



International Astronomical Union
Union Astronomique Internationale

POST-MEETING REPORT

program / Monday, July 10

08:30 a.m.		Welcome Remarks
08:45 a.m.	E. Bergin	Opening Keynote Talk
09:30 a.m.	S. Aalto	From the High-Redshift Universe to Local Galaxies K
10:15 a.m.		Break
10:45 a.m.	T. Greve	Atomic and Molecular Tracers at $z > 6$ I
11:15 a.m.	K. Kohno	Dust, Atomic and Molecular Tracers in External Galaxies I
11:45 a.m.	C. Yang	The Rich Molecular Inventory of High-Redshift Dusty Galaxies Revealed by Broadband Spectral Line Surveys C
12:00 p.m.	Y. Nishimura	ALMA Band 3 Line Survey Toward the Cloverleaf Quasar at $z=2.56$ C
12:15 p.m.		Lunch
01:45 p.m.	T. Shimonishi	Molecular Cloud Chemistry in Low Metallicity Environments I
02:15 p.m.	M. Bouvier	Sulphur-Bearing Species in NGC 253 (C)
02:30 p.m.	M. Jiménez-Donaire	Mapping Dense Molecular Tracers in Nearby Galaxies (C)
02:45 p.m.	J.-E. Lee	Astrochemistry in the Milky Way K
03:30 p.m.		Break
04:00 p.m.	I. Jimenez-Serra	Chemistry in the Galactic Centre I
04:30 p.m.	S.-Y. Liu	Chemistry of Star Forming Regions I
05:00 p.m.	A. Fuente	The Journey of Sulfur in Molecular Clouds C
05:15 p.m.	S. Scibelli	Early Results from GLUCOSE: the GBT L1544 Unbiased Complex Organics Survey C

06:00-08:00 p.m. Public Talks at State Theatre
Jonathan Gardner and Ewine van Dishoeck
James Webb Space Telescope Results
(<https://www.nmc.edu/news/2023/07/webb-telescope-lecture.html>)





K=Keynote, KK=Kavli Keynote, I=invited, C=contributed, All times are EST

program / Tuesday, July 11

8:30 a.m.	B. McGuire	Development of molecular complexity I
9:00 a.m.	S. Widicus Weaver	New techniques in molecular spectroscopy I
9:30 a.m.	F. Dulieu	Extended conditions of molecule formation on grains C
9:45 a.m.	A. Ishibashi	Direct measurements for radical reactions on ice: approach to the formation mechanisms of complex organic molecules C
10:00 a.m.		Break
10:30 a.m.	I. Cooke	Gas-phase chemistry in the laboratory I
11:00 a.m.	N. Watanabe	Ices and Molecular Complexity I
11:30 a.m.	J. Noble	Ice structure in star forming regions –new clues from experiments, theory and observations C
11:45 a.m.	R. Fortenberry	Accurate Quantum Chemical Insights for the Age of JWST and ALMA C
12:00 p.m.		Tom Phillips in memoriam
12:15 p.m.		Lunch
1:45 a.m.	Y. Oya	Protostars and protostellar chemistry I
2:15 p.m.	T. Lamberts	Computational astrochemistry I
2:45 p.m.	M. Bonfand	In depth study of a rich population of young high-mass protostars unveiled by the emission of complex organic molecules C
3:00 p.m.	Y.-L. Yang	Icy Origin of Complex Molecules in Embedded Protostars C
3:15 p.m.	E. Artur de la Villarmois	The potential of sulfur-bearing species to trace accretion processes in young protostars C
3:30 p.m.	M. van 't Hoff	Searching for Earth's initial formation conditions: Evidence of hot gas around low-mass protostars C
3:45 p.m.		Break
4:15 p.m.	M. Powner	Prebiotic chemistry and origin of life KK
5:00 p.m.		Celebration of the career of Eric Herbst

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program / Wednesday, July 12

