Cameron Hummels

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Computational astrophysicist and science communicator specializing in galaxy evolution, the circumgalactic medium, and research software development. Leads large-scale public engagement programs reaching tens of thousands annually and develops community astrophysics tools used across major simulation collaborations.

Employment

2024–present	**Education and Public Outreach Lead** DSA Radio Telescope
2023–present	**Research Scientist** California Institute of Technology
2016–present	**Director of Astrophysics Outreach** California Institute of Technology
2019–2022	**Senior Postdoctoral Fellow** California Institute of Technology
2015–2019	**NSF Astronomy and Astrophysics Postdoctoral Fellow** California Institute of Technology Host: Phil Hopkins
2012–2015	**Postdoctoral Fellow** University of Arizona Host: Brant Robertson

Education

2012	**Columbia University** Ph.D. in Astrophysics Advisors: Greg Bryan & David Schiminovich
2005	**Wesleyan University** M.A. in Astrophysics Advisor: Kathryn Johnston
2001	**Pomona College** B.A. in Computer Science Minor in Mathematics and Astrophysics

Selected Awards and Honors

2026	**Harlow Shapley Lecturer**, American Astronomical Society
2023	**Astronomer in Residence**, Grand Canyon National Park
2018	**AAAS Early Career Award for Public Engagement with Science**, Finalist
2016	**Citizenship Award**, Caltech
2015	**NSF Astronomy and Astrophysics Postdoctoral Fellowship**
2010	**APPLAUSE Award**, Columbia University
2009	**NASA Astronomy Ambassador to New York City & State**

Grants Awarded ($2.3 million total)

2025 **NSF AAG (PI)**: *"A Tool for Generating Synthetic Observations of Galactic Atmospheres."* **$385k**

2023 **NASA ADSPS (Co-PI** w/ PI John ZuHone): *"Defining Science Requirements for Galaxy Formation and Evolution Across the UV and X-ray Wavebands with Synthetic Observations."* **$233k**

2021 **NASA HST (Institutional PI** w/ PI Joe Burchett): *"Unveiling Multiphase Accretion Flows in a Sample of Truly Edge-on Galaxies."* **$384k**

NASA HST (Institutional PI w/ PI Evan Schneider): *"Unlocking the Potential of Galactic Outflow Observations"* **$127k**

2019 **NASA HST (PI)**: *"A Subgrid Model for Simulating the Unresolved Microphysics in the Circumgalactic Medium."* **$364k**

NSF AAG (PI): *"Toward an Accurate Model for the Gas Around Galaxies"*, **$259k**

2017 **NSF SPA (Co-PI** w/ PI Abby Crites): *"Sixteenth Annual Symposium of the NSF Astronomy and Astrophysics Postdoctoral Fellows"*, **$29k**

2015 **NSF AAPF (PI)**: *"Investigating the Nature of the Circumgalactic Medium Using Realistic Synthetic Observations"*, **$278k**

2014 **NASA HST (PI)**: *"The COS Cold Absorber Puzzle: Understanding the Metallicity and Phase of the Circumgalactic Medium"* **$112k**

NASA HST (Institutional PI w/ PI Molly Peeples): *"MAST Interface to Synthetic Telescopes with yt MISTY: Observing Simulations of the Intergalactic Medium"*, **$115k**

Computing Grants Awarded

2020 **NASA Pleiades (PI)**: *"Subgrid Models of the Circumgalactic Medium"*, **5,600,000 CPU-hrs**

2017 **NSF Blue Waters (Co-I** w/ PI Phil Hopkins): *"Galaxy Formation at Ultra-High Resolution"*, **320,000,000 CPU-hrs**

2016 **NSF Blue Waters (Co-I** w/ PI Brian O'Shea): "Petascale Adaptive Mesh Simulations of Milky Way-type Galaxies and Their Environments", **170,000,000 CPU-hrs**

2012 **NSF Stampede (PI)**: *"The Effects of Stellar Feedback and Gas Accretion on the Evolution of Galaxies"*, **4,000,000 CPU-hrs**

Research Software Leadership

Leader in multiple community astrophysics software packages used in 2,000+ publications.

