Andrew M. Turner, Ph.D.

2545 McCarthy Mall, Honolulu, HI 96822
(808) 956-5786
andrew.turner@hawaii.edu

Education

2011-2018 **University of Hawaii at Manoa** Honolulu, HI
Doctor of Philosophy. Major: Physical Chemistry
Honors & Awards: ARCS Scholar, ACS Astrochemistry Dissertation Award

2006-2009 **Indiana University** Bloomington, IN
Master of Arts for Teachers – Chemistry Department
Course Concentration: Analytical Chemistry
Honors & Awards: Department Fellowship

2002-2006 **DePauw University** Greencastle, IN
Bachelor of Arts. Major: Chemistry. Minor: Environmental Geoscience
Honors & Awards: Cum Laude, Science Research Fellow, Dow Foundation Scholar, Percy L. Julian Scholar

Research Experience

2019- **University of Hawaii at Manoa** Honolulu, HI
Assistant Director of W.M. Keck Laboratory in Astrochemistry
Research Techniques Utilized: Fourier Transform Infrared Spectroscopy, Quadrupole Mass Spectrometry, Photoionization Reflectron Time-of-Flight Mass Spectrometry, Ultrahigh-Vacuum Systems ($P < 10^{-10}$ Torr), Cryogenic Systems ($T = 5$ K), Nd:YAG and Dye Lasers, Electron Irradiation, LabVIEW, AutoCAD

2018-2019 **University of Hawaii at Manoa** Honolulu, HI
Post-Doctoral Fellow
On the Formation of Alkylsulfonic Acids in Low-Temperature Ices
Research Advisor: Ralf I. Kaiser, Ph.D.

2011-2018 **University of Hawaii at Manoa** Honolulu, HI
Graduate Assistant
On the Formation of Alkylphosphonic Acids in Low-Temperature Phosphine Ices
Secondary Project: *Decomposition of Perchlorates on the Martian Surface*
Research Advisor: Ralf I. Kaiser, Ph.D.

2006-2008 **Indiana University** Bloomington, IN
Graduate Assistant
Reaction Kinetics of Biogenic Terpenes with Hydroxyl-radicals and Ozone
Research Advisor: Ronald A. Hites, Ph.D.
Research Techniques Utilized: Quadrupole Mass Spectrometry, UV-Induced Photolysis

2005 **DePauw University** Greencastle, IN

Undergraduate Researcher

Characterization of the BCR Sequential Extraction Method

Research Advisor: David T. Harvey, Ph.D.

Research Techniques Utilized: Atomic Absorption Spectroscopy, Sequential Extraction of sediment samples

2004 **SUNY Stony Brook** Stony Brook, NY

Undergraduate Researcher

Complexation of Uranyl Ion (UO_2^{2+}) with Organic Acids in Soil

Research Advisor: Gary Halada, Ph.D.

Research Techniques: Ultraviolet/Visible Spectroscopy, High Performance Liquid Chromatography

2003-2004 **DePauw University** Greencastle, IN

Undergraduate Researcher

Impacts of Acid Mine Drainage from the Green Valley Mine in SW Indiana

Research Advisors: Bridget L. Gourley, Ph.D. and Jeanette K. Pope, Ph.D.

Research Techniques Utilized: Atomic Absorption Spectroscopy, Colorimetry

Teaching Experience

2018-2019 **University of Pikeville** Pikeville, KY

Assistant Professor

•CHE 113: General Chemistry I
•CHE 114: General Chemistry II
•CHE 400: Physical Chemistry I
•CHE 405: Quantum Mechanics
•CHE 480: Seminar in Chemistry
•FS 102: First Year Seminar
•Committees: Curriculum, Teacher Education

2011-2018 **University of Hawaii at Manoa** Honolulu, HI

Lecturer (2018)

•CHEM 162: General Chemistry II (Lecture and Lab)

Teaching Assistant (2011-2018)