8:30 a.m.	M. van de Sande	Evolved Stars 
9:15 a.m.	E. De Beck	Chemical Content of Outflows from Evolved Stars—Removing the Biases 
9:30 a.m.	M. Siebert	Molecular Abundances and Morphologies in Binary Evolved Star systems: The Unique Cases of RW LMi and V Hya 
9:45 a.m.		Break
10:15 a.m.	K. Pontoppidan	New Insights From the JWST 
11:00 a.m.	E. Habart, M. McClure, Th. Henning	Solicited JWST talks (3 x 25 minutes)
12:15 p.m.		Lunch
1:45 p.m.		Excursion

program / Thursday, July 13

8:30 a.m.	V. Guzman	Planet Formation K
9:15 a.m.	J. Bergner	Protoplanetary disk chemistry I
9:45 a.m.	K. Furuya	Connecting chemical compositions in the atmosphere and the midplane of protoplanetary disks C
10:00 a.m.	K. Zhang	AGE-PRO: the ALMA survey of Gas Evolution in PROtoplanetary disks C
10:15 a.m.	C. E. Munoz-Romero	A MIRI MRS View of Water Vapor in the Disk of AS 209 C
10:30 a.m.		Break
11:00 a.m.	A. Booth	The molecular inventory of a warm planet-forming disk C
11:15 a.m.	J. Tobin	The Water and Ammonia Reservoir in the Proto-Planetary Disk of V883 Ori C
11:30 a.m.	T. Yoshida	Discovery of Line Pressure Broadening and Direct Constraint on Gas Surface Density in a Protoplanetary Disk C
11:45 a.m.	E. Van Clepper	Chemical consequences of dust growth in Protoplanetary disks: implications for the Solar Nebula and beyond C
12:00 p.m.	M. van Gelder	Unveiling the molecular gas composition in young protostellar disks with JWST/MIRI C
12:15 p.m.		Lunch
1:45 p.m.	M. Line	Exoplanets K
2:30 p.m.	S. Moran	Exoplanetary atmosphere composition and chemistry I
3:00 p.m.	C. Law	SO and SiS Emission Tracing an Embedded Planet and a Circumplanetary Disk Candidate in the HD 169142 Disk C
3:15 p.m.	L. Majumdar	Linking atmospheres of Hot Jupiter HD209458b with its formation C
3:30 p.m.		Break
4:00 p.m.	S. Jacobsen	Formation and evolution of the Solar System KK
4:45 p.m.	C. Alexander	The Solar System record KK

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program / Friday, July 14

8:30 a.m.	C. Walsh	Linking formation to exoplanet characteristics I
9:00 a.m.	M. Drozdovskaya	Link between interstellar and cometary chemistry I
9:30 a.m.	M. Cordiner	Observations of icy bodies and moons in the Solar System I
10:00 a.m.		Break
10:30 a.m.	C. He	Planetary and satellite atmospheres I
11:00 a.m.	S. Milam	Revealing the physiochemical history of comets with JWST C
11:15 a.m.	S. Wamfler	Semi-volatiles as carriers of stable isotope anomalies? C
11:30 a.m.	G. Blake	Conference summary and final remarks
12:15 p.m.		Lunch
1:45 p.m.		Training session

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List of posters

Tuesday Poster Session

5:30 - 7 pm, Lakes Rooms, Conference Center Lower Level

Alya Al-Kibbi	<i>CO and N₂H⁺ in a Dynamically Evolving Disk</i>
Felipe Alarcón	<i>Chemical predictions of planet-feeding gas of accreting planets in the context of atomic carbon vertical flows in the HD 163296 disk</i>
Dana Anderson	<i>A Comparison of Astrochemical Modeling Codes for Protoplanetary Disks</i>
Dana Baylis-Aguirre	<i>Old Tool, New Tricks: Adapting RADEX to Model Mid-IR Spectra of Mira Variable Atmospheres</i>
Erica Behrens	<i>Probing the Physical Conditions of Starburst Galaxies with Neural Networks</i>
John Black	<i>Molecules in Wonderland: photodissociation regions in the JWST era</i>
Laure Bouscasse	<i>Chemical environment of emerging hot cores: the early warm-up phase chemistry</i>
Ryan Boyden	<i>Thermochemical Modeling of Orion Nebula Cluster Disks: evidence for massive, compact gas disks with ISM-like gas-to-dust ratios</i>
Nashanty Brunken	<i>Interstellar ices CO and CO₂: From clouds to planet-forming disks</i>
Hayley Bunn	<i>Bridging the gap: laboratory spectroscopy for star and planet forming regions and exoplanetary atmospheres.</i>
Alex Byrne	<i>Astrochemical Modeling of the Propargyl Radical in TMC-1: A radical precursor to aromatic species</i>
Jenny Calahan	<i>UV-driven Chemistry as a Signpost for Late-stage Planet Formation</i>
Tadeus Carl	<i>Deep Search for Glycine in the Barnard 5 Methanol Hotspot</i>
Steven Charnley	<i>Formation of Complex Organic Molecules in Dark Clouds</i>
Yuan Chen	<i>Selected O-bearing species in the CoCCoA survey (Complex Chemistry in hot Cores with ALMA)</i>
Drew Christianson	<i>Chemical Modeling of Cometary Ices with Dynamic Energetic Conditions</i>
Maria Jose Colmenares Diaz	<i>Looking at the C/O in planet-forming disks from the combined perspective of ALMA and JWST</i>
Gustavo A. Cruz-Diaz	<i>The influence of water on the production of organic molecules from photolyzed ice mixtures.</i>
Herma Cuppen	<i>Simulation of CO-rich ice: its role in COM formation and survival in disks</i>
Gwenaëlle Dufour	<i>Non-linear Astrochemical Kinetics</i>
Gisela Esplugues	<i>A sulfur journey across star-forming regions: study of thioformaldehyde emission</i>
Vincent Esposito	<i>Anharmonic IR Absorption Spectra of Prototypical Neutral and Cation Astronomical PAHs</i>