2022–present **CloudFlex** Parametric Circumgalactic Medium Model (22 citations), **Lead Developer**

2020–present **CosmoVis** 3D Interactive Circumgalactic Visualization Tool (5 citations), **Lead Theorist**

2014–present **trident** Synthetic Observation Generator (108 citations), **Lead Developer**

2010–present **yt** Analysis Suite (1261 citations), **Core Developer**

2007–present **enzo** Hydrodynamics Code (789 citations), **Developer**

Colloquia and Invited Seminars

2024 **Harvard University** ITC Colloquium

MIT Seminar

2022 **Lowell Observatory** Colloquium

North Carolina State University Colloquium

Colloquia and Invited Seminars (continued)

2021 **Yale University** Colloquium
University of Arizona Seminar
2019 **Harvard University** ITC Colloquium
University of California, Berkeley, TAC Seminar
University of California, Davis, Colloquium
2018 **University of California, Santa Barbara**, Colloquium
University of Washington Seminar
2017 **University of California, San Diego** Colloquium
Carnegie Observatories Colloquium
New Mexico State University Colloquium
2016 **Center for Computational Astrophysics** Seminar
Harvard University Seminar
Carnegie Observatories Seminar
University of California, Santa Cruz Seminar
2015 **Ohio State** CCAPP Seminar
Pomona College, Colloquium
University of Arizona Colloquium
University of California, Santa Cruz Seminar
2014 **Kavli Institute for Theoretical Physics** Seminar
2013 **University of California, Santa Cruz** Seminar
2012 **Georgia Tech** Seminar
University of Chicago Seminar

Selected Conference Talks

2025 **Baryon Cycle from Reionization to Cosmic Noon** Puerto Varas, Chile
2024 **What Matters Around Galaxies** Varenna, Italy
Ultraviolet Workshop NASA JPL
2023 **Modelling of Multiphase Astrophysical Media** Aspenstein, Germany
2022 **What Matters Around Galaxies** Champoluc, Italy
Art Wolfe Symposium Santa Cruz
2021 **Fundamentals of Gaseous Halos** KITP
2019 **What Matters Between Galaxies** Spineto, Italy
2018 **Santa Cruz Galaxy Workshop**
Circumgalactic Medium Workshop Northwestern
Intergalactic Interconnections Marseille
COSMOS Meeting Niels Bohr University, Denmark
Astro Visualization Workshop Caltech IPAC
Art Wolfe Symposium Big Sur
NSF AAPF Symposium Maryland
2017 **Swinburne-Caltech Science Workshop** Caltech
Santa Cruz Galaxy Workshop UC Santa Cruz

Selected Conference Talks (continued)

What Matters in Galaxies Durham UK

2016 **GalFresca Galaxy Workshop**, Caltech

Python in Astronomy U. Washington

2015 **Mocking the Universe** STSci

2014 **Santa Cruz Galaxy Workshop** UC Santa Cruz

CGM Workshop Notre Dame

2013 **Communicating Astronomy to the Public** Capetown, South Africa

Galaxy Evolution Winter School Hebrew University, Israel

2012 **The Baryon Cycle** UC Irvine

Outreach & Informal Education

Leads large-scale astronomy outreach programs reaching tens of thousands of participants annually through public events, digital media, and partnerships with schools, observatories, and national parks.

2024–present **DSA Radio Telescope, EPO Lead**
Lead planning and execution of dozens of outreach events annually in Eastern Nevada, including Northern Nevada Railway Star Train, school visits, star parties, Science Fiction vs Fact Film Series, etc.

2020–present **Astronomy Programming with National Park Service**
Work with National Parks to organize annual dark sky festivals and telescope programs:

- **Great Basin NP** – Annual Astronomy Festival (∼500 attendees each): 2024–present
- **Sequoia NP** – Annual Dark Sky Festival (∼2000 attendees each): 2022–present
- **Death Valley NP** – Annual Dark Sky Festival (∼5000 attendees each): 2020–present
- **Big Bend NP** – Astronomy Program and Star Party (∼350 attendees): 2024
- **Bryce Canyon NP** – Annular Solar Eclipse (∼2000 attendees): 2023
- **Grand Canyon NP** – Astronomer in Residence (∼3000 attendees): 2023

2016–present **Caltech Astronomy Outreach, Director**
Lead planning and execution of ∼50 outreach events (∼25,000 attendees) annually. Includes monthly lecture and stargazing; sidewalk stargazing; star parties; "Science Train" aboard LA Metro; school visits; eclipse events; including events in Spanish and Mandarin.