•Head teaching assistant for CHEM 161: General Chemistry I (Lab)
•Discussion section leader for CHEM 162: General Chemistry II (Lecture)
•CHEM 161: General Chemistry I (Lab and Lecture)
•CHEM 162: General Chemistry II (Lab)
•CHEM 352: Physical Chemistry II (Lecture)
•Twice received the department's "Outstanding Teaching Assistant" award

2009-2011 **North Miami High School** Denver, IN

Chemistry Teacher

•Introductory to Chemistry & Physics
•Chemistry I, II, and AP
•Astronomy and Geology
•Committees: Accredication
•Extracurriculas: Quiz Bowl, Academic Team, Track & Field, Cross Country

2006-2009 **Indiana University** Bloomington, IN

Associate Instructor

- C117: Principles of Chemistry & Biochemistry I (Lab)
- N330: Intermediate Inorganic Chemistry (Lab and Lecture)
- Recognized by the department twice for outstanding performance as an instructor based on student evaluations

PRESENTATIONS

- J. H. Marks, X. Bai, A. A. Nikolayev, Q. Gong, C. Zhu, N. F. Kleimeier, **A. M. Turner**, S. K. Singh, J. Wang, J. Yang, Y. Pan, A. M. Mebel, R. I. Kaiser, *Methanetriol – Formation of an Impossible Molecule*, International Symposium on Molecular Spectroscopy 77th Meeting, Champaign-Urbana, IL, June 2024.
- J. Wang, A. A. Nikolayev, J. H. Marks, **A. M. Turner**, S. Chandra, N. F. Kleimeier, A. M. Mebel, R. I. Kaiser, *Formation of Nitrogen Heteroaromatics [Indole, C_8H_7N; Pyrrole, C_4H_5N; Aniline, $C_6H_5NH_2$] in Model Interstellar Ices and their Role in the Synthesis of Proteinogenic Amino Acids and Nucleobases*, International Symposium on Molecular Spectroscopy 77th Meeting, Champaign-Urbana, IL, June 2024.
- **A. M. Turner**, R. I. Kaiser, *On the Formation of Complex Organic Molecules in Astrophysically-Relevant Laboratory Ices*, APS March Meeting 2024, Minneapolis, MN, March 2024. [**Panelist**].
- J. H. Marks, A. A. Nikolayev, M. M. Evseev, J. Wang, **A. M. Turner**, N. F. Kleimeier, O. V. Kuznetsov, M. McAnally, A. N. Morosov, I. O. Antonov, A. M. Mebel, R. I. Kaiser, *Quantum Tunneling Mediated Synthesis of Prebiotic Chelation Agents in Interstellar Analog Ices*, Laboratory Astrophysics Workshop (ICE-2024), Kauai, HI, February 2024.
