subsequently published in "Under One Sky: The IAU Centenary Symposium," Proceedings of the International Astronomical Union, Volume 349, pp. 25–47, Cambridge University Press, 2019, available online, so is not repeated here.

Dr. Ewine van Dishoeck, IAU President-Elect and Chair of IAU100 Task Force:

In 2019, the IAU will celebrate its 100 year anniversary. To commemorate this milestone, the IAU will organize a year-long celebration to highlight a century of astronomical discoveries and to further stimulate the use of astronomy as a tool for education, development and diplomacy. The IAU100 theme "Under One Sky" was chosen to emphasize the worldwide nature of our field and the role that the IAU has played in bringing people together and uniting them to explore the universe.

Planning of IAU100 started in 2017. It is appropriate that the kick-off of these celebrations takes place here at the 2018 IAU General Assembly in Vienna. Some of you already attended the opening of the IAU100 "Above and Beyond" Exhibition

on Monday, featuring also a delicious huge IAU100 Sacher-Torte. Let me give you a brief overview of what we are planning to do in the coming year. In short, a lot! My thanks go to the IAU Task Force and secretariat, whose names are listed below, and in particular to our IAU100 coordinator, Jorge Rivero González, as the main driver of all the activities. See our website www.iau-100.org for up-to-date information on everything that will be happening.

The IAU100 activities will take place at global and regional levels, and especially at the national and local levels. We are preparing a comprehensive program of flagship initiatives to reach audiences worldwide through the IAU National Outreach Coordinator contact points in 123 countries. The target audiences range from the global astronomical community, national science organizations and societies, to policy-makers, students, amateur astronomers as well as families and the general public. Its program and organization make good use of the experience developed during the International Year of Astronomy 2009 (IYA2009), but IAU100 has a slightly different focus that includes highlighting astronomical discoveries over the past century as well as the role of the IAU in making them happen.

To address the latter point: there will be two IAU100 books that will both appear in 2019:

- The International Astronomical Union: Uniting the Community for 100 Years, by Johannes Andersen, David Baneke and Claus Madsen (Springer)
- IAU Symposium 349 "Under One Sky": the IAU Centenary Symposium proceedings, to be edited by Chris Sterken, John Hearnshaw and David Valls-Gabaud (CUP)

Please take the opportunity to attend IAU Symposium 349 here in Vienna in the coming days to learn more about the IAU history.

The overall goals of IAU100 are:

1. Increase awareness of progress and excitement in astronomy over the past century, in particular:
   - The importance of collaborative enterprise of astronomy as a whole
   - The importance of technology development for astronomical progress
   - The coordinating role of the IAU for the global astronomical community
2. Promote widespread access to astronomy knowledge and observing experiences.
3. Support and improve use of astronomy as a tool for education, development and diplomacy.
4. Support and improve an inclusive, equalitarian and diverse astronomy community.
5. Facilitate the preservation and protection of the world's cultural and natural heritage of dark and quiet skies.
6. Raise awareness and discuss prospective new exciting developments in the next 100 years of astronomy.

Note that these goals match well with the new IAU Strategic Plan 2020–2030 approved here at the GA in Vienna.

The IAU100 celebrations are structured around a number of flagship programs. These are global programs of activities centered on specific themes that will help to achieve IAU100's main goals. They include:

- IAU100 Celebrations

Through the organization of high-level events in different countries, the IAU100 celebrations will bring together high-level representatives, policy-makers and astronomers

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with an exciting program centered around Goal 1. The main event will be the "IAU100 Flagship event at Palais des Academies in Brussels (Belgium)" to be organized in April 2019 at the location where the IAU was founded in 1919.

- IAU100 Exhibitions

The IAU "Above and Beyond" exhibition, developed in collaboration with Science Now, showcases major achievements in astronomy in the last century, their wider technological and cultural implications, as well as selected IAU milestones. The inauguration of this travelling exhibition happened on August 20 2018 here in Vienna. By making the entire content open source, it can be easily reproduced (and translated) for venues elsewhere in the world. Also, a low-cost version is available worldwide in the form of A0 posters.

- New Worlds: Are We Alone?

The actions of this flagship program will foster a sense of global citizenship and critical thinking by encouraging the public at large to think about our place in the universe through the organization of activities related to exoplanets and astrobiology. Most notably, following previous IAU experience, the "NameExoWorld" project will offer the possibility to all nations in the world the possibility to give a name to an exoplanet system.