Sam Federman	<i>IPA: Mapping Shocks in the Winds and Jets of Young Protostars Across the Mass Spectrum</i>
Athena Flint	<i>Interaction of interstellar radicals with c-C₃H₂: Reaction pathways and implications for detectability</i>
Pamela Freeman	<i>The Carbon-based Complex Molecules of High Mass Star Forming Regions AFGL 2591 and IRAS 20126</i>
Zachary Fried	<i>Machine Learning of the Chemical Inventory and Rare Isotopologues of the Solar-Type Protostellar Source IRAS 16293-2422</i>
Jonathan Gardner	<i>The James Webb Space Telescope</i>
Noah Garrett	<i>F12+DFT Quartic Force Fields for Cost-Effective Theoretical Spectroscopy</i>
Danny Gasman	<i>A study of water in protoplanetary disks with JWST/MIRI</i>
Sacha Gavino	<i>CO snowline shaped by dust scattering in protoplanetary disks</i>
Morgan Giese	<i>Analysis of Complex Organic Molecules in the W3 Star Forming Region</i>
Javier Goicoechea	<i>The role of FUV radiation in the formation and excitation of HCN: a critical review of its diagnostic power as a tracer of the dense molecular gas reservoir for star formation</i>
Sierra Grant	<i>Probing the inner 10 au of protoplanetary disks with JWST-MIRI and VLT-CRIRES+: CO₂ vs. H₂O</i>
Daniel Harsono	<i>The view of the water from ALMA+JWST</i>
Daniel Harsono	<i>JWST's view of the jet and wind from TMC1A</i>
Olivia Harwick	<i>Anharmonic Vibrational Frequencies and Spectroscopic Constants of Cyclic Carbon Monoxide Dimers</i>
Eric Herbst	<i>Unusual Chemical Processes in the ISM</i>
Hiroshi Hidaka	<i>1.Determination of the branching ratio of methoxy and hydroxy-methyl radical formation by CH₃OH + OH on ice at 10K</i>
Natalia Inostroza	<i>Methanediol CH₂(OH)₂ and hydroxymethyl CH₂OH+: key organic intermediates on the path to complex organic molecules</i>
Miwha Jin	<i>A model for explosive desorption of multi-component ice mantles</i>
Jes Jorgensen	<i>Complex Organic Molecules in Protostars with ALMA Spectral Surveys (COMPASS)</i>
Shreya Kakkenpara Suresh	<i>Role of NH₃ binding energy on chemistry in L1544 and IRAS 16293-2422</i>
Jayatee Kanwar	<i>The hydrocarbon chemistry in inner regions of disks</i>
Yuki Kimura	<i>Morphology of H₂O, CO₂ and CO ices on refractory grains based on experiments using transmission electron microscopy</i>
Kristina Kipper	<i>Complex ice chemistry: A comparative study of electron irradiated ices with ICEBEAR</i>