Astronomy on Tap, Los Angeles, Founder & Organizer
Lead planning and execution of monthly events hosted at local pub featuring science talks, telescopes, and trivia, each with 200-500 attendees. 140+ events total.

Caltech Astro YouTube Channel, Founder & Maintainer
∼12k subscribers, ∼ 150 educational videos and science live-streams

City of Astronomy Science Festival, Primary Organizer
Lead planning and execution of major Pasadena science festival (4x, ∼2000 attendees each).

2024 **Solar Eclipse Festivals, Primary Organizer**
Organized major eclipse events including star parties, science lectures, and solar viewing: **Piedras Negras, Mexico** (∼2000 attendees); **Pasadena, CA** (∼3000 attendees).

2021 **Disney Film: *"Crater"*, Scientific Advisor**
Advised director, cast, and crew on relevant science for feature-length science fiction film set on the lunar surface. Assisted with script development, set design, and costume design.

2017 **Solar Eclipse Festivals, Primary Organizer**
Organized major eclipse events including star parties, science lectures, and solar viewing: **Fossil, OR** (∼500 attendees); **Pasadena, CA** (∼3000 attendees).

Outreach & Informal Education (continued)

2005–2012 **Columbia University Astronomy Outreach, Director**
Led planning and execution of ∼40 outreach events (∼7000 attendees) annually, including monthly lecture and stargazing; sidewalk stargazing; star parties; "Science Train" aboard NYC Subway; school visits; eclipse events; etc.

2008–2012 **Rooftop Variables, Organizer**
Helped oversee Columbia University effort to mentor elementary teachers in science education; Mentored Scott Misner, 8th grade teacher at Isaac Young MS and science classes.

2009 ***From Earth to the Universe* NYC Astrophoto Exhibition, Organizer**
Oversaw major photography exhibit on Columbia's campus (2 weeks, ∼10,000 attendees)

***365 Days of Astronomy* Podcast, Contributor**
Recorded 16 10-minute astronomy educational podcasts

2003–2005 **Project ASTRO**, Volunteer
Partnered with 5th grade teachers in Connecticut to facilitate astronomy curriculum

Telescope Nights at Wesleyan University
Guided public stargazing through 14" and 16" telescopes monthly

Selected Public Talks

2026 **Ventura College**, *AAS Shapley Lecture*
Great Orion Dark Sky Festival (three talks), *Keynote*
Death Valley Dark Sky Festival

2025 **City of Astronomy Science Festival**
Garfield High School
California Dark Sky Festival (three talks), *Keynote*
Great Basin Astronomy Festival
OVRO Public Lecture Series
Pasadena Space Ride
Luz Observatory
Great Orion Dark Sky Festival (three talks), *Keynote*
Death Valley Dark Sky Festival

2024 **California Dark Sky Festival** (three talks), *Keynote*
Eastern Sierra Observatory (two talks), *Keynote*
Glendale Community College
Solar Eclipse Festival, Piedras Negras, Mexico
Great Orion Dark Sky Festival (three talks), *Keynote*
Eastern Sierra Observatory

2023 **Grand Canyon NP** (eight talks over six weeks), *Astronomer in Residence*
Sequoia Dark Sky Festival *Keynote*
Nevada Perseids Festival *Keynote*
Eastern Sierra Observatory *Keynote*
Death Valley Dark Sky Festival

2022 **California Dark Sky Festival** (three talks), *Keynote*
Sequoia Dark Sky Festival

Selected Public Talks (continued)

Nevada Perseids Festival *Keynote*
Hubble Space Telescope Public Lecture (*YouTube Link*)
Astronomy on Tap, Los Angeles
Eastern Sierra Observatory
Death Valley Dark Sky Festival
2021 **Quadrantids Meteor Shower Festival** *Keynote*
Eastern Sierra Observatory *Keynote*
Nevada Perseids Festival *Keynote*
Eastern Sierra Observatory
Death Valley Dark Sky Festival
2020 **Eastern Sierra Observatory** (three nights) *Keynote*
Quadrantids Meteor Festival
2019 **Astronomy on Tap, Eastern Sierra**
Science for March
Lunar Eclipse Event @ Caltech
2018 **Caltech Astro Stargazing Lecture**
Astronomy on Tap, Los Angeles
Qatar University Doha, Qatar
Astronomy on Tap, Chicago
2017 **Solar Eclipse Festival** *Keynote*, Fossil, OR
2016 **Caltech Astro Stargazing Lecture**, Pasadena, CA
Caltech Reel Science, Pasadena, CA
2015 **Pima Community College**, Tucson, AZ
2014 **University of Arizona**
2013 **Phoenix ComicCon**
2012 **Columbia University Public Program**
2010 **Amateur Astronomers Incorporated**, New Jersey
2009 **Columbia University Public Program**
NY Skies Amateur Astronomy Group
2008 **Columbia University Public Program**