- 100 Years of General Relativity: Solar Eclipse

The year 2019 also marks the 100th anniversary of the solar eclipse observations that served as the first successful test of Einstein's Theory of General Relativity that fundamentally changed the way we understand gravity and the universe. This flagship program will highlight and explain this important milestone by organizing commemorative actions as well as reaching out to larger audiences, including schools, to raise awareness about the importance of gravity and Einstein's Theory of General Relativity by building on recent discoveries such as the detections of gravitational waves. A highlight will be the events, conferences and educational activities at Principe Island in late May 2019 where Eddington's expedition observed the Solar eclipse of 29 May 1919. Also, throughout the year, the "Einstein Schools" will educate children worldwide about the role of gravity in shaping our universe, with STEM professionals acting as mentors and encouraging enrollment.

- Astronomy for All

One important focus of the IAU100 celebrations will be the implementation of actions to support and encourage women and minority scientists and engineers at all career levels and promote inclusive, equitable work environments within astronomy-related careers. In addition, this flagship program will focus on facilitating access to astronomical resources and careers for people with special educational or physical needs, or those who might be excluded for their particular race or gender.

One highlight is the itinerant "Inspiring Stars" exhibition, which premiered here at the GA in Vienna a few days ago, and which focuses on visually challenged children and adults. Please go and see the exhibition if you have not yet done so. Another planned activity is the IAU "Women and Girls in Astronomy" day to commemorate the United Nations International Day of Women and Girls in Science on February 11th. Coordinated actions will be organized through the IAU's National Outreach Coordinator network to support women in astronomy and encourage girls for a career in science by providing access to excellent role models and mentors. Finally, the IAU will organize its first symposium ever on "Astronomy for Equity, Diversity and Inclusion – a roadmap to

action within the framework of the IAU centennial anniversary": IAU Symposium 358 will be held in Japan in November 2019.

- Star Parties

Through the organization of side-walk astronomy events, IAU100 plans to enable as many people as possible, especially children, to look at the sky through a telescope and gain a basic understanding of the universe. Selected worldwide actions include the "100 Hours of Astronomy" in January 2019, which will invite amateur astronomers, educators, professional astronomers, planetaria, science centers and more to arrange astronomy-related events around the world during this 4-day period to reach out to the public at large.

Moreover, 2019 is a special year because of the 50th anniversary of the Moon landing. Therefore, on July 20 2019, we will plan "Moon landing 50 years and Sea of Tranquility sidewalk events" calling on those who own portable telescopes around the world, to show the Moon from public squares and identify the site of the historic moon landing.

- Dark Skies for All

This flagship focuses on the promotion of the preservation of the dark and quiet skies, a topic that is becoming more and more urgent for our field and that has been on IAU's agenda for a long time. Note that there are various sessions organized here at the GA that we urge you to attend. As part of IAU100, a high-level conference with UNESCO is being planned in 2019–2020. Also, a new IAU Dark Skies Ambassadors Network for public engagement on light pollution protection actions will be formed, including government lobbying actions. It will capitalise on existing educational programs on light pollution such as the Quality Lighting Teaching Kit.

I hope that this brief overview of IAU100 provides you with a "taste" of what is to come in 2019. If you want to participate, please contact your National Outreach Coordinator. You can implement one of the endorsed activities locally, or develop an activity under one of the flagship themes, or implement your own idea. Your involvement will be vital for the IAU100 success, we need you!

The IAU Task Force consists of E.F. van Dishoeck (chair), P. Benvenuti, L. Canas, S.-L. Cheung, L. Christensen, R. d'Antonio, D. Elmegreen, J. Rivero González, K. Govender, M.T. Lago, S. Torres-Peimbert, I. Robson, P. Russo, R. Williams. The IAU100 Secretariat is located at Leiden Observatory, the Netherlands.

Note added in 2023: this report reflects the presentation that was made at the IAU GA in Vienna in August 2018, at the very start of IAU100. The full report of IAU100, published in 2020 after IAU100 ended, can be found at the IAU and IAU100 websites, at https://www.iau.org/static/archives/announcements/pdf/iau100-final-report-ann20019.pdf

3. City Hall Reception by the Mayor

The Mayor and Governor of Vienna, Michael Ludwig, welcomes the IAU General Assembly participants at the City Hall on Tuesday evening, August 21.