Beatrice Kulterer	<i>Post-outburst chemistry in a Very Low Luminosity Source</i>
Charles Law	<i>Chemical Signatures of a Giant Planet in the HD 169142 Disk.</i>
Helena Lecoq Molinos	<i>A quantum chemistry approach to cloud formation in exoplanet atmospheres</i>
Blake Ledger	<i>Stored in the archives: Uncovering the CN/CO intensity ratio with ALMA in nearby U/LIRGs</i>
Seokho Lee	<i>Effects of C/O ratio on the Carbon Isotope Ratio in the Protoplanetary Disks</i>
Haocheng Liang	<i>Millimeter/Submillimeter spectral analysis of methylamine dissociation product, $\cdot\text{CH}_2\text{NH}_2$</i>
Niels Ligterink	<i>TBD</i>
Matthias Maercker	<i>The contribution of dust from AGB stars to the chemical evolution of the ISM</i>
Silke Maes	<i>Route towards 3D chemical models of AGB outflows</i>
Marissa Maney	<i>A New Laboratory Experiment to Explore the Icy Origins of Comet and Meteoritic Organics</i>
Teresa Margheri	<i>The atmospheres of the icy Galilean moons as observed with JUICE/SWI: 3D radiative transfer predictions.</i>
Gary Melnick	<i>SPHEREx Investigation of Ices Throughout the Milky Way</i>
Marbely Micolta	<i>Signposts of Planet Formation in the Accretion Flows of Young Stars</i>
Shivani Mishra	<i>A theoretical vibrational investigation of ethynyl substituted PAHs</i>
Colton Moore	<i>N₂O as an O(1D) Source for Gas Phase Study of COMs</i>

Thursday Poster Session

5:30 - 7 pm, Lakes Rooms, Conference Center Lower Level

Yoichi Nakai	<i>Methanol production via irradiation of low-energy CH₃⁺ ions on an ASW surface</i>
Thanh Nguyen	<i>Non-energetic Chemical Pathways of Sulfur Bearing Species with Hydrogen Atoms on Interstellar Ice</i>
Ana Niedojadlo	<i>Structure and spectroscopy of molecules of astrochemical interest and their aggregates with water</i>
Hideko Nomura	<i>Formation of complex organic molecules through ice mantle reactions</i>
Shota Notsu	<i>The Molecular Composition of Shadowed Proto-solar Disk Midplanes Beyond the Water Snowline</i>
Savio Oliveira	<i>Observing the Late Stages of Protostellar Evolution: the Boundary Conditions of Planet Formation</i>
Zach Palmer	<i>Aluminum Nitride Clusters: A New Direction in Astrochemical Research</i>
Anshika Pandey	<i>A comprehensive rotational study of astronomical iso-pentane within 84 to 111 GHz</i>
Teresa Paneque-Carreno	<i>Vertical stratification of molecules in protoplanetary disks as a probe for disk conditions</i>
Jamila Pegues	<i>Investigating the Role of Stellar Radiation in Protoplanetary Disk Chemistry across the Stellar Mass Distribution</i>
Elettra L. Piacentino	<i>Singlet oxygen (O(1D)) derivatization of benzene in astrochemical ices.</i>
Adele Plunkett	<i>Formaldehyde as an astrochemical tracer of infall and outflow in a noteworthy Class 0 protostar</i>
Anna Punanova	<i>Methanol formation ladder</i>
Mihika Rao	<i>Using HCO⁺ (& its isomers) as an astrochemical tool to probe the structure of young low mass protostars</i>
Jonathan Rebelsky	<i>New Apparatus for Production of Protonated Ions</i>
Elena Redaelli	<i>Nitrogen isotopic ratio as a probe of star formation</i>
Anthony Remijan	<i>PRIMOS: The Prebiotic Interstellar Molecular Survey</i>
Will Rocha	<i>The coldest view of a high- and low-mass protostar with James Webb: results from Ice Age and JOYS programs.</i>
Nathan Roth	<i>Measuring the Polycyclic Aromatic Hydrocarbon Content of Comets with JWST</i>
Julia Santos	<i>Resonant infrared irradiation of CO and CH₃OH interstellar ices</i>
Pallavi Saraf	<i>Assessing the commonality of progenitor sites among r-process-rich stars</i>