- J. Wang, A. A. Nikolayev, J. H. Marks, **A. M. Turner**, S. Chandra, N. F. Kleimeier, V. N. Azyazov, A. M. Mebel, R. I. Kaiser, *Formation of Nitrogen Aromatics [Indole, C_8H_7N; Pyrrole, C_4H_5N; Aniline, $C_6H_5NH_2$] in Interstellar Analog Ices and their Role in the Synthesis of Proteinogenic Amino Acids and Nucleobases*, Laboratory Astrophysics Workshop (ICE-2024), Kauai, HI, February 2024.
- C. Zhang, V. Leyva, J. Wang, **A. M. Turner**, M. McAnally, A. Herath, C. Meinert, L. A. Young, R. I. Kaiser, *Arrokoth – A Sugar World*, Laboratory Astrophysics Workshop (ICE-2024), Kauai, HI, February 2024.
- **A. M. Turner**, R. I. Kaiser, *Advances in Isomer-Selective Detection of Astrophysically-Relevant Molecules: 10 Years at the W. M. Keck Research Laboratory in Astrochemistry*, ACS Fall 2023 National Meeting, San Francisco, CA, August 2023 **[invited talk]**.
- J. H. Marks, J. Wang, **A. M. Turner**, N. Fabian Kleimeier, M. M. Evseev, O. V. Kuznetsov, M. McAnally, I. Antonov, A. M. Mebel, R. I. Kaiser, *Quantum Tunneling in Interstellar Ice by Ammonia (NH_3) and Acetylene (CH_3CHO): Chelation Agents to Assist RNA Replication*, International Symposium on Molecular Spectroscopy 76rd Meeting, Champaign-Urbana, IL, June 19-23, 2023.
- **A. M. Turner**, R. I. Kaiser, *Laboratory astrophysics beyond the second period: Silicon, phosphorus, and sulfur chemistry in extraterrestrial ices*, ACS Fall 2022 National Meeting, August 2022 **[invited talk]**.
- Y. Luo, **A. M. Turner**, R. I. Kaiser, R. Sun, *Ab initio study on the decomposition of solid 1,1-diamino-2,2-dinitroethylene (FOX-7)*, ACS Fall 2022 National Meeting, August 2022.
- J. H. Marks, J. Wang, A. K. Eckhardt, N. F. Kleimeier, **A. M. Turner**, R. I. Kaiser, *Interstellar Peptide Bond Formation by Acetaldehyde and Ammonia in Analog Ice*, International Symposium on Molecular Spectroscopy 75th Meeting, June 20-24, 2022.
- **A. M. Turner**, R. I. Kaiser, Molecules of astrobiological interest formed in ice analogues during laboratory space simulation experiments, Pacifichem 2021, December 16-21, 2021.
- **A. M. Turner**, R. I. Kaiser, *Investigating Molecules of Astrophysical Interest Utilizing Ice Analogues in Space Simulation Experiments*, ACS Spring 2021 National Meeting, April 5-30, 2021 **[invited talk]**.
- **A. M. Turner**, R. I. Kaiser, *Complex Organic Molecules in Extraterrestrial Ices*, 43rd COSPAR Scientific Assembly, January 28-February 4, 2021 **[invited talk]**.

