

Christopher Nelson Shingledecker

*Alexander von Humboldt Stiftung Postdoc-Stipendiat
Das Zentrum für astrochemische Studien (CAS@MPE)
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Education

- 2018 **Doctor of Philosophy**, *University of Virginia, Charlottesville, VA, Chemistry.*
- 2013 **Bachelor of Science**, *University of Virginia, Charlottesville, VA, with Highest Distinction, ACS Certification, Distinguished Major Program.*
Major: Chemistry
Minor: Astronomy

Doctoral Thesis

Title *On Cosmic Rays in Astrochemical Models*
Supervisor Eric Herbst

Awards and Honors

- 2018 Alexander von Humboldt Foundation Postdoctoral Research Fellowship
- 2018 Adam Ritchie Outstanding Graduate Student Award
- 2018 PCCP HOT Article: A general method for the inclusion of radiation chemistry in astrochemical models
- 2017 PCCP HOT Article: A new model of the chemistry of ionizing radiation in solids: CIRIS
- 2017 Rao Prize
- 2017 NASA ROSES Proposal Writing Retreat Winner
- 2015 DOE NNSA Stewardship Science Graduate Fellowship: Honorable Mention
- 2013 Oscar R. Rodig Excellence in Chemistry Award

Professional Associations & Honor Societies

Radiation Research Society - *Senior Scholar-in-Training*
American Astronomical Society - *Full Member*
American Chemical Society - *Member*
Phi Beta Kappa Honor Society - *Member*
Phi Theta Kappa Honor Society - *Member*
Mu Alpha Theta Honor Society - *Member*
Alpha Chi Sigma Chemistry Fraternity - *Professional Member*

Scientific Organizing Committees

- 2017 14th Astrobiology Graduate Conference (AbGradCon), June 2018.
2016–2017 13th Astrobiology Graduate Conference (AbGradCon), University of Virginia, Charlottesville, VA, USA, June 2017.

Refereeing Duties

- since 2017 ACS Earth & Space Chemistry
since 2018 The Astrophysical Journal
since 2018 Nuclear Instruments and Methods in Physics Research Section B

Public Outreach Activities

- since 2014 Ruckersville Elementary School Science Day
since 2014 Fan Mountain Public Night
2010–2014 Alpha Chi Sigma ChemFest

Other Activities

- 2015–2017 **Treasurer**, *ακ Chapter Housing Corporation*, AXΣ Professional Fraternity, University of Virginia.
Charlottesville, VA, USA
2012–2013 **Chapter Reporter**, *ακ Chapter*, AXΣ Professional Fraternity, University of Virginia.
Charlottesville, VA, USA

Languages

- German **Intermediate** *Reading and speaking*
French **Basic** *Reading and some speaking*

Computer skills

- Programming Language FORTRAN 77, Fortran 90, Coarray Fortran, C, C++, Julia, IDL, Python, R, BASIC, Bash
Operating Systems UNIX, Linux, Mac OS, Windows, Plan 9 from Bell Labs
Software L^AT_EX, SLURM, PBS, OpenMP, MPI, Mathematica, Gnuplot

Publications

- (2018) A. Bergantini, M. J. Abplanalp, P. Pokhilko, A. I. Krylov, C. N. Shingledecker, E. Herbst, and R. I. Kaiser, "A Combined Experimental and Theoretical Study on the Formation of Interstellar Propylene Oxide (CH₃CHCH₂O)A Chiral Molecule", **860**, 108, 108 (2018).
B. A. McGuire, C. L. Brogan, T. R. Hunter, A. J. Remijan, G. A. Blake, A. M.

- Burkhardt, P. B. Carroll, E. F. van Dishoeck, R. T. Garrod, H. Linnartz, C. N. Shingledecker, and E. R. Willis, "First Results of an ALMA Band 10 Spectral Line Survey of NGC 6334I: Detections of Glycolaldehyde (HC(O)CH₂OH) and a New Compact Bipolar Outflow in HDO and CS", **863**, L35, L35 (2018).
- B. A. McGuire, A. M. Burkhardt, S. Kalenskii, C. N. Shingledecker, A. J. Remijan, E. Herbst, and M. C. McCarthy, "Detection of the aromatic molecule benzonitrile (*c*-C₆H₅CN) in the interstellar medium", *Science* (2018).
- C. N. Shingledecker, J. Tennis, R. Le Gal, and E. Herbst, "On Cosmic-Ray-driven Grain Chemistry in Cold Core Models", **861**, 20, 20 (2018).
- C. N. Shingledecker and E. Herbst, "A general method for the inclusion of radiation chemistry in astrochemical models", *Phys. Chem. Chem. Phys.* **20**, 5359–5367 (2018).
- (2017) B. A. McGuire, C. N. Shingledecker, E. R. Willis, A. M. Burkhardt, S. El-Abd, R. A. Motiyenko, C. L. Brogan, T. R. Hunter, L. Margulès, J.-C. Guillemin, R. T. Garrod, E. Herbst, and A. J. Remijan, "ALMA Detection of Interstellar Methoxymethanol (CH₃OCH₂OH)", *The Astrophysical Journal*, letters **851**, L46, L46 (2017).
- B. A. McGuire, A. M. Burkhardt, C. N. Shingledecker, S. V. Kalenskii, E. Herbst, A. J. Remijan, and M. C. McCarthy, "Detection of Interstellar HC₅O in TMC-1 with the Green Bank Telescope", *The Astrophysical Journal* **843**, L28 (2017).
- C. N. Shingledecker, R. Le Gal, and E. Herbst, "A new model of the chemistry of ionizing radiation in solids: ciris", *Phys. Chem. Chem. Phys.* **19**, 11043–11056 (2017).
- (2016) M. J. Abplanalp, S. Gozem, A. I. Krylov, C. N. Shingledecker, E. Herbst, and R. I. Kaiser, "A study of interstellar aldehydes and enols as tracers of a cosmic ray-driven nonequilibrium synthesis of complex organic molecules", en, *Proceedings of the National Academy of Sciences* **113**, 7727–7732 (2016).
- A. M. Burkhardt, N. M. Dollhopf, J. F. Corby, P. B. Carroll, C. N. Shingledecker, R. A. Loomis, S. T. Booth, G. A. Blake, E. Herbst, A. J. Remijan, and B. A. McGuire, "CSO AND CARMA OBSERVATIONS OF L1157. II. CHEMICAL COMPLEXITY IN THE SHOCKED OUTFLOW", *The Astrophysical Journal* **827**, 21 (2016).
- R. A. Loomis, C. N. Shingledecker, G. Langston, B. A. McGuire, N. M. Dollhopf, A. M. Burkhardt, J. Corby, S. T. Booth, P. B. Carroll, B. Turner, and A. J. Remijan, "Non-detection of HC₁₁N towards TMC-1: constraining the chemistry of large carbon-chain molecules", en, *Monthly Notices of the Royal Astronomical Society* **463**, 4175–4183 (2016).
- C. N. Shingledecker, J. B. Bergner, R. Le Gal, K. I. Öberg, U. Hincelin, and E. Herbst, "On the Inference of the Cosmic-ray Ionization Rate ζ from the HCO⁺-to-DCO⁺ Abundance Ratio: The Effect of Nuclear Spin", *The Astrophysical Journal* **830**, 151, 151 (2016).