Collette Sarver	<i>Physical Distribution and Kinematics of Complex Organic Molecules in DR21(OH), GAL 75.78+0.34, and NGC 7538 using CARMA</i>
Chase Schultz	<i>Computational Investigation of the O(1D) + Formamide Reaction Pathway.</i>
Haley Scolati	<i>A Morphological Study of G34 using Machine Learning</i>
Osama SHALABIEA	<i>Molecular Formation in Low-Metallicity Hot core).</i>
Hannah Shay (Toru)	<i>Beyond the Machine: Automating Spectra Generation and Analysis from Machine Learning Results</i>
Brielle Shope	<i>Three-phase Chemical Modeling Study of Methyl Formate, Glycolaldehyde, and Acetic Acid Bimodal Abundance Ratios in NGC 6334I</i>
Ni-En Sie	<i>CO₂ formation in VUV-Irradiated CO ice</i>
Alexia Simon	<i>Decoding H/D exchange reactions in laboratory ices to interpret Solar System observations</i>
Katerina Slavicinska	<i>The Hunt for New Interstellar Ices with JWST</i>
Zak Luka Smith	<i>Ice mapping of the Chameleon I Molecular Cloud: JWST ICEAGE</i>
Silvia Spezzano	<i>Methanol deuteration in pre-stellar cores: observations and modelling</i>
Satyam Srivastav	<i>Rotational spectra of interstellar branched carbon-chain molecules</i>
Taiki Suzuki	<i>The chemical evolution of complex organic molecules in the turbulent disks</i>
Farideh S. Tabatabaei	<i>Kinematic structure of the low-mass protostellar core IRAS 15398-3359</i>
Angèle TAILLARD	<i>Uncover the mechanisms of non-thermal ice desorption in cold cores</i>
Kotomi Taniguchi	<i>Chemical Link among NH₂CHO, HNCO, and H₂CO in High-Mass Protostellar Cores</i>
Milou Temmink	<i>A MIRI view of the H₂O-rich planet-forming disk DR Tau”</i>
Will Thompson	<i>Complex Organic Chemistry in High Mass Star Forming Regions</i>
Alan Tokunaga	<i>The Invariance of the 3.3 μm Aromatic Infrared Band</i>
Takuto Tomaru	<i>Study of morphology and electric field structure of amorphous solid water by FM-AFM</i>
Estephani Torres	<i>Villanueva Measuring CO Gas Distributions in an Age-Diverse Sample of Protoplanetary Disks</i>
Hannah Toru (Shay)	<i>Beyond the Machine: Automating Spectra Generation and Analysis from Machine Learning Results</i>
Leon Trapman	<i>Measuring protoplanetary gas disk masses in AGE-PRO using N₂H⁺ and C₁₈O</i>

Masashi Tsuge	<i>Nuclear spin conversion of H₂ on surfaces of interstellar grain analogs: Amorphous solid water, amorphous silicate, and diamond-like carbon</i>
Masashi Tsuge P	<i>penetration of nonenergetic hydrogen atoms into amorphous solid water and their reactions with embedded molecules</i>
Łukasz Tychoniec	<i>JWST/MIRI view on protostellar jets with JOYS program</i>
Ramlal Unnikrishnan	<i>Charting Circumstellar Chemistry of Carbon-rich AGB stars</i>
Merel van 't Hoff	<i>A first high-resolution view of molecular line emission from the young circumstellar disk L1527</i>
AKANT VATS	<i>Nitrogen containing PAHs in interstellar environments: vibrational and rotational spectra</i>
Marissa Vlasblom	<i>Modeling JWST observations: the effects of small cavities on the H₂O and CO₂ spectra of protoplanetary disks</i>
Abygail Waggoner	<i>Can't Catch these Cations: Variable Molecular Emission in Protoplanetary Disks</i>
Catherine Walker	<i>The molecular complexity of interstellar clouds probed by Herschel HIFI spectral line surveys.</i>
Levi Walls	<i>Constraining the Distribution and Abundance of Hot Gas in Young, Protostellar Disks</i>
Dan Watson	<i>Ices in the envelopes of Class 0 protostars</i>
Gabi Wenzel	<i>Gas-phase electronic action absorption spectra of oxygen-functionalized polycyclic aromatic hydrocarbons (O-PAHs)</i>
Olivia Wilkins	<i>Rotational Spectroscopic Studies of HCN Ice Photolysis with SubLIME</i>
Chris Wilson	<i>Dense gas in star forming galaxies traced by HCN and CN</i>
Ci (Ceci) Xue Isocyanide	<i>Molecules in GOTHAM Observations of TMC-1</i>
Katarina Yocum	<i>The effect of ice temperature on the ortho-to-para ratio of formaldehyde (H₂CO)</i>
Hyeong-sik Yun	<i>A Robust way to obtain kinematics-corrected spectra of the complex organic molecular (COMs) lines toward protostellar/protoplanetary sources.</i>