- **A. M. Turner**, *Prebiotic Phosphorus Chemistry in Interstellar Ices*, Center for Space & Habitability Seminars, October 22, 2020 **[invited talk]**.
- **A. M. Turner**, *A Photoionization Reflectron Time-of-Flight Investigation of Phosphorus Chemistry in Extraterrestrial Ices*, ACS Astrochemistry Subdivision Online Seminar Series (AstroCheminar), September 9, 2020 **[invited talk]**.
- **A. M. Turner**, M. J. Abplanalp, C. Meinert, R. I. Kaiser, *Synthesis of alkylphosphonic acids in interstellar analogue ices of phosphine and water*, ACS 258rd National Meeting, San Diego, CA, August 25-29, 2019**.**
- **A. M. Turner**, M. J. Abplanalp, C. Meinert, R. I. Kaiser, *Alkylphosphonic Acids from Irradiated Phosphine-Doped Interstellar Ice Analogues*, AbSciCon 2019 (American Geophysical Union), Bellevue, WA, June 24-28, 2019**.**
- **A. M. Turner**, R. Frigge, M. J. Abplanalp, R. I. Kaiser, *Exploiting Tunable Vacuum Ultraviolet Photoionization Combined with Reflectron Time-of-Flight Mass Spectrometry to Unravel the Nitrogen Chemistry of Complex Organics in the Interstellar Medium*, International Symposium on Molecular Spectroscopy 73rd Meeting, Champaign-Urbana, IL, June 18-22, 2018.
- M. J. Abplanalp, Sandor Gobi, Alexandre Bergantini, **A. M. Turner**, R. I. Kaiser, *Chocolate molecules in space: Utilizing tunable vacuum ultraviolet light for isomer specific detection of complex organic molecules from astrophysical ice analogues*, ACS 255rd National Meeting, New Orleans, LA, March 18-22, 2018
- **A. M. Turner**, R. I. Kaiser, *Investigating the formation of alkylphosphonic acids in phosphine ices*, ACS 253rd National Meeting, San Francisco, CA, April 2-6, 2017 **[invited]**
- **A. M. Turner**, R. I. Kaiser, *Toward the formation of alkylphosphonic acids in phosphine ices*, AAS Division for Planetary Sciences 48th /European Planetary Science Congress 11th Annual Meeting, Pasadena, CA, October 16-21, 2016
- **A. M. Turner**, R. I. Kaiser, M. J. Abplanalp, *Laboratory synthesis of alkyl phosphanes in astrochemical ice analogs*, Pacifichem 2015, Honolulu, HI, December 15-20, 2015
- **A. M. Turner**, M. J. Abplanalp, R. I. Kaiser, *Production of Open-Chain Phosphanes and Alkyl-Phosphines in Astrochemical Ice Analogues*, Experimental Laboratory Astrophysics Workshop (ICE-2015), Kauai, HI, February 23-26, 2015
- **A. M. Turner**, R. I. Kaiser, R. Dayuha, *Formation of alkyl phosphonic acids using phosphine ices*, ACS 246rd National Meeting, Indianapolis, IN, September 8-12, 2013
- **A. M. Turner**, T. J. Blair, R. Dayuha, R. I. Kaiser, *Formation of alkyl phosphonic acids using phosphine ices*, Experimental Laboratory Astrophysics Workshop (ICE-2013), Kauai, HI, February 25-27, 2013
- **A. M. Turner**, E. C. Amt, C. Houston, B. L. Gourley, J. K. Jerz, *Water quality in West Little Sugar Creek is recovering but still impacted by acidic drainage from the abandoned Green Valley Mine in southwest Indiana*, ACS 227rd National Meeting, Anaheim, CA, March 28-April 1, 2004
- E. C. Amt, C. Houston, **A. M. Turner**, J. K. Jerz, B. L. Gourley, *Water quality in West Little Sugar Creek is recovering but still impacted by acidic drainage from the abandoned Green Valley Mine in southwest Indiana*, Geological Society of America National Meeting, Seattle, WA, November 2-5, 2003