Teaching and Instruction

2023 **Guest Lecturer** Planet Finder Academy, **Caltech**
2018 **Guest Lecturer** AY124 *Structure and Dynamics of Galaxies* (graduate level), **Caltech**
2017 **Instructor** LSST Data Science Fellowship Program, **NOAO**
Guest Lecturer, AY127 *Astrophysical Cosmology* (graduate level), **Caltech**
2016 **Guest Lecturer**, AY102 *Physics of the Interstellar Medium*, **Caltech**
2015 **Guest Lecturer**, *Extragalactic Astronomy* (graduate level), **U. Arizona**
2014 **Guest Lecturer**, *Astronomy 101*, **Tohono O'odham Community College**, Tucson, AZ
2012 **Instructor** yt users workshop, **U. Chicago**
2005–2008 **Instructor** Astronomy 1403: *Earth, Moon & Planets* (3 semesters), **Columbia University**

Teaching and Instruction (continued)

Instructor Astronomy 1404: *Beyond the Solar System* (3 semesters), **Columbia University**

Mentoring Experience

Emily Silich – Caltech PhD student
Sam Ponnada – Caltech PhD student; now postdoc at U. Gothenberg
Daria Bonds – CSU Undergrad; now PhD student UC San Diego
Iryna Butsky – U. Washington PhD student; now Hubble Fellow at Stanford
Yuguang Chen – Caltech PhD student; now Research Faculty at Chinese University of Hong Kong
Andrew Rothstein – Caltech undergrad student; now physics PhD student at Princeton
Evan Schneider – Arizona PhD student; now Faculty at U. Pittsburgh

Academic Service

2025 **SOC**, "*Cosmic Ecosystems*" conference, Perimeter Institute
2021 **Lead Organizer**, "*Fundamentals of Gaseous Halos*" KITP Program
2019 **Science Advisory Committee**, DSA-110
2018 **Co-Organizer**, TMT Science Meeting, Caltech
Co-Organizer, NSF AAPF Annual Symposium
2017 **Co-Organizer**, "*Galaxies and their Halos*" conference, Caltech
2012 **Co-Organizer**: YT Users Workshop, U. of Chicago

Reviewer, NSF Astronomy and Astrophysics Research Grants (AAG)
Reviewer, NSF Astronomy and Astrophysics Postdoctoral Fellowship (AAPF)
Reviewer, NASA FINESST Program
Reviewer, NASA Astrophysical Theory Program (ATP)
Reviewer, DiRAC High Performance Computing Allocations
Referee, Monthly Notices of the Royal Astronomical Society
Referee, Astrophysical Journal

References

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Publications (h-index: 38; first-author: 7; citations: 7378)