Summary of the scientific highlights of the meeting

During the Kavli-IAUS 383, we discussed 6 major science topics:

- 1) From the high-redshift Universe to local galaxies
 - 1a) Atomic, and molecular tracers at $z > 6$
 - 1b) Dust, atomic, and molecular tracers of peak star formation ($z \sim 2$)
 - 1c) Molecular tracers of the central engine in AGNs
 - 1d) Mapping molecular cloud chemistry on Galactic scales
- 2) The Milky Way: Chemical transformations with star formation and feedback
 - 2a) Molecular tracers of the central engine
 - 2b) Star formation in the Milky Way
 - 2c) Chemical tracers of feedback (PDRs, winds, and outflows)
 - 2d) General cloud chemistry (PAH detection in dark clouds)
 - 2e) Development of molecular complexity
 - 2f) Evolved stars
- 3) Planet Formation and Exoplanets
 - 3a) Protostars and protostellar disk chemistry
 - 3b) Protoplanetary disk chemistry
 - 3c) Exoplanetary atmosphere composition and chemistry
 - 3d) Linking formation to exoplanet characteristics
- 4) The Solar System Record
 - 4a) Meteoritic composition and planet formation
 - 4b) Cometary and Asteroid composition
 - 4c) Giant planet and satellite composition
- 5) Grounding Information: Laboratory Astrophysics and Theory
 - 5a) Gas phase chemistry
 - 5b) Ices and molecular complexity
 - 5c) New techniques in molecular spectroscopy
 - 5d) Planetary and satellite atmospheres
- 6) Looking to the future (missions and facilities)

In the following, we summarize scientific highlights discussed at the IAU Symposium 383:

- the Kavli-keynote talks, which allowed us all to connect to different disciplines where Astrochemistry is extending to:
 - (i) Pownner on the complexity of prebiotic chemistry (with its roots found in the interstellar medium) and origins of life;
 - (ii) Jabobsen on cosmochemistry and the formation of our Solar System; (iii) Alexander on the composition of meteorites and their link to the composition of the early Earth;
- the wonderful and very successful public talks on the first evening of the meeting, led by van Dishoeck and Gardner on JWST's first results and history. The State Theatre was full and the attendees were very happy and interactive;
- amazing ALMA observations of the high redshift universe (Kohn, Yang, Nishimura);
- a wonderful summary of the detection of PAHs using the GBT (McGuire);
- an embrace of our interdisciplinary roots with talks on grounding theory and laboratory experiments (Widicus Weaver, Dulieu, Ishibashi, Cooke, Watanabe, Fortenberry, Lamberts);
- Outstanding first results from JWST (Pontoppidan, Habart, McClure, Henning);
- Pathfinding ALMA observations of planet-forming disks (Guzman, Bergner, Zhang, Booth, Tobin, Yoshida, Law, Walsh). A highlight was the work of Yoshida who discussed the discovery of pressure-broadening of molecular lines that enable a density measurement and the work of Booth and Law who may have found the influence of proto-planets on disk chemistry;
- The field also attempted to make bridges for the first time to exoplanetary atmospheres with talks by Line, Moran who covered observations, and He who discussed laboratory work on haze formation;
- The excursion to Empire Bluffs overlooking Lake Michigan was a non-scientific but wonderful highlight, providing a relaxing and beautiful environment for people to talk and know each other;
- The Friday afternoon session run by ALMA ambassadors and NAASC members on obtaining ALMA archival data and data reduction was a great way to end as it enables the cycle to continue.

Executive Summary of the Meeting

Astrochemistry is at the heart of many astrophysical fields, from the early Universe to local galaxies, to star- and planet-formation and evolution in our Milky Way, to exoplanet atmospheres, and to our Solar System. Decades-long concerted efforts of astronomers and theoretical/experimental chemists have provided a solid base for using molecules as powerful diagnostic tools of the physical and chemical structure, dynamics, and history of a multitude of astrophysical objects, allowing connections and glimpses into the life cycle of the interstellar medium, as well as into the growth of chemical complexity in space. The great sensitivity, high angular resolution, and frequency coverage of telescopes such as ALMA has allowed unprecedented views of stellar and planet nurseries. JWST with its sensitive near- to mid-infrared spectrometers has opened a new sensitive and sharp observing window into major molecular ingredients such as water, carbon dioxide as well as other key organic species. JWST has started to probe the composition of ices on interstellar and planet-forming scales, enabling studies of the linked chemistry of exoplanetary atmospheres and protoplanetary disks. The eighth Kavli-IAU Symposium on Astrochemistry has allowed the ever-growing astrochemical community to meet and discuss recent achievements and future progress. After Spain (2011) and Chile (2017), we had a 4.5-day Kavli-IAU Astrochemistry Symposium at Traverse City, MI, USA in July 2023.