PROFESSIONAL AFFILIATIONS

American Chemical Society
American Physical Society
Phi Lambda Upsilon, Honorary Chemistry Society
ARCS Foundation, Scholar
National Education Association

Publication List

- C. Zhang, V. Leyva, J. Wang, **A. M. Turner**, M. Mcanally, A. Herath, C. Meinert, L. A. Young, and R. I. Kaiser, *Ionizing radiation exposure on Arrokoth shapes a sugar world*, Proceedings of the National Academy of Sciences, 121, e2320215121 (**2024**).
- M. McAnally, J. Bocková, A. Herath, **A. M. Turner**, C. Meinert, R. I. Kaiser, *Abiotic formation of alkylsulfonic acids in interstellar analog ices and implications for their detection on Ryugu*, Nature Communications, 15, 4409 (**2024**).
- J. Wang, **A. M. Turner**, J. H. Marks, C. Zhang, N. F. Kleimeier, A. Bergantini, S. K. Singh, R. C. Fortenberry, R. I. Kaiser, *Preparation of Acetylenediol (HOCCOH) and Glyoxal (HCOCHO) in Interstellar Analog Ices of Carbon Monoxide and Water*, Astrophysical Journal, 967, 79 (**2024**)
- J. H. Marks, X. Bai, A. A. Nikolayev, Q. Gong, C. Zhu, N. F. Kleimeier, **A. M. Turner**, S. K. Singh, J. Wang, J. Yang, Y. Pan, T. Yang, A. M. Mebel, R. I. Kaiser, *Methanetriol--Formation of an Impossible Molecule*, Journal of the American Chemical Society, 146, 12174-12184 (**2024**).
- S. J. Goettl, **A. M. Turner**, B.-J. Sun, A. H. H. Chang, P. Hemberger, R. I. Kaiser, *Gas-Phase Preparation of the Dibenzo[e,l]pyrene ($C_{24}H_{14}$) Butterfly Molecule via a Phenyl Radical Mediated Ring Annulation*, Chemical Communications, 60, 1404 (**2024**).
- J. H. Marks, J. Wang, B.-J. Sun, M. McAnally, **A. M. Turner**, A. H. H. Chang, R. I. Kaiser, *Thermal Synthesis of Carbamic Acid and its Dimer in Interstellar Ices: A Reservoir of Interstellar Amino Acids*, ACS Central Science, 9, 2171 (**2023**).
- **A. M. Turner**, J. H. Marks, J. T. Lechner, T. M. Klapötke, R. Sun, R. I Kaiser, *Ultraviolet-Initiated Decomposition of Solid 1,1-Diamino-2,2-Dinitroethylene (FOX-7)*, Journal of Physical Chemistry A, 127, 37, 7707 (**2023**)
- S. J. Geottl, L. B. Tuli, **A. M. Turner**, Y. Reyes, A. H. Howlader, S. F. Wnuk, P. Hemberger, A. M. Mebel, R. I. Kaiser, *Gas Phase Synthesis of Coronene through Stepwise Directed Ring Annulation*, Journal of the American Chemical Society, 145, 15443 (**2023**).