Dr. Silvia Torres-Peimbert, IAU President:

Distinguished hosts and friends,

For the International Astronomical Union it has been a privilege to have been hosted by the City of Vienna at its very fine Convention Center to hold its XXX General

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Assembly. More than 3000 participants of 89 different countries have registered to exchange ideas and reinforce international collaborations.

We all recognize that is an old city rich in history and culture. The City of Vienna has given us the opportunity that in addition to our daily scientific work, to enjoy the beauty of its buildings and parks, and to admire and enjoy its many museums and works of art.

In the personal side, Vienna has for me the extraordinary significance of having been the home of such distinguished musicians as Ludwig van Beethoven, Amadeus Mozart, and Johann Strauss, to extraordinary artists like Gustav Klimt, Oskar Kokoschka and Egon Schiele, whom I admire. and the father of psychoanalysis, Sigmund Freud, who has helped us to understand human behavior. In addition to those well-known valuable figures, all of the astronomers are aware that this city nurtured great scientists. I will refer only to those physicists whose research contributed to the understanding of my area of study in Astrophysics. I wish to refer to some of these distinguished physicists, Ernst Mach (1838 - 1916) for his study on shock waves, Ludwig Boltzmann (1844 - 1906) for the correlation of thermodynamics and mechanics, Lise Meitner (1878 - 1968) whose research in the field of radioactivity eventually led to the discovery of nuclear fission of uranium, Erwin Schrödinger (1887 - 1961), for the development of the atomic theory, Victor Hess (1883 – 1964) for the discovery of Cosmic Rays. And finally, I cannot resist commenting about another special attraction in this city: the famous Viennese coffee houses that have been included by UNESCO in the national inventory of intangible cultural heritage: “Viennese coffee house culture” with their delicious Sachertorte and Apple Strudel.

The fascination of science, and in particular of astronomy, is continuously expanding in most countries, among adults and children. I believe that this is marvelous since it shows that human curiosity and respect for nature and knowledge is an unperishable value.

4. Inspiring Stars Inaugural Event

The inaugural exhibition of “Inspiring Stars” occurred on August 22 at the Austria Center Vienna. “Inspiring Stars” is a travelling international exhibition designed to highlight, support, and promote inclusive initiatives in outreach and teaching, and at a professional level, in the field of astronomy. The IAU invited all attending members, members of Austrian organisations that cater for people with disabilities and/or impairments, the Austrian astronomical community, and members of the public to visit the exhibition and the special events taking place during the inauguration. With this exhibit, the IAU aims to move forward with its existing actions for the promotion of inclusion and equal participation in science.

All visitors to the exhibition were able to engage with interactive displays that showcased various resources for multi-sensorial exploration in astronomy from around the world. These include tactile planets, books, and posters (Spain, USA), a multi-sensorial optical telescope (USA), a tactile telescope model (Japan), software that translates astronomical data into audio output (Argentina and Australia), and many more. The inauguration event featured six distinguished invited speakers, who shared their experiences as scientists with impairments and/or disabilities.

With the exhibition, the IAU aims to continue its existing actions for the promotion of inclusion and equal participation in science. “Inspiring Stars” is a collaborative initiative led by the International Astronomical Union and supported by the American

Astronomical Society, along with organisations serving the disabled and/or impaired in national/local communities.

5. Young Astronomers Lunch

The Young Astronomers Lunch was sponsored jointly by the Norwegian Academy of Arts and Sciences and the IAU U.S. National Committee of the National Academy of Sciences on August 23. It provided an opportunity for early career astronomers to network, discuss careers and opportunities, and receive mentorship advice. Ed Guinan presented the opening remarks, followed by discussions at each table.

6. Women in Astronomy Lunch

The International Astronomical Union, through its Executive Committee Working Group on Women in Astronomy, has been a strong advocate for discussing gender and diversity and for supporting initiatives that can lead to a more balanced representation in our community. In this context, the Organizing Committee of the IAU EC WG on Women in Astronomy together with the NOC and LOC of the IAU-GA in Vienna hosted a Women in Astronomy Lunch on August 29, sponsored by the IAU U. S. National Committee of the National Academy of Sciences. It was open to all attendees, and provided an opportunity to network, discuss common issues, and provide advice. The lunch included presentations by Dr. Andreas Keil (European Research Council) and by Prof. Ewine van Dishoeck (IAU President-Elect).