The program was divided into 6 topics which were distributed in 9 morning/afternoon sessions, leaving an afternoon free for social purposes, with two senior members of the community providing an introductory and a summary talk. We had ample time for discussions at the end of each topic. Topic 5 (Grounding Information: Laboratory Astrophysics and Theory) was distributed within the other scientific topics, to make sure that it was followed by the various communities. Topic 6 (Future missions) was also integrated in talks across the other scientific topics. This was especially important to allow discussions and exchanges for the identification of current and future needs of the astrophysical community to be directed to our experimental and theoretical astrochemistry colleagues. Poster sessions have been organized during 2 evenings, allowing at least 2 hours per session. Each topic has been introduced by a Keynote speaker (45 min), followed by invited (30 min) and contributed talks (15 min), for a total of 3 Kavli-Keynote, 5 Keynote and 17 invited speakers.

We have included speakers from the laboratory, observational and theoretical astrochemical community to ensure constructive exchange, as well as experts in various astrophysical fields, from the early Universe to our Galaxy to star- and planet-formation to exoplanets to our Solar System, linked by the common interest on Astrochemistry. In line with IAU guidance, in our invited speaker list we have ensured gender and geographic balance and also paid particular attention to junior scientists, who have suffered the most from the isolation during the pandemic. We wanted them to enjoy fully the fruitful live discussions with their peers and more senior scientists in this large Symposium.

We note that this was an international conference with attendees from all over the world including Thailand, India, Nepal, numerous countries in Europe, Korea, Japan, Taiwan and of course, the United States.

The Kavli funds were used to support the travel and lodging of scientists outside our field of Astrochemistry, including organic chemistry with links to the origins of life (Powner, UK), theoretical chemistry (Lamberts, The Netherlands), Laboratory Chemist (Ishibashi, Watanabe, Japan; Dulieu, France), Molecular Spectroscopist (Cooke, Canada), Chemist (Fried, Toru, Byrne, USA; Nobel, France), Exoplanet expert (Moran, USA), early-career Chemist (Thanh, Japan).

The IAU funds were used to support early-career researchers from around the world (Belgium, Canada, Germany, Japan, The Netherlands, USA, Taiwan, Korea, Austria), as well as Professors with local budget problems (Shalabiea, Egypt; Majumdar, India).

NAASC funding of \$7000 was also granted to support other early-career researchers and those at institutions/countries where centralized support is lower. Support was given directly to these individuals via fee waivers. The conference fee was 450 USD and providing fee waivers at the start provided a direct enhancement for these individuals to attend the meeting. For the most part, this strategy was successful and a number of individuals attended who otherwise might not have done so. Waivers were given to 15 individuals, mainly PhD students and young researchers from USA (6), Nepal (1), India (4), UK (2), Japan (2).

The organizers are extremely grateful for the generous financial support from the Kavli Foundation and the International Astronomical Union, which allowed them to bring to Traverse City outstanding scientists outside the astrophysics community and enthusiastic young researchers from around the world. This combination was very much appreciated by all participants, as we all learned from each other, expanded our scientific horizons, and even started new collaborations.

IAUS 383 was an extremely successful symposium that brought together several astrophysical communities all linked by Astrochemistry: from the early Universe to star- and planet-formation and evolution in our Milky Way and local galaxies, to exoplanet atmospheres, and to our Solar System. Excellent talks and posters focusing on astrophysical observations, theoretical chemistry, and laboratory experiments highlighted the interdisciplinarity of Astrochemistry and the need for close collaborations among these various disciplines to unveil the chemical evolution of our Universe and our origins. Ample time for discussion made it possible for young researchers and students with different backgrounds to exchange ideas and connect with more senior people.

The conference was attended by 195 individuals. The gender balance of the attendees was impressive with 99 women and 96 men. The vast majority of the attendees were graduate students and postdoctoral fellows with informal accounting showing 65% of the attendees at this level.

The conference itself was spectacular as it has been a long time since the field was together in one place and it was a true celebration of science.

Selection of pictures from the Symposium

Group Picture



Conference Room



Poster Sessions