- J. H. Marks, A. A. Nikolayev, M. M. Evseev, J. Wang, **A. M. Turner**, N. Fabian Kleimeier, O. V. Kuznetsov, M. McAnally, A. N Morozov, I. O. Antonov, A. M. Mebel, R. I. Kaiser, *Quantum Tunneling Mediated Synthesis of Prebiotic Chelation Agents in Interstellar Analog Ices*, Chem, 9 (**2023**).
- C. Zhang, J. Wang, **A. M. Turner**, J. H. Marks, S. Chandra, R. C. Fortenberry, R. I. Kaiser, *On the Formation of Vinylamine ($C_2H_3NH_2$) in Interstellar Ice Analogs*, The Astrophysical Journal, 952, 132 (**2023**).
- **A. M. Turner**, J. H. Marks, Y. Luo, J. T. Lechner, T. M. Klapötke, R. Sun, R. I. Kaiser, *Electron-Induced Decomposition of Solid 1,1-Diamino-2,2-Dinitroethylene (FOX-7) at Cryogenic Temperatures*, Journal of Physical Chemistry A, 127, 3390 (**2023**).
- C. Zhang, C. Zhu, **A. M. Turner**, I. Antonov, A. D. Garcia, C. Meinert, L. A. Young, D. C. Jewitt, R. I. Kaiser, *Processing of Methane and Acetylene Ices by Galactic Cosmic Rays and Implications to the Color Diversity of Kuiper Belt Objects*, Science Advances, 9, eadg6936 (**2023**).
- J. Wang, J. H. Marks, **A. M. Turner**, A. M. Mebel, A. K. Eckhardt, R. I. Kaiser, *Gas-Phase Detection of Oxirene*, Science Advances, 9, eadg1134 (**2023**).
- L. B. Tuli, S. J. Goettl, **A. M. Turner**, A. H. Howlader, P. Hemberger, S. F. Wnuk, T. Guo, A. M. Mebel, R. I. Kaiser, *Gas Phase Synthesis of the Nano Bowl-40 ($C_{40}H_{10}$)*, Nature Communications, 14, 1527 (**2023**).
- J. H. Marks, J. Wang, N. F. Kleimeier, **A. M. Turner**, A. K. Eckhardt, R. I. Kaiser, *Prebiotic Synthesis and Isomerization in Interstellar Analog Ice: Glycinal, Acetamide, and Their Enol Tautomers*, Angewandte Chemie International Edition, 62, e202218645 (**2023**).
- C. Zhang, **A. M. Turner**, J. Wang, J. H. Marks, R. C. Fortenberry, R. I. Kaiser, *Low-Temperature Thermal Formation of the Cyclic Methylphosphonic Acid Trimer [c-(CH_3PO_2)$_3$]*, ChemPhysChem, 24, e202200660 (**2023**).
- J. Wang, J. H. Marks, **A. M. Turner**, A. A. Nikolayev, V. N. Azyazov, A. M. Mebel, R. I. Kaiser, *Mechanistical study on the formation of hydroxyacetone (CH_3COCH_2OH), methyl acetate (CH_3COOCH_3), and 3-hydroxypropanal ($HCOCH_2CH_2OH$) along with their enol tautomers (prop-1-ene-1,2-diol ($CH_3C(OH)CHOH$), prop-2-ene-1,2-diol ($CH_2C(OH)CH_2OH$), 1-methoxyethen-1-ol*

($CH_3OC(OH)CH_2$) and prop-1-ene-1,3-diol ($HOCH_2CHCHOH$)) in interstellar ice analogs, Physical Chemistry Chemical Physics, 25, 936-953 (**2023**).