(2015) R. A. Loomis, B. A. McGuire, C. Shingledecker, C. H. Johnson, S. Blair, Amy Robertson, and A. J. Remijan, "Investigating the Minimum Energy Principle in Searches for New Molecular Species," The Case of H₂C₃O Isomers", *The Astrophysical Journal* **799**, 34 (2015).

B. A. McGuire, P. B. Carroll, N. M. Dollhopf, N. R. Crockett, J. F. Corby, R. A. Loomis, A. M. Burkhardt, C. Shingledecker, G. A. Blake, and A. J. Remijan, "CSO AND CARMA OBSERVATIONS OF L1157. I. A DEEP SEARCH FOR HYDROXYLAMINE (NH₂OH)", *The Astrophysical Journal* **812**, 76 (2015).

Invited Talks and Colloquia

- June 2017 **Cosmic Rays Bite the Dust: An Introduction to the CIRIS Model**, *Talk*, Wellesley College: Dept. of Chemistry, Host: Christopher Arumainayagam. Wellesley, MA
- May 2017 **Modeling Cosmic Ray Induced Interstellar Chemistry**, *Tuesday UVa/NRAO Astronomy (TUNA) Lunch Talk Series*, NRAO, Host: Kristina Nyland. Charlottesville, VA

Conference Talks and Posters

- June 2017 **A New Model of the Chemistry of Ionizing Radiation in Solids**, *Talk*, International Symposium on Molecular Spectroscopy, University of Illinois - Urbana-Champaign. Urbana-Champaign, IL
- June 2017 **Cosmic Irradiation of Interstellar Ices as a Means of Forming Prebiotic Molecules**, *Talk*, Astrobiology Graduate Conference, University of Virginia. Charlottesville, VA
- June 2017 **PWR Winner Presentation: European Ice Irradiation as a Mechanism of Prebiotic Molecule Synthesis**, *Talk*, Astrobiology Graduate Conference, University of Virginia. Charlottesville, VA
- April 2017 **Simulating the chemistry of ionizing radiation in solids**, *Poster*, American Chemical Society 253rd National Meeting, Moscone Center. San Francisco, CA
- Feb. 2015 **Cosmic-ray Induced Interstellar Grain Chemistry: A New Microscopic Monte Carlo Approach**, *Poster*, Second Workshop on Experimental Laboratory Astrophysics, Poipu Beach. Kauai, HI
- July 2014 **Temperature Gradients in Meteorites During Atmospheric Entry**, *Poster*, Astrobiology Graduate Conference, Rensselaer Polytechnic Institute. Troy, NY
- April 2013 **Analysis of the Chemistry of Protoplanetary Disks: The Search for the Water Snow-line**, *Talk*, Distinguished Majors Symposium, University of Virginia. Charlottesville, VA

Presentations to the General Public

- May 2015 **Our Chemical Cosmos**, *Talk*, Charlottesville Astronomical Society, McCormick Observatory.
Charlottesville, VA
- October 2015 **Studying the Molecular Universe**, *Talk*, Fan Mountain Observatory Public Night, Fan Mountain Observatory.
Covesville, VA

References

- Eric Herbst **Commonwealth Professor of Chemistry, Astronomy, and Physics**, *Department of Chemistry, University of Virginia*, Charlottesville, VA 22904, tel: 434-243-0535.
email: eh2ef@virginia.edu
- Anthony Remijan **Head, North American ALMA Science Center**, *National Radio Astronomy Observatory (NRAO)*, Charlottesville, VA, tel: 434-296-0278.
email: aremijan@nrao.edu
- Sergei Egorov **Professor of Chemistry**, *Department of Chemistry, University of Virginia*, Charlottesville, VA 22904, tel: 434-924-07690.
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