# Dr. Jordy Bouwman

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## EDUCATION

**Leiden University** — Leiden, the Netherlands
**PhD in Natural Sciences / Astronomy** — October 2010
**PhD Advisor: Prof. H. Linnartz**

**Free University Amsterdam** — Amsterdam, the Netherlands
**MSc in Chemistry – Laser Sciences** — February 2006

**University of Applied Sciences Rijswijk** — Rijswijk, the Netherlands
**BEng in Applied Physics (cum laude)** — February 2004

## ACADEMIC EMPLOYMENT HISTORY

**CU Boulder / LASP** — Boulder, CO, USA
**Assistant Professor** — Aug. 2021 – Present

**Universiteit Leiden** — Leiden, the Netherlands
**Assistant Professor** — Nov. 2016 – Aug. 2021
**In the Laboratory of Prof. H. Linnartz**

**Radboud Universiteit, Nijmegen** — Nijmegen, the Netherlands
**VENI Research Fellow** — Nov. 2013 – Oct. 2016

**University of California, Berkeley** — Berkeley, CA, USA
**Postdoctoral Research Scientist** — Nov. 2010 – Nov. 2013
**Postdoctoral advisor: Prof. S. R. Leone**

## RESEARCH GRANTS AS PI AT CU BOULDER

**National Science Foundation** — Boulder, CO
**Division of Astronomical Sciences** — 2023
Award amount $418,655 / Period of Performance September 2023 – August 2026
A single PI grant for conducting three years of research at Chemistry/LASP, CU Boulder. Title of grant proposal: “Laboratory investigation of the gas-phase formation of (poly)cyclic hydrocarbons under interstellar conditions”

**National Aeronautics and Space Administration** — Boulder, CO
**Preliminary Science Investigations for Europa-Clipper** — 2023
Award amount $1,795,480 / Period of Performance December 2023 – December 2026
PI: Jordy Bouwman, Co-Is: Zoltan Sternovsky (CU Boulder – Aerospace Engineering), Sean Hsu (CU Boulder – LASP), Rob Garrod (UVA - Chemistry), Morgan Cable (NASA JPL).
Grant for conducting three years of research at LASP, CU Boulder. About $1M of the total amount is for PI Bouwman. Title of grant proposal: “Physical/chemical alterations and detectability of molecular species on Europa’s surface using IR spectroscopy and mass spectrometry”

**CU Research and Innovation Office** Boulder, CO
**Seed grant** 2023
Award amount $48,830 / Period of Performance May 2023 – November 2024
PI: Jordy Bouwman, Co-I: Zoltan Sternovsky (CU Boulder – Aerospace Engineering)
Seed grant for developing a new research program at CU Boulder. Title of grant proposal: "Enabling the detection of nitrogen-bearing molecules on Jupiter's icy moon Europa"

## OTHER GRANTS PRIOR TO CU BOULDER

**Netherlands Organisation for Scientific Research** Leiden, the Netherlands
**Vidi Research Grant** 2017
Award amount €850,000 / Period of Performance January 2017 – April 2024
A single PI grant for conducting three years of independent research at Leiden University, Leiden, the Netherlands. Title of grant proposal: "Hydrocarbon chemistry under exotic conditions: the case of (exo)planetary atmospheres"

**Netherlands Organisation for Scientific Research** Nijmegen, the Netherlands
**Veni Research Grant** 2013
Award amount €250.000 / Period of Performance November 2013 – October 2016.
A single PI grant for conducting three years of independent research at the free electron laser FELIX at Radboud University, Nijmegen, the Netherlands.

## AWARDS

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| Summer 2023: | CU Boulder Undergraduate Research Opportunities Mentorship Award for guidance of undergraduate student Jackson Cahn |
| Summer 2025: | CU Boulder Graduate School Exceptional Graduate Faculty Mentor Award |

## PI ON BEAMTIME PROPOSALS AT LARGE-SCALE FACILITIES

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| Swiss Light Source (synchrotron)<br>Villigen, Switzerland | 14 granted proposals (2014 – present)<br>~560 hours of measurement time<br>168 hours of beamtime since at CU Boulder |
| Free Electron Laser for Infrared Experiments<br>Radboud University, Nijmegen, the Netherlands | 6 granted proposals (2017 – present)<br>~168 hours of measurement time<br>32 hours since at CU Boulder |
| Advanced Light Source (synchrotron)<br>Berkeley, CA, USA | 1 granted proposal (2011)<br>24 hours of measurement time |

## PEER-REVIEWED PUBLICATIONS

Manuscripts are listed in three categories: 1) Work published while at CU Boulder 2) Work published prior to CU Boulder, and 3) Conference proceedings. Papers on which I am corresponding author are highlighted with an asterisk (*) behind my name. I was the intellectual driver on the studies where I am the corresponding author. Postdocs and (under)graduate students supervised by me are underscored.

Late Prof. H. Linnartz was my PhD advisor in the period 2006–2010 and he is thus co-author on 7 papers resulting from that work. I returned to his laboratory in 2016 to take on an assistant professor position on a personal research grant (VIDI) and Prof. Linnartz is therefore also co-author on 21 papers since 2017. I am the intellectual driver on 7 manuscripts (out of the 21) co-authored with him since 2017, i.e. on the manuscripts on which I am the corresponding author.

Besides the work conducted in the lab of Prof. Harold Linnartz, many manuscripts resulting from my independent research since 2013 involve studies conducted at large-scale facilities. These studies are conducted in collaboration with beamline scientist who make their instruments available to my group to answer our science questions and assist with the data interpretation. At the Swiss Light Source, the beamline scientists Dr. P. Hemberger and Dr. A. Bodi make their imaging photoelectron photoion spectrometer at the VUV beamline available to users. We published 13 papers together based on studies conducted on their instrument and I am the intellectual driver on all these projects. We furthermore conducted measurements on two different ion trap instruments connected to the free electron laser FELIX at Radboud University and these studies involve beamline scientists Dr. G. Berden, Prof. J. Oomens or Prof. S. Brünken. The measurements at FELIX resulted in 10 publications on which I am the intellectual driver.