74. Lucchini, S., Abramson, C., **Hummels, C.**, ... (2026), "ENhanced Galactic Atmospheres With Arepo: Resolving the CGM at 200 pc with the ENGAWA Simulations," arXiv e-prints, arXiv:2603.05584.
73. Lu, Y. S., Kereš, D., Hopkins, P. F., ... including **Hummels, C.** (2026), "Constraining cosmic ray transport models using circumgalactic medium properties and observables," Monthly Notices of the Royal Astronomical Society, **545**, staf1984.
72. Silich, E. M., ZuHone, J., Bellomi, E., ... including **Hummels, C.** (2025), "X-Ray Emission Signatures of Galactic Feedback in the Hot Circumgalactic Medium: Predictions from Cosmological Hydrodynamical Simulations," The Astrophysical Journal, **993**, 125.
71. Kakoly, A., Stern, J., Faucher-Giguère, C. A., ... including **Hummels, C.** (2025), "Turbulence-dominated CGM: the origin of UV absorbers with equivalent widths of 1 Å," Monthly Notices of the Royal Astronomical Society, **543**, 3345.
70. Oppenheimer, B. D., Voit, G. M., Bahé, Y. M., ... including **Hummels, C.** (2025), "Introducing the Descriptive Parametric Model: gaseous profiles for galaxies, groups, and clusters," Monthly Notices of the Royal Astronomical Society, **543**, 2649.
69. Roy, M., Su, K. Y., Tonnesen, S., ... including **Hummels, C.** (2025), "To Survive or to Shatter: The Impact of Cosmic Rays on the Fate of Stripped Cold Clouds," arXiv e-prints, arXiv:2510.21699.
68. Wetzel, A., Samuel, J., Gandhi, P. J., ... including **Hummels, C.** (2025), "Second public data release of the FIRE-2 cosmological zoom-in simulations of galaxy formation," arXiv e-prints, arXiv:2508.06608.
67. **Hummels, C.**, Oppenheimer, B., Voit, G. M., ... (2025), "A Practical Guide to Hosting a Virtual Conference," Bulletin of the American Astronomical Society, **57**, 20251007.
66. Ponnada, S. B., Cochrane, R. K., Hopkins, P. F., ... including **Hummels, C.** (2025), "Hooks, Lines, and Sinkers: How Active Galactic Nucleus Feedback and Cosmic-Ray Transport Shape the Far-infraredRadio Correlation of Galaxies," The Astrophysical Journal, **980**, 135.
65. Qutob, N., Emami, R., Su, K. Y., ... including **Hummels, C.** (2024), "Observational Signatures of AGN Feedback in the Morphology and the Ionization States of Milky Way-like Galaxies," The Astrophysical Journal, **977**, 72.

64. Butsky, I. S., **Hummels, C. B.**, Hopkins, P. F., ... (2024), "Cold Gas Subgrid Model (CGSM): a two-fluid framework for modelling unresolved cold gas in galaxy simulations," Monthly Notices of the Royal Astronomical Society, **535**, 1672.
63. Orr, M. E., Burkhart, B., Lu, W., ... including **Hummels, C.** (2024), "Objects May Be Closer than They Appear: Significant Host Galaxy Dispersion Measures of Fast Radio Bursts in Zoom-in Simulations," The Astrophysical Journal, **972**, L26.
62. **Hummels, C. B.**, Rubin, K. H. R., Schneider, E. E., ... (2024), "CLOUDFLEX: A Flexible Parametric Model for the Small-scale Structure of the Circumgalactic Medium," The Astrophysical Journal, **972**, 148.
61. Roca-Fàbrega, S., Kim, J. H., Primack, J. R., ... including **Hummels, C.** (2024), "The AGORA High-resolution Galaxy Simulations Comparison Project. IV. Halo and Galaxy Mass Assembly in a Cosmological Zoom-in Simulation at z 2," The Astrophysical Journal, **968**, 125.
60. Ponnada, S. B., Butsky, I. S., Skalidis, R., ... including **Hummels, C.** (2024), "Synchrotron signatures of cosmic ray transport physics in galaxies," Monthly Notices of the Royal Astronomical Society, **530**, L1.
59. Walker, C. R. H., Spitler, L. G., Ma, Y. Z., ... including **Hummels, C.** (2024), "The dispersion measure contributions of the cosmic web," Astronomy and Astrophysics, **683**, A71.
58. Hafen, Z., Sameer, **Hummels, C.**, ... (2024), "The Halo21 absorption modelling challenge: lessons from 'observing' synthetic circumgalactic absorption spectra," Monthly Notices of the Royal Astronomical Society, **528**, 39.
57. Strawn, C., Roca-Fàbrega, S., Primack, J. R., ... including **Hummels, C.** (2024), "The AGORA High-resolution Galaxy Simulations Comparison Project. VI. Similarities and Differences in the Circumgalactic Medium," The Astrophysical Journal, **962**, 29.
56. Ponnada, S. B., Panopoulou, G. V., Butsky, I. S., ... including **Hummels, C.** (2024), "Synchrotron emission on FIRE: equipartition estimators of magnetic fields in simulated galaxies with spectrally resolved cosmic rays," Monthly Notices of the Royal Astronomical Society, **527**, 11707.
55. Setton, D. J., Besla, G., Patel, E., ... including **Hummels, C.** (2023), "The Large Magellanic Cloud's 30 kpc Bow Shock and Its Impact on the Circumgalactic Medium," The Astrophysical Journal, **959**, L11.
54. Butsky, I. S., Nakum, S., Ponnada, S. B., ... including **Hummels, C.** (2023), "Constraining cosmic ray transport with observations of the circumgalactic medium," Monthly Notices of the Royal Astronomical Society, **521**, 2477.
53. Wetzel, A., Hayward, C. C., Sanderson, R. E., ... including **Hummels, C.** (2023), "Public Data Release of the FIRE-2 Cosmological Zoom-in Simulations of Galaxy Formation," The Astrophysical Journal Supplement Series, **265**, 44.
52. Ponnada, S. B., Panopoulou, G. V., Butsky, I. S., ... including **Hummels, C.** (2022), "Magnetic fields on FIRE: Comparing B-fields in the multiphase ISM and CGM of simulated L_* galaxies to observations," Monthly Notices of the Royal Astronomical Society, **516**, 4417.
51. Lehner, N., Kopenhafer, C., O'Meara, J. M., ... including **Hummels, C.** (2022), "KODIAQ-Z: Metals and Baryons in the Cool Intergalactic and Circumgalactic Gas at 2.2 z 3.6," The Astrophysical Journal, **936**, 156.
50. Butsky, I. S., Werk, J. K., Tchernyshyov, K., ... including **Hummels, C.** (2022), "The Impact of Cosmic Rays on the Kinematics of the Circumgalactic Medium," The Astrophysical Journal, **935**, 69.
49. Moreno, J., Danieli, S., Bullock, J. S., ... including **Hummels, C.** (2022), "Galaxies lacking dark matter produced by close encounters in a cosmological simulation," Nature Astronomy, **6**, 496.
48. Kim, J., Golwala, S., Bartlett, J. G., ... including **Hummels, C.** (2022), "Probing Hot Gas Components of the Circumgalactic Medium in Cosmological Simulations with the Thermal Sunyaev-Zel'dovich Effect," The Astrophysical Journal, **926**, 179.
47. Trapp, C. W., Kereš, D., Chan, T. K., ... including **Hummels, C.** (2022), "Gas infall and radial transport in cosmological simulations of milky way-mass discs," Monthly Notices of the Royal Astronomical Society, **509**, 4149.