- I. Antonov, A. Chyba, S. D. Perera, **A. M. Turner**, M. L. Pantoya, M. T. Finn, A. Epshteyn, R. I. Kaiser, *Discovery of Discrete Stages in the Oxidation of exo-Tetrahydrodicyclopentadiene ($C_{10}H_{16}$) Droplets Doped with Titanium–Aluminum–Boron Reactive Mixed-Metal Nanopowder,* Journal of Physical Chemistry Letters, 13, 9777-9785 (**2022**).
- J. Wang, N. F. Kleimeier, R. Johnson, S. Gozem, M. J. Abplanalp, **A. M. Turner**, J. H. Marks, R. I. Kaiser, *Photochemically Triggered Cheletropic Formation of Cyclopropenone (c-C_3H_2O) from Carbon Monoxide and Electronically Excited Acetylene*, Physical Chemistry Chemical Physics, 24, 17449-17461 (**2022**).
- **A. M. Turner**, Y. Luo, J. H. Marks, R. Sun, J. Lechner, T. M. Klapötke, R. I. Kaiser, *Exploring the Photochemistry of Solid 1,1-Diamino-2,2-dinitroethylene (FOX-7) Spanning Simple Bond Ruptures, Nitro-to-Nitrite Isomerization, and Non-Adiabatic Dynamics*, Journal of Physical Chemistry A, 126, 29, 4747-4761 (**2022**).
- S. J. Brotton, S. D. Perera, A. Misra, N. F. Kleimeier, **A. M Turner**, R. I Kaiser, M. Palenik, M. T. Finn, A. Epshteyn, B. J. Sun, L. J. Zhang, A. H. H. Chang, *A Spectroscopic Investigation on the Oxidation of exo-Tetrahydrodicyclopentadiene (JP-10; $C_{10}H_{16}$) Doped with Titanium-Aluminum-Boron Reactive Metal Nanopowder*, Journal of Physical Chemistry A, 126, 1, 125-144 (**2022**).
- N. F. Kleimeier, Y. Liu, **A. M. Turner,** L. A. Young, C. H. Chin, T. Yang, X. He, J. I. Lo, B. M. Cheng, R. I. Kaiser, *Excited State Photochemically Driven Surface Formation of Benzene from Acetylene Ices on Pluto and in the Outer Solar System*, Physical Chemistry Chemical Physics, 24, 1424-1436 (**2022**).
- C. Zhu, N. F. Kleimeier, **A. M. Turner**, S. K. Singh, R. C. Fortenberry, R. I. Kaiser, *Synthesis of methanediol [$CH_2(OH)_2$]: The simplest geminal diol*, Proceedings of the National Academy of Sciences, 119, e2111938119 (**2022**).
- C. Zhu, A. Eckhardt, S. Chandra, **A. M. Turner**, P. Schreiner, R. I. Kaiser, *Identification of a prismatic P_3N_3 molecule formed from electron irradiated phosphine-nitrogen ices,* Nature Communications, 12, 5497 (**2021**).
- **A. M. Turner**, A. Bergantini, A. S. Koutsogiannis, N. F. Kleimeier, S. K. Singh, C. Zhu, A. K. Eckhardt, R. I. Kaiser, *A Photoionization Mass Spectrometry Investigation into Complex Organic Molecules Formed in Interstellar Analog Ices of Carbon Monoxide and Water Exposed to Ionizing Radiation*, The Astrophysical Journal, 916, 24 (**2021**).
- **A. M. Turner**, S. Chandra, R. C. Fortenberry, R. I. Kaiser, *A Photoionization Reflectron Time-of-Flight Mass Spectrometric Study on the Detection of Ethynamine ($HCCNH_2$) and 2H-Azirine (c-H_2CCHN)*, ChemPhysChem, 22, 985-994 (**2021**).
- S. Chandra, A. K. Eckhardt, **A. M. Turner**, G. Tarczay, R. I. Kaiser, *A Photoionization Study on the Detection of 1-Sila Glycolaldehyde ($HSiOCH_2OH$), 2-Sila Acetic Acid ($H_3SiCOOH$), and 1,2-Disila Acetaldehyde ($HSiOSiH_3$)*, Chemistry – A European Journal, 27, 4939 (**2021**).
- **A. M. Turner,** R. I. Kaiser, *Exploiting Photoionization Reflectron Time-of-Flight Mass Spectrometry to Explore Molecular Mass Growth Processes to Complex Organic Molecules in Interstellar and Solar System Ices*, Accounts of Chemical Research, 53, 2791 (**2020**).
- **A. M. Turner**, A. S. Koutsogiannis, N. F. Kleimeier, A. Bergantini, C. Zhu, R. C. Fortenberry, R. I. Kaiser, *An experimental and theoretical investigation on the formation of ketene (H_2CCO) and ethynol (HCCOH) in interstellar analogues ices*, The Astrophysical Journal, 896, 88 (**2020**).
- N. F. Kleimeier, **A. M. Turner**, R. C. Fortenberry, R. I. Kaiser, *On the Formation of the Popcorn Flavorant 2,3-Butanedione ($CH_3COCOCH_3$) in Acetaldehyde-Containing Interstellar Ices*, ChemPhysChem, 21, 1531 **(2020)**.
- C. Zhu, **A. M. Turner**, M. J. Abplanalp, B. Webb, G. Siuzdak, R. C. Fortenberry, R. I. Kaiser, *An Interstellar Synthesis of Glycerol Phosphates*, The Astrophysical Journal Letters, 899, L3 (**2020**).
- C. Zhu, **A. M. Turner**, C. Meinert, R. I. Kaiser, *On the Production of Polyols and Hydroxycarboxylic Acids in Interstellar Analogous Ices of Methanol*, The Astrophysical Journal, 889, 134 (**2020**).