## PEER-REVIEWED PUBLICATIONS WHILE AT CU BOULDER

**Submitted papers**

1. R. McClish, D. Schleier, J. Kamer, T. Kasper, A. Bodi, P. Hemberger, and **J. Bouwman***, "Pyrrole Without Life: Reaction of Aminomethylene with the Propargyl Radical", submitted, (2025)

**Published papers**

1. M. Patch, R. McClish, S. Panchagnula, D. B. Rap, S. Banhatti, H. R. Hrodmarsson, S. Brünken, H. Linnartz, A. G. G. M. Tielens, and **J. Bouwman***, "Radical Isomerization upon Dissociative Electron Ionization of Anthracene and Phenanthrene", Journal of the American Chemical Society, (2025), 147, 38, 34508–34516
2. N. Suas-David, Y. Gu, H. Linnartz, and **J. Bouwman***, "P2DN: A pulsed setup for a high-density supersonic plasma expansion", Earth and Space Science, **9**, (2025), 6, 1510–1524
3. R. Arns, R. McClish, P. Hemberger, A. Bodi, **J. Bouwman***, T. Kasper, and D. Schleier, "Is Phenylnitrene a missing link in PANH formation?", accepted for publication in Angewandte Chemie, (2025), e202503940
4. J. Kamer and **J. Bouwman***, "Reactions of Coronene$^+$ Photodissociation Fragment Ions with Water in a Room Temperature Quadrupole Ion Trap", ACS Earth and Space Science, **9**, (2025) 5, 1017–1029
5. S. Kempf and collaborators (including **J. Bouwman**), "SUDA: A SUrface Dust Analyser for compositional mapping of the Galilean moon Europa", Space Science Reviews, **221**, (2024) 1-55
6. J. Kamer, D. Schleier, A. Jiao, G. F. Schneider, J. Martens, G. Berden, J. Oomens, and **J. Bouwman***, "IR spectra of cationic 1,5,9-triazacoronene and two of its cationic derivatives" *Physical Chemistry Chemical Physics*, **26**, (2024) 27912-27921
7. D. Schleier, J. Kamer, A. Jiao, G. F. Schneider, H. Linnartz and **J. Bouwman*** "Photoprocessing of cationic triazacoronene: Dissociation characteristics of polycyclic nitrogen heterocycles in interstellar environments", *Physical Chemistry Chemical Physics*, **26** (2024), 15547–15558
8. S. Panchagnula, J. Kamer, A. Candian, H. R. Hrodmarsson, H. Linnartz, **J. Bouwman***, and A.G.G.M. Tielens, "Laser-induced fragmentation of coronene cations", *Physical Chemistry Chemical Physics*, **26** (2024), 18557 - 18570
9. Y. Gu, N. Suas-David, **J. Bouwman**, Y. Li, H. Linnartz, "Numerical and Experimental Study of Supersonically Expanding Argon Plasma using a Micrometer Hollow Cathode Discharge", *Journal of Applied Physics*, **135** (2024), 193302, 15 pages
10. H. R. Hrodmarsson, M. Rapacioli, F. Spiegelman, G. A. Garcia, **J. Bouwman**, L. Nahon, H. Linnartz, "Probing the electronic structure and ground state symmetry of gas phase $C_{60}^+$ via VUV photoionization and comparison with theory", *Journal of Chemical Physics*, **160** (2024), 164314, 13 pages

11. E. Peeters, É. Habart, O. Berné, and JWST team including **J. Bouwman**, "PDRs4ALL III. JWST's NIR spectroscopic view of the Orion Bar", *Astronomy and Astrophysics*, **685** (2024), A74, 47 pages
12. D. Schleier, J. Kamer, J. Martens, G. Berden, J. Oomens, **J. Bouwman***, Exploring the scaling factors for infrared modes of PANHs - A case study on cationic 3-Azafluoranthene$^{\cdot+}$ and protonated 3-Azafluoranthene, *ChemPhysChem*, e202300915 (2024), 10 pages
13. R. Mikula, Z. Sternovsky, S. P. Armes, E. Ayari, **J. Bouwman**, D. H. H. Chan, J. Fontanese, M. Horanyi, J. K. Hillier, S. Kempf, N. Khawaja, Z. Kupihár, F. Postberg, and R. Srama, "Impact Ionization Mass Spectra of Polypyrrole-Coated Anthracene Microparticles: A Useful Mimic for Cosmic Polycyclic Aromatic Hydrocarbon Dust" *ACS Earth Space Chemistry*, **8** (2024), 3, 586–605
14. E. Habart, E. Peeters, O. Berné, and JWST team including **J. Bouwman** "PDRs4All II: JWST's NIR and MIR imaging view of the Orion Nebula", *Astronomy and Astrophysics*, **685** (2024), A73, 48 pages
15. J. Kamer, D. Schleier, M. Donker, P. Hemberger, A. Bodi, **J. Bouwman***, "Threshold photoelectron spectroscopy and dissociative photoionization of benzonitrile", *Physical Chemistry Chemical Physics*, **25** (2023), 29070-29079
16. **J. Bouwman***, M.N. McCabe, C.N. Shingledecker, J. Wandishin, V. Jarvis, E. Reusch, P. Hemberger and A. Bodi, "Five-membered ring compounds from the ortho-benzyne + methyl radical reaction under interstellar conditions", *Nature Astronomy*, **7** (2023), 423–430
17. H. R. Hrodmarsson, **J. Bouwman**, A. G. G. M. Tielens, and H. Linnartz "Fragmentation of the PAH cations of Isoviolanthrene and Dicoronylene: A case made for interstellar cyclo[n]carbons as products of universal fragmentation", *International Journal of Mass Spectrometry*, **485** (2023), 116996, 13 pages
18. K. Ramanathan, Arun S., **J. Bouwman**, L. Avaldi, M. V. Vinitha, P. Bolognesi, R. Richter, and U. R. Kadhane "Photodissociation of Quinoline Cation: Mapping the Potential Energy Surface", *Journal of Chemical Physics*, **157** (2022), 064303, 11 pages
19. U. R. Kadhane, M. V. Vinitha, K. Ramanathan, Arun S., **J. Bouwman**, L. Avaldi, P. Bolognesi, and R. Richter "Comprehensive survey of dissociative photoionisation of quinoline by PEPICO experiments", *Journal of Chemical Physics*, **156** (2022), 244304, 12 pages
20. Olivier Berné, Émilie Habart, and Els Peeters (PI Team), and JWST team including **J. Bouwman** "PDRs4All: A JWST Early Release Science Program on Radiative Feedback from Massive Stars", *Publications of the Astronomical Society of the Pacific*, **134** (2022), 1035, 22 pages
21. D. Schleier, P. Hemberger, A. Bodi and **J. Bouwman*** "Threshold Photoelectron Spectroscopy of Quinoxaline, Quinazoline, and Cinnoline", *Journal of Physical Chemistry A*, **126** (2022), 14, 2211-2221
22. N. F. W. Ligterink, A. Ahmadi, B. Luitel, A. Coutens, H. Calcutt, H. Linnartz, J. K. Jorgensen, R. Garrod and **J. Bouwman** "The prebiotic molecular inventory of Serpens SMM1: II. The building blocks of peptide chains", *ACS Earth and Space Chemistry*, **6** (2022), 3, 455–467