46. Su, K. Y., Hopkins, P. F., Bryan, G. L., ... including **Hummels, C.** (2021), "Which AGN jets quench star formation in massive galaxies?," Monthly Notices of the Royal Astronomical Society, **507**, 175.
45. Roca-Fàbrega, S., Kim, J. H., Hausammann, L., ... including **Hummels, C.** (2021), "The AGORA High-resolution Galaxy Simulations Comparison Project. III. Cosmological Zoom-in Simulation of a Milky Way-mass Halo," The Astrophysical Journal, **917**, 64.
44. Ji, S., Kereš, D., Chan, T. K., ... including **Hummels, C.** (2021), "Virial shocks are suppressed in cosmic ray-dominated galaxy haloes," Monthly Notices of the Royal Astronomical Society, **505**, 259.
43. Chen, Y., Steidel, C. C., **Hummels, C. B.**, ... (2021), "Erratum: The Keck Baryonic Structure Survey: using foreground/background galaxy pairs to trace the structure and kinematics of circumgalactic neutral hydrogen at z 2," Monthly Notices of the Royal Astronomical Society, **502**, 1702.
42. Hopkins, P. F., Chan, T. K., Ji, S., ... including **Hummels, C.** (2021), "Cosmic ray driven outflows to Mpc scales from L_* galaxies," Monthly Notices of the Royal Astronomical Society, **501**, 3640.
41. Li, F., Rahman, M., Murray, N., ... including **Hummels, C.** (2021), "Probing the CGM of low-redshift dwarf galaxies using FIRE simulations," Monthly Notices of the Royal Astronomical Society, **500**, 1038.
40. Chen, Y., Steidel, C. C., **Hummels, C. B.**, ... (2020), "The Keck Baryonic Structure Survey: using foreground/background galaxy pairs to trace the structure and kinematics of circumgalactic neutral hydrogen at z 2," Monthly Notices of the Royal Astronomical Society, **499**, 1721.
39. Butsky, I. S., Fielding, D. B., Hayward, C. C., ... including **Hummels, C.** (2020), "The Impact of Cosmic Rays on Thermal Instability in the Circumgalactic Medium," The Astrophysical Journal, **903**, 77.
38. Ji, S., Chan, T. K., **Hummels, C. B.**, ... (2