- **A. M. Turner**, M. J. Aplanalp, A. Bergantini, R. Frigge, C. Zhu, B. J. Sun, C. T. Hsiao, A. H. H. Chang, C. Meinert, R. I. Kaiser, *Origin of Alkylphosphonic Acids in the Interstellar Medium,* Science Advances, 5, 8, eaaw4307 (**2019**).
- C. Zhu, R. Frigge, **A. M. Turner**, M. J. Abplanalp, B. J. Sun, Y. L. Chen, A. H. H. Chang, R. I. Kaiser, *A Vacuum Ultraviolet Photoionization Study on the Formation of Methanimine (CH_2NH) and Ethylenediamine ($NH_2CH_2CH_2NH_2$) in Low Temperature Interstellar Model Ices Exposed to Ionizing Radiation,* Physical Chemistry Chemical Physics, 21, 1952 (**2019**).
- **A. M. Turner**, A. Bergantini, M. J. Abplanalp, C. Zhu, S. Góbi, B. J. Sun, K. H. Chao, A. H. H. Chang, C. Meinert, R. I. Kaiser, *An Interstellar Synthesis of Phosphorus Oxoacids*, Nature Communications, 9, 3851 (**2018**).
- R. Frigge, C. Zhu, **A. M. Turner**, M. J. Aplanalp, B. J. Sun, Y. S. Huang, A. H. H. Chang, R. I. Kaiser, *Synthesis of the hitherto elusive formylphosphine ($HCOPH_2$) in the Interstellar Medium—A Molecule with an Exotic Phosphorus Peptide Bond,* Chemical Communications, 54, 10152, (**2018**).
- R. Frigge, C. Zhu, **A. M. Turner**, M. J. Aplanalp, A. Bergantini, B. J. Sun, Y. L. Chen, A. H. H. Chang, R. I. Kaiser, *A Vacuum Ultraviolet Photoionization Study on the Formation of N-methyl Formamide ($HCONHCH_3$) in Deep Space: A Potential Interstellar Molecule with a Peptite Bond*, The Astrophysical Journal, 862, 84, (**2018**).
- C. Zhu, R. Frigge, A. M. Turner, R. I. Kaiser, B. J. Sun, S. Y. Chen, A. H. H. Chang, *First Identification of Unstable Phosphino Formic Acid (H_2PCOOH),* Chemical Communications, 54, 5716 (**2018**).
- C. Zhu, **A. M. Turner**, M. J. Abplanalp, R. I. Kaiser, *Formation of High Order Carboxylic Acids (RCOOH) in Interstellar Analogous Ices of Carbon Dioxide (CO_2) and Methane (CH_4),* The Astrophysical Journal Supplement, 234, 15 (**2018**).
- M. J. Abplanalp, S. Góbi, A. Bergantini, **A. M. Turner**, R. I. Kaiser, *On The Synthesis of Chocolate Flavovoids (Propanols, Butanals) in the Interstellar Medium,* ChemPhysChem, 19, 556 (**2018**).
- **A. M. Turner**, M. J. Abplanalp, T. J. Blair, R. Dayuha, R. I. Kaiser, *An Infrared Spectroscopic Study toward the Formation of Alkylphosphonic Acids and their Precursors in Extraterrestrial Environments*. The Astrophysical Journal Supplement, 234, 6 (**2018**).
- S. Góbi, A. Bergantini, **A. M. Turner**, R.I. Kaiser, *Electron Radiolysis of Ammonium Perchlorate: A Reflectron Time-of- Flight Mass Spectrometric Study,* Journal of Physical Chemistry A, 121, 3879-3890 (**2017**).
- B. M. McMurtry, S. E. J. Saito, **A. M. Turner**, H. K. Chakravarty, R. I Kaiser, *On the Formation of Benzoic Acid and Higher Order Benzene Carboxylic Acids in Interstellar Model Ice Grains*, The Astrophysical Journal, 831, 174 (**2016**).
- B. M. McMurtry, **A. M. Turner**, S. E. J. Saito, R. I Kaiser, *On the Formation of Niacin (Vitamin B3) and Pyridine Carboxylic Acids in Interstellar Model Ices,* Chemical Physics, 472, 173 (**2016**).
- **A. M. Turner**, M. J. Abplanalp, R. I. Kaiser, *Mechanistic Studies on the Radiolytic Decomposition of Perchlorates on the Martian Surface*, The Astrophysical Journal, 820, 127 (**2016**).
- **A. M. Turner**, M. J. Abplanalp, R. I. Kaiser, *Probing the Carbon-phosphorus Bond Coupling in Low-temperature Phosphine (PH_3)-Methane (CH_4) Interstellar Ice Analogues*, The Astrophysical Journal 819, 97 (**2016**).
- **A. M. Turner**, M. J. Abplanalp, S. Y. Chen, Y. T. Chen, A. H. H. Chang, R. I. Kaiser, *A Photoionization Mass Spectroscopic Study on the Formation of Phosphanes in Low Temperature Phosphine Ices*, Physical Chemistry Chemical Physics, 17, 27281-27291 (**2015**).
- L. Zhou, S. Maity, M. J. Abplanalp, **A. M. Turner,** R. I. Kaiser, *On the Radiolysis of Ethylene Ices by Energetic Electrons and Implications to the Extraterrestrial Hydrocarbon Chemistry,* The Astrophysical Journal, 790, 38 (**2014**).
- R. A. Hites & **A. M. Turner**, *Rate constants for the gas-phase β-myrcene + OH and isoprene + OH reactions as a function of temperature,* International Journal of Chemical Kinetics, 41, 6 (**2009**).

Conference Organization

- Laboratory Astrophysics Workshop (ICE-2024), Kauai, HI, February 18-22, 2024. Chair