## PEER-REVIEWED PUBLICATIONS PRIOR TO CU BOULDER

Papers on which I am corresponding author are highlighted with an asterisk (*) behind my name. Postdocs and (graduate) students supervised by me are underscored.

23. H. R. Hrodmarsson, **J. Bouwman**, A. G. G. M. Tielens, and H. Linnartz "Similarities and dissimilarities in the fragmentation of polycyclic aromatic hydrocarbon cations: A case study involving three dibenzopyrene isomers", *International Journal of Mass Spectrometry*, **476** (2022), 116834, 15 pages
24. K. A. Kipfer, N. F. W. Ligterink, **J. Bouwman**, L. Schwander, V. Grimaudo, C. P. de Koning, N. J. Boeren, P. Keresztes Schmidt, R. Lukmanov, M. Tulej, P. Wurz, and A. Riedo "Towards

Detecting Polycyclic Aromatic Hydrocarbons on Planetary Objects with ORIGIN", *The Planetary Science Journal*, **3** (2022), 43, 16 pages

25. M.N. McCabe, P. Hemberger, D. Campisi, J. C. Broxterman, E. Reusch, A. Bodi, **J. Bouwman*** "Formation of phenylacetylene and benzocycobutadiene in the ortho-benzyne + acetylene reaction", *Physical Chemistry Chemical Physics*, **24** (2021), 1869-1876
26. N. Suas-David, H. Linnartz, **J.Bouwman** "Acetylene $\nu_1 + \nu_5$ ($\Pi_u$) ← $\nu_4$($\Pi_g$) hot band revisited", *Journal of Molecular Spectroscopy*, **384** (2021), 111570 , 5 pages
27. **J. Bouwman***, H. Linnartz, A. G. G. M. Tielens "Mid-infrared spectroscopic signatures of dibenzopyrene cations - the effect of symmetry on PAH IR spectroscopy", *Journal of Molecular Spectroscopy*, **378** (2021), 111458, 7 pages
28. **J. Bouwman***, H. Hrodmarsson, G. B. Ellison, A. Bodi, P. Hemberger, "Five Birds with One Stone: Photoelectron Photoion Coincidence Unveils Rich Phthalide Pyrolysis Chemistry", *Journal of Physical Chemistry A*, **125** (2021), 1738−1746
29. N. F. W. Ligterink, A. Ahmadi, A. Coutens, Ł. Tychoniec, H. Calcutt, E. F. van Dishoeck, H. Linnartz, J. K. Jørgensen, R. T. Garrod, **J. Bouwman**, "The prebiotic molecular inventory of Serpens SMM1 I. The isomers $CH_3NCO$ and $HOCH_2CN$ as tracers of -CN and -NCO chemistry", *Astronomy and Astrophysics*, **647** (2021), A87, 32 pages
30. S. Panchagnula, **J. Bouwman**, D. B, Rap, P. Castellanos, A. Candian, C. Mackie, S. Banhatti, S. Brünken, H. Linnartz, A.G.G.M. Tielens "Structural investigation of doubly-dehydrogenated pyrene cations", *Physical Chemistry Chemical Physics*, **22** (2020), 21651-21663
31. M.N. McCabe, P. Hemberger, E. Reusch, A. Bodi and **J. Bouwman*,** "Off the Beaten Path: Almost Clean Formation of Indene from the ortho-Benzyne + Allyl Reaction", *Journal of Physical Chemistry Letters*, **11** (2020), 2859–2863
32. **J. Bouwman***, C. Boersma, M. Bulak, J. Kamer, P Castellanos, A.G.G.M. Tielens, and H. Linnartz "Gas-phase IR spectroscopy of the rubicene cation ($C_{26}H_{14}^+$) – A case study for interstellar pentagons", Astronomy and Astrophysics, **636** (2020), A57, 9 pages
33. M. Diedhiou, B.J. West, **J. Bouwman** and P.M. Mayer "Ion Dissociation Dynamics of 1,2,3,4-Tetrahydronaphthalene: Tetralin as a Test Case For Hydrogenated PAHs", *Journal of Physical Chemistry A*, **123** (2019), 51, 10885-10892
34. X. L. Bacalla, H. Linnartz, N. L. J. Cox, J. Cami, E. Roueff, J. V. Smoker, A. Farhang, **J. Bouwman**, and D. Zhao "The EDIBLES survey IV. Cosmic ray ionization rates in diffuse clouds from near-ultraviolet observations of interstellar $OH^+$", *Astronomy and Astrophysics*, **622** (2019), A31, 12 pages
35. **J. Bouwman***, P. Castellanos, M. Bulak, J. Terwisscha van Scheltinga, J. Cami, H. Linnartz and A.G.G.M. Tielens "The effect of molecular structure on the infrared signatures of astronomically relevant PAHs", *Astronomy and Astrophysics*, **621** (2019), A80, 8 pages
36. **J. Bouwman***, A. Bodi, and P. Hemberger "Nitrogen matters: The Difference Between PANH and PAH Formation", *Physical Chemistry Chemical Physics*, **20** (2018), 29910-29917
37. **J. Bouwman***, S. Horst, and J. Oomens "Spectroscopic characterization of the product ions formed by electron ionization of adamantane", *ChemPhysChem*, **19** (2018), 9 pages
38. V. Kofman, M.J.A. Witlox, **J. Bouwman**, I.L. ten Kate, and H. Linnartz " A multifunctional setup to record FTIR and UV-vis spectra of organic molecules and their photoproducts in astronomical ices ", *Review of Scientific Instruments*, **89** (2018), 053111, 10 pages
39. A. Candian, **J. Bouwman***, P. Hemberger, A. Bodi, and A.G.G.M. Tielens "Dissociative ionisation of adamantane: a combined theoretical and experimental study", *Physical Chemistry Chemical Physic*s, **20** (2018), 5399-5406
40. J. Zhen, A. Candian, P. Castellanos, **J. Bouwman**, H. Linnartz, and A.G.G.M. Tielens "Laboratory gas-phase infrared spectra of two astronomically relevant PAH cations: diindenoperylene, $C_{32}H_{16}^+$ and dicoronylene, $C_{48}H_{20}^{+}$", *Astrophysical Journal*, **854** (2018), 1, 7 pages