Dr. Ewine van Dishoeck, IAU President-Elect:

Dear colleagues and friends,

It has become a tradition that the president elect of the IAU speaks at the Women in Astronomy lunch, and I am honored to do so. This is the first time in the history of the IAU that for two such lunches in a row, a woman is speaking, and, assuming that Debra Elmegreen will be confirmed as the new President-Elect, that will make it three in 2021. It is clear that over the last decade, the IAU has been making significant progress in terms of gender balance at the top level with the Officers (now 75% women), Executive Committee and Division Presidents (typically 40–50% women). I am also very pleased that about half of the plenary and Invited Discourse speakers are women, and that the new Junior Members enhance diversity at the young end. But, as the statistics show, more work is needed and it requires continuous attention at the highest levels, and this is why the WiA working group reports directly to the Executive Committee.

The first WiA meeting that I attended was at the IAU General Assembly in New Delhi in 1985, in a small dark room. But there I learned in just a few hours a lot about the difficult situations that women from India and elsewhere were facing. For example, they were primarily solar astronomers, simply because women working at night was not an accepted situation by their society at that time. Last year the Executive Committee visited Pune in India and organized a Women in Astronomy afternoon to raise awareness at the institute, university and colleges level: Indian women can now be found in all fields of astronomy, but their fraction is still low compared with other countries according to the 2015 IAU survey. I want to hear more about your stories to get a better overview of where the IAU can help and provide a push in the right direction. I am very pleased that Francesca has taken up this suggestion and organized a separate WiA day this Monday where we heard stories from across the globe, more than we can in just this lunch.

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The last three years since the 2015 IAU GA have been a tumultuous and stressful period for our field due to the reports of harassment, bullying and other forms of discrimination. Let me be clear: astronomy worldwide, including the IAU, has to have its house in order, a house where everyone feels welcome and feels safe. All astronomers should abide by our code of conduct, and this should come naturally as part of our humanity rather than having to spell it out word by word. Symbolic compliance by just checking a box at registration is not enough: how you behave is an integral part of who you are. Aretha Franklin's "Respect" song says it all, and is therefore just as powerful today as it was in 1967, and I have fortunately seen a lot of respect at this meeting. At the same time, we should keep an atmosphere in which we can have an open vigorous scientific debate, including sometimes critical questions and disagreements: we need such discussions to advance our science.

I would like to use my energy to move in a positive direction and hear from you what the IAU can do to make further progress for Women in Astronomy. For example, as we wrote in the 2020–2030 Strategic Plan, more actions are needed to retain women in science and make sure that the senior staff complement at universities and institutes reflects that of the younger student/postdoc population in terms of diversity (with diversity being more than just gender balance). This can be done through a top-down approach of setting goals or quotas or special programs for women and several of those have been successful. In my own experience, a bottom-up approach, where "flexibility" is the key word, is equally important: flexibility, for example, to be able to seize unexpected opportunities for a female hire, or by giving women a crucial extra year to build up a better CV and more confidence, to position them better for competitions. It is unfortunate that most of our funding agencies and universities are going exactly the opposite way, by having fewer and fewer grants or budgets that can be used flexibly. The ERC is actually a great exception in this regard.

At newspaper interviews, I often get asked "what advice would you give a young woman just starting in astronomy?" Three responses. First, make sure that you excel in one thing, that you are known as the expert in a certain area, for example Mrs. Youngest galaxies with ALMA. Then you get noticed, much more than being average in lots of things. Second, do whatever you do with a passion, whether inside or outside astronomy. Third, grab opportunities when they arise unexpectedly: I became involved in both ALMA and JWST through unexpected invitations. I could have said no since I had plenty of other things to keep me busy, but I am glad I did say yes, even though each has been a 20–30 year commitment.

Let me end with some more general advice to young people, women and men, on the issues that matter to be successful. I was fortunate to have a PhD advisor and mentor, professor Alexander Dalgarno from Harvard, who was a champion in guiding students and postdocs, and I have been fortunate to guide more than 80 myself. His advice, as summarized by Neal Lane in the *Proceedings of the Dalgarno Celebratory Symposium* book (2009, ed. J. Babb et al., Imperial College Press), was:

- Motivation matters: choose the right problems (this is directly linked to passion)
- Confidence matters: assume nothing is impossible
- Skills matter: use all the tools
- Patience and tenacity matter: never give up
- People matter: human relationships are special
- Integrity matters: stay honest and keep to high standards

To these I would add:
- Fun and family matters: make sure that you enjoy life (inside and outside astronomy) and treasure your family!

Thanks again for your attention, and I look forward to suggestions and activities from the WG on what the IAU can do in the coming three years.

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