41. S. Spieler, M. Kuhn, J. Postler, M. Simpson, R. Wester, P. Scheier, W. Ubachs, X. Bacalla, **J. Bouwman**, and H. Linnartz "$C_{60}^+$ and the Diffuse Interstellar Bands: An Independent Laboratory Check ", *Astrophysical Journal*, **846** (2017), 168, 6 pages
42. J. I. M. Pastoors, A. Bodi, P. Hemberger, **J. Bouwman***, "Dissociative ionization and thermal decomposition of cyclopentanone", *Chemistry - A European Journal*, **23** (2017), 13131 - 13140
43. K. D. Doney, D. Zhao, **J. Bouwman**, H. Linnartz, "The high-resolution infrared spectrum of the $\nu_3+\nu_5$ combination band of jet-cooled propyne", *Chemical Physics Letters*, **684** (2017), 351-356
44. J. Zhen, P. Castellanos, and **J. Bouwman**, H. Linnartz, A. G. G. M. Tielens, "Infrared Spectra of Hexa-peri-hexabenzocoronene Cations: $HBC^+$ and $HBC^{2+}$", *Astrophysical Journal*, **836** (2017), 28, 7 pages
45. A. J. de Haas, J. Oomens, and **J. Bouwman***, "Facile pentagon formation in the dissociation of polyaromatics", *Physical Chemistry Chemical Physics*, **19** (2017), 2974-2980
46. J. Gao, **J. Bouwman**, G. Berden, and J. Oomens, "The Influence of Metal Ion Binding on the IR Spectra of Nitrogen-Containing PAHs", *Journal of Physical Chemistry A*, **120** (2016), 40, 7800–7809
47. **J. Bouwman***, A.J. de Haas, J. Oomens, "Spectroscopic evidence for the formation of pentalene$^+$ in the dissociative ionization of naphthalene", *Chemical Communications*, **52** (2016), 2636-2638
48. **J. Bouwman***, J. Oomens, A. Bodi, P. Hemberger, "On the formation of cyclopentadiene in the $C_3H_5$ + $C_2H_2$ reaction", *Physical Chemistry Chemical Physics*, **17** (2015), 20508–20514
49. **J. Bouwman***, B. Sztaray, J. Oomens, P. Hemberger, A. Bodi, "Dissociative Photoionization of Quinoline and Isoquinoline", *Journal of Physical Chemistry A*, **119** (2015), 7, 1127–1136
50. A. Cook, A. Ricca, A. L. Mattioda, **J. Bouwman**, J. Roser, H. Linnartz, J. Bergman, L.J. Allamandola "Photochemistry of Polycyclic Aromatic Hydrocarbons in Cosmic Water Ice: The Role of PAH Ionization and Concentration", *Astrophysical Journal*, **799** (2015), 14, 20 pages
51. **J. Bouwman**, M. Fournier, I. R. Sims, S. R. Leone, K. R. Wilson, "Reaction Rate and Isomer-Specific Product Branching Ratios of $C_2H$ + $C_4H_8$: 1-Butene, *cis*-2-Butene, *trans*-2-Butene, and Isobutene at 79 K", *Journal of Physical Chemistry A*, **117** (2013), 24, 5093–5105
52. S. H. Cuylle, E. D. Tenenbaum, **J. Bouwman**, H. Linnartz and L. J. Allamandola, "Ly alpha-Induced Charge Effects of Polycyclic Aromatic Hydrocarbons Embedded in Ammonia and Ammonia:Water Ice", *Monthly Notices of the Royal Astronomical Society*, **423** (2012), 2, 1825-1830
53. **J. Bouwman**, F. Goulay, S. R. Leone, K. R. Wilson, "Bimolecular Rate Constant and Product Branching Ratio Measurements for the Reaction of $C_2H$ with Ethene and Propene at 79 K", *Journal of Physical Chemistry A*, **116** (2012), 15, 3907–3917
54. F. Goulay, A. J. Trevitt, J. D. Savee, **J. Bouwman**, D. L. Osborn, C. A. Taatjes, K. R. Wilson, S. R. Leone, "Product Detection of the CH Radical Reaction with Acetaldehyde", *Journal of Physical Chemistry A*, **116** (2012), 24, 6091−6106
55. M. Steglich, **J. Bouwman**, F. Huisken, T. Henning, "Can Neutral and Ionized Polycyclic Aromatic Hydrocarbons Be Carriers of the Ultraviolet Extinction Bump and the Diffuse Interstellar Bands?", *Astrophysical Journal*, **742** (2011), 2, 12 pages
56. **J. Bouwman***, H. M. Cuppen, M. Steglich, L. J. Allamandola, H. Linnartz, "Photochemistry of Polycyclic Aromatic Hydrocarbons in Cosmic Water Ice II. Near UV/VIS Spectroscopy and Ionization Rates", *Astronomy and Astrophysics*, **529** (2011), A46, 9 pages
57. **J. Bouwman***, A. L. Mattioda, H. Linnartz, L. J. Allamandola, "Photochemistry of Polycyclic Aromatic Hydrocarbons in Cosmic Water Ice I. Mid-IR Spectroscopy and Photoproducts", *Astronomy and Astrophysics*, **525** (2011), A93, 13 pages
58. S. Bottinelli, A. C. A Boogert, **J. Bouwman**, M. Beckwith, E. F. van Dishoeck, K. I. Oberg, K. M. Pontoppidan, H. Linnartz, G. A. Blake, N. J. Evans, F. Lahuis, "The C2D Spitzer

Spectroscopic Survey of Ices around Low-Mass Young Stellar Objects. IV. $NH_3$ and $CH_3OH$", *Astrophysical Journal*, **718** (2010), 1100-1117

59. **J. Bouwman***, H. M. Cuppen, A. Bakker, L. J. Allamandola, and H. Linnartz, "Photochemistry of the PAH Pyrene in Water Ice: the Case for Ion-Mediated Solid-State Astrochemistry", *Astronomy and Astrophysics*, **511** (2010), A33, 10 pages
60. **J. Bouwman***, D. M. Paardekooper, H. M. Cuppen, H. Linnartz, L. J. Allamandola, "Real-Time Optical Spectroscopy of Vacuum Ultraviolet Irradiated Pyrene:$H_2O$ Interstellar Ice", *Astrophysical Journal*, **700** (2009), 1, 56-62
61. **J. Bouwman***, W. Ludwig, Z. Awad, K. I. Oberg, G. W. Fuchs, E. F. van Dishoeck, H. Linnartz, "Band Profiles and Band Strengths in Mixed $H_2O$:CO Ices", *Astronomy and Astrophysics*, **476** (2007), 995-1003
62. H. Verbraak, J. N. P. van Stralen, **J. Bouwman**, J. S. de Klerk, D. Verdes, H. Linnartz, F. M. J. Bickelhaupt, "High-Resolution Infrared Spectroscopy of the Charge-Transfer Complex $[Ar\text{-}N_2]^+$: A Combined Experimental/Theoretical Study", Journal of Chemical Physics **123** (2005), 144305, 8 pages

## CONFERENCE PROCEEDINGS

The conference proceedings below were reviewed by the editorial board, not by peer-review.

1. M. N. McCabe, P. Hemberger, E. Reusch, A. Bodi, and **J. Bouwman***, "Almost Clean Formation of Indene in the Allyl + o-Benzyne Reaction", European Conference on Laboratory Astrophysics ECLA2020, Chapter **21** (2020)
2. **J. Bouwman***, J. Kamer, P. Castellanos, M. Bulak, S. Panchagnula, J. Zhen, A.J. de Haas, J. Oomens, H. Linnartz, and A.G.G.M. Tielens, "Interstellar Polycyclic Aromatic Hydrocarbons: Spectroscopy, Photofragmentation and Photoproducts", IAU 350, **15** (2019), 353-355
3. S. Panchagnula, **J. Bouwman**, J. Kamer, H. Linnartz and A.G.G.M. Tielens, "Photofragmentation of coronene cations", IAU 350, **15** (2019), 402-403
4. M. Bulak, D. Paardekooper**, J. Bouwman**, G. Fedoseev and H. Linnartz "Towards disentangling photodesorption and photodissociation in astronomical ice analogues", IAU 350, **15** (2019), 422-424
5. **J. Bouwman*** "Probing Molecular Dissociation using Large Scale Facilities; the Case of Astronomically Relevant Polyaromatics" in "XXIst Symposium on Atomic, Cluster and Surface Physics 2018," SASP, **21** (2018)
6. **J. Bouwman***, H. M. Cuppen, L. J. Allamandola and H. Linnartz, "VUV photochemistry of PAHs trapped in interstellar water ice" in "PAHs and the Universe: A Symposium to Celebrate the 25$^{th}$ Anniversary of the PAH Hypothesis," C. Joblin and A. G. G. M. Tielens (eds), EAS Publications Series, **46** (2011), 251-256
7. H. Linnartz, J. B. Bossa, **J. Bouwman**, H. M. Cuppen, S. H. Cuylle, E. F. van Dishoeck, E. C. Fayolle, G. Fedoseev, G. W. Fuchs, S. Ioppolo, K. Isokoski, T. Lamberts, K. I. Oberg, C. Romanzin, E. Tenenbaum, J. Zhen in "Solid state pathways towards molecular complexity in space", IAU **280** (2011), 390-404

## COLLOQUIA AND SEMINARS

1. "Formation and Dissociation of Hydrocarbons under Interstellar Conditions" Physical Chemistry seminar at University of Wisconsin Madison, Madison, WI, December 2025
2. "Formation and Dissociation of Hydrocarbons under Interstellar Conditions" Physical Chemistry seminar at Caltech, Pasadena, CA, November 2025
3. "Detectability and Formation of Organics in the Solar System and in Space" Physical Chemistry seminar at NASA Jet Propulsion Lab, CA, April 2025
4. "Formation and Dissociation of Hydrocarbons under Interstellar Conditions" Physical Chemistry seminar at University of California, Irvine, CA, April 2025

5. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions” Physical Chemistry seminar at University of Southern California, Los Angeles, CA, March 2025
6. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions” Physical Chemistry seminar at University of Florida, Gainesville, FL, March 2025
7. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions” Online seminar (Astrocheminar) for the American Chemical Society Astrochemistry subdivision, March 2025
8. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions” Physical Chemistry seminar at University of Georgia, Athens, GA, November 2024
9. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions” Chemistry seminar at Colorado State University, Fort Collins, CO, October 2024
10. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions” Physical chemistry seminar at UC Berkeley, Berkeley, CA, September 2024
11. “Detectability and Formation of Organics in the Solar System and in Space” Planetary Exploration Group, Technical University Delft, Delft, the Netherlands, 2024
12. “Formation and Detectability of Organics in the Solar System and in Space” Planetary Sciences Seminar, Freie Universität Berlin, Berlin, Germany, 2024
13. “Formation and Dissociation of Hydrocarbons in Space and in Planetary Atmospheres” at Lunar and Planetary Laboratory, University of Arizona, Tucson, AZ, USA, 2024
14. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions”, Physical Chemistry Seminar at CU Boulder, Boulder, CO, USA, 2023
15. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions”, Analytical Chemistry Seminar at CU Boulder, Boulder, CO, USA, 2023
16. “Cosmochemical cycle of organic matter” Chemistry Department Seminar at University of Virginia, Charlottesville, VA, USA, 2022
17. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions” Chemistry Department Seminar at University of Würzburg, Würzburg, Germany, 2021
18. “Cosmochemical Cycle of Organic Matter” Seminar at the Institute for Molecules and Materials – Structure and Dynamics of Molecules, Radboud University, Nijmegen, the Netherlands, 2021
19. “Cosmochemical Cycle of Organic Matter” Physical Chemistry Seminar, CU Boulder, USA, 2021
20. “Exotic Chemistry in Remote Environments - Photodissociation of Interstellar Aromatic Hydrocarbons” This week’s discoveries talk, Leiden University, 2018

## INVITED CONFERENCE PRESENTATIONS

1. “Physical/chemical alterations and detectability of molecular species on Europa’s surface using laboratory IR spectroscopy, mass spectrometry, and modeling” NASA Europa Clipper Science Meeting, organized by NASA JPL, 2024, online.
2. “Chemical Evolution of Interstellar Polycyclic Hydrocarbons” CHAINS Dutch Chemical Society Meeting, Veldhoven, the Netherlands, 2019
3. “Spectroscopy of Interstellar Hydrocarbons and their Photodissociation Products” Energetic Processing of large Molecules Meeting, Madrid, Spain, 2019
4. “Probing the Photodissociation of Interstellar Aromatic Hydrocarbons using Large-Scale Facilities” Photon Tools for Physical Chemistry, Beatenberg, Switzerland, 2019
5. “Photodissociation of Interstellar Aromatic Hydrocarbons” Dutch Astrochemistry Network Meeting, Radboud University, 2018
6. “Probing the Dissociation of Interstellar Polycyclic Aromatic Hydrocarbons using large-scale facilities” at SASP meeting, Obergurgl, Austria, 2018
7. “Photochemistry of PAHs” at the workshop on “the Past and Future of AstroPAH Research”, Noordwijk, the Netherlands, 2016

8. “Photoprocessing of Polycyclic Aromatic Hydrocarbons” Physics at Veldhoven, Veldhoven, the Netherlands, 2016
9. “Photoprocessing of Polycyclic Aromatic Hydrocarbons in the Gas Phase and Solids” Ices 2 PAHs meeting, Annapolis, MD, USA, 2015

## OTHER PRESENTATIONS

1. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions” Group seminar at Laser and Molecular Spectroscopy Group of Prof. Otto Dopfer, Technical University Berlin, Berlin, Germany, 2024
2. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions” Group seminar at Physical Chemistry of Complex Systems and Technology group of Prof. Bernd Abel, University of Leipzig, Leipzig, Germany, 2024
3. “Formation and Dissociation of Hydrocarbons under Interstellar Conditions”, Molecular Chemical Physics Supergroup meeting, CU Boulder, USA, 2024
4. “Formation of Poly(Cyclic) Hydrocarbons Under Interstellar Conditions”, Astrochem Seminar, Leiden Observatory, Leiden University, the Netherlands, 2023
5. Enceladus Journal Club presentation, CU Boulder, LASP 2023
6. “Cosmochemical Cycle of Organic Matter”, Astrochem Seminar, Leiden Observatory, Leiden University, the Netherlands, 2020
7. “Shining Light on the Aromatic Universe”, van Marum colloquium, Chemistry Department at Leiden University, the Netherlands, 2019
8. “Identifying photodissociation products of polycyclic aromatic hydrocarbons”, at “Celebrating the first 40 years of Xander Tielens’ contribution to science”, Avignon, France, 2019
9. “The Cosmochemical Cycle of Organic Matter”, Lunch Seminar for Students organized by Leidsche Flesch, Leiden, the Netherlands, 2019
10. “Dissociation of Interstellar Polycyclic Aromatic Hydrocarbons”, at the RSC/RAS “Astrochemistry for all” meeting, Sheffield, UK, 2018
11. “Dissociative Photoionization of Polycyclic Aromatic Hydrocarbons” Physics at Veldhoven, Veldhoven, the Netherlands 2017
12. “Science at Radboud University” at Korea University, Seoul, South Korea, May 2016
13. “Dissociative Photoionization of Polycyclic Aromatic Hydrocarbons” COST action meeting, Pisa, Italy, 2016
14. “Formation and Photodissociation of Complex Hydrocarbons” American Chemical Society, Denver, CO, USA, 2015
15. “Formation and Destruction of Hydrocarbons Elucidated with VUV (…and IR) Radiation” Astrochem Seminar, Universiteit Leiden, Leiden, the Netherlands, 2015
16. “Dissociative Ionization of Nitrogen Containing Polycyclic Aromatic Hydrocarbons” Workshop “Photodissociation in Astrochemistry”, Leiden, the Netherlands, 2015
17. “Dissociative Ionization of Nitrogen Containing Polycyclic Aromatic Hydrocarbons” NextGenChem Meeting, Eindhoven, the Netherlands, 2014
18. Colloquium at the Radboud Universiteit Nijmegen, the Netherlands, 2013
19. Seminar at the NASA Space Science & Astrobiology Division, Moffett Field, CA, USA, 2013
20. Seminar at the Division Geological & Planetary Sciences, Caltech, Pasadena, CA, USA, 2012
21. Seminar at Aerodyne Research Inc., Boston, MA, USA, 2012
22. Presentation at Titan chemistry workshop, Miami, FL, USA, 2011
23. Leiden Observatory Colloquium, Universiteit Leiden, the Netherlands, 2010
24. European Conference on Surface Science, Groningen, the Netherlands, 2010
25. PAHs and the Universe, Toulouse, France, 2010
26. Seminar at NASA Ames Research Center, Moffett Field, CA, USA, 2009
27. Group seminar at U.C. Berkeley, Berkeley, CA, USA, 2009
28. Dutch National Astronomy Conference, Kerkrade, the Netherlands, 2009

29. Molecular Spectroscopy Meeting, Columbus, OH, USA, 2009
30. NWO Chemical Sciences Meeting, Lunteren, the Netherlands, 2009
31. Interstellar Medium /Circumstellar Matter Meeting, Leiden, the Netherlands, 2008
32. Interstellar Medium /Circumstellar Matter Meeting, Leiden, the Netherlands, 2007

## GRADUATE STUDENT ADVISING AT CU BOULDER

| Student | Department | Years |
|---|---|---|
| Henry Cardwell | Chemistry | 2022 – present |
| Rory McClish | Chemistry | 2023 – present |
| Laura Denton | Chemistry | 2023 – present |
| Denver Talley | Chemistry | 2023 – present |

## UNDERGRADUATE STUDENT ADVISING AT CU BOULDER

| Name: | Funding source: | Current position: |
|---|---|---|
| Jackson Cahn (2022) | CU Boulder UROP grant | Graduate student at School of Mines |
| Madison Patch (2023) | CU Boulder UROP grant | Graduate student at Caltech |
| Caitlyn Staudenmier (2023) | CU Boulder UROP grant | Undergrad at CU Boulder |
| Mia Muse (2024) | Toji fellowship / NSF grant | Undergrad at CU Boulder |

## GRADUATE STUDENT ADVISING AT OTHER UNIVERSITIES

| Student | Years | Role | University |
|---|---|---|---|
| Jerry Kamer | 2021 – present | Primary advisor | Leiden University |
| Morgan McCabe | 2019 – present | Primary advisor | Leiden University |
| Sanjana Panchagnula | 2018 – 2024 | Co-advisor | Leiden University |
| Pablo Castellanos | 2015 – 2018 | Co-advisor | Leiden University |
| Juehan Gao | 2014 – 2016 | Co-advisor | Radboud University |

## POSTDOCTORAL ADVISING AT LEIDEN UNIVERSITY

| Name: | Current position: |
|---|---|
| Domenik Schleier (2021 – 2023) | Postdoc with Prof. Dopfer – TU Berlin |
| Nicolas Suas-David (2019 – 2022) | Postdoc with Prof. Georges – Université de Rennes |

## UNDERGRADUATE STUDENT ADVISING PRIOR TO CU BOULDER

**Bachelor students guided on research project:**
**Leiden University** Jerry Kamer, Merel Donker, Pien Vinke, Jeger Broxterman

**Master students guided on research projects:**
**Leiden University** Irene Haasnoot, Judit Ferrer Asensio
**Radboud University** Arjen de Haas, Johan Pastoors

## SERVICE ACTIVITIES

### Director of Graduate Studies (August 2024 – present)

Tasks included the following. Dealing with difficult student cases, implementing policy changes such as incorporating the annual performance reporting, developing Program Learning Outcomes (PLOs) and their assessment for the Department of Chemistry Graduate Program, assigning about 40 oral examination committees, reading assessing and approving secondary proposals, clarifying the timeline for submission of secondary proposals, etcetera.

## Examination committee member while at CU Boulder

**Comprehensive exam committee member for:** Bertram Cham (2025, chair), Michael Sands (2024, chair), Samer Hammoodi (2024, chair), Emmaline Longnecker (2023), Lane Terry (2023), Bri Dobson (2022), and Zachery Shiffman (2022)

- **PhD Thesis defense committee member for**:
  Heinrich Salzmann (Defense committee member and second reader, PI Mathias Weber, Chemistry, 2025) Johnathan Stauffer (PI Kevin Reardon, APS, 2024), John Malecha (PI Doug Gin, Chemistry, 2022)
- **Honors thesis committee member for:**
  Mia Muse (PI Jordy Bouwman, Chemistry, CU Boulder, role: chair, 2025), Isaac Al-Huseini (PI David Nesbitt, Physics, CU Boulder) 2024, Mike Vos (PI Tobin Munsat, Physics, CU Boulder, 2022)

## Other committees served while at CU Boulder

- Outcome assessment committee member for Chemistry undergraduate program (2024-present)
- Graduate Admission Committee member for the Physical Chemistry division at CU Boulder (2022, 2023, and 2024)
- Honors thesis committee member for CU Boulder chemistry department (2023 – 2024)
- CU Boulder Seed grant proposal review panelist (2022 and 2024)
- Member of the editorial board for Elsevier's Journal of Molecular Spectroscopy (2021 – 2025)

## Other scientific and management activities while at CU Boulder

- Attended the two-day session on Leadership Education for Advancement and Promotion session at CU Boulder (May 2025)
- Radio and television interview on Czech national television on the use of an ice accelerator instrument for the analysis of Europa-Clipper mission data (June 2024)
- Scientific advisory committee member for COSPAR 2026 meeting (to take place in Florence, Italy)
- Proposed session on "Carbon across the solar system" together with Amanda Hendrix, Faith Vilas and Kelly Miller at the American Geophysical Union meeting in Washington. Session was accepted as poster session and took place fall 2024
- Reviewed publications for a variety of scientific journals, including Science, Angewandte Chemie, MNRAS, Molecular Astrophysics, A&A, ApJ, ApJSS, Science Advances, JPCA, ACS Earth and Space Chemistry and PCCP
- Attended 8x1 hour long sessions in the "Thriving at CU Boulder" seminar series for new faculty members (2023)
- Attended a two-day meeting Leadership Education for Advancement and Promotion (LEAP) program organized by CU Boulder
- Session chair at the Dust, Atmosphere and Plasma meeting at CU Boulder (June 5-6 2023).
- Outreach activity at elementary school "De Startbaan" in Sassenheim, the Netherlands (May 2022)
- Measurement campaign at the Swiss Light Source, Villigen, Switzerland in June 2023
- Member of the COST action network "Carbon Molecular Nanostructures in Space" (CA21126, from 2023 – present)

## Examination committee member prior to CU Boulder

- **PhD examinations at Leiden University:** Niels Ligterink, Eva Bøgelund, Cameron Mackie,

Vincent Kofman, Xavier Bacalla, KoJu Chuang, Kirstin Doney, Daniel Paardekooper
- **PhD examinations at Radboud University:** Leendert Karssemeijer, Julianna Palotás

### Other scientific and management activities prior to CU Boulder

- Session chair at the American Physical Society Meeting - The Chemical Physics of Molecules in Space Session (March 2021)
- Member of the Horizon2020 European Research Council network EuroPAH (2017 – 2021)
- Member of the education committee for the astronomy bachelor program (2017-2021)
- Member of scientific proposal review committees for NASA (2016 – present)
- Panel member for selecting PhD students at Leiden Observatory, 2018
- Chair for the American Chemical Society Astrochemistry subdivision session: "Organic inventory of the gas phase: from small molecules to PAHs", Washington DC, 2017
- Scientific organizer and supervisor of a study trip to South-Korea (2016)
- Measurement campaigns as in-house researcher at the Free Electron Laser for Infrared Experiments (FELIX), Radboud University, Nijmegen, the Netherlands (numerous measurement campaigns from 2013 – 2016)
- Measurements campaigns as in-house researcher at the Advanced Light Source at Lawrence Berkeley National Laboratory (numerous campaigns from 2010 – 2013)

## TEACHING ACCOMPLISHMENTS AT CU BOULDER

### Courses taught at CU Boulder

| | |
|---|---|
| • CHEM4531 – "Physical Chemistry 2" | Spring 2024<br>Spring 2023<br>Fall 2021 |
| • CHEM5581 – "Introductory Quantum Chemistry" | Fall 2024<br>Fall 2023<br>Fall 2022 |
| • CHEM2101 – "Foundations of Chemistry 2 Laboratory Class" | Spring 2022 |
| • CHEM6411 – "Chemistry in the solar system and interstellar space" | Spring 2024 |
| • CHEM6401 – "PCCP seminar and seminar class" | Fall 2024<br>Spring 2025 |

### Effective teaching measures

- Attended CTL fall symposium held by Center for Teaching and Learning (2024 Fall Intensive Course)
- Attended course on "Boosting Student Engagement in Small Classes" held by Center for Teaching and Learning (2023 Fall Intensive Course)
- Attended course on "Equitable & Inclusive Engagement Practices for Learner Success" held by Center for Teaching and Learning (2023 Fall Intensive Course)

## TEACHING ACCOMPLISHMENTS PRIOR TO CU BOULDER

- **Instructor: "Astronomical Spectroscopy"** (Leiden University, 2018 – 2020)
  **MSc level.** Designed the course, planned and gave all lectures, wrote exams, graded exams and homework assignments, and assigned final grades. I received excellent evaluations from the students, with an average score of 8.7 on a scale of 0 – 10.
- **Instructor: "Molecular Physics"** (MSc level, Radboud University, 2014 – 2015)
  **MSc level.** Designed course material and presented lectures, wrote and graded exam and homework assignment. I received excellent evaluations for the course.

- **Instructor: "Honors Academy"** (Radboud University, 2013 – 2015)
  **BSc level.** Designed course material and presented lectures on "being a scientist" as an evening lecturer in an interdisciplinary program specifically aimed at the top 10% of the students.
- **Teaching assistant: "Introduction to Astronomy"** (Leiden University, 2008 – 2010)
  **BSc level.** Duties included grading homework assignments, lecturing computer classes, holding office hours for students.
- **Teaching assistant: "Crime Scene Investigation"** (VU Amsterdam 2005)
  **High school level.** Duties included guiding high school students in laboratory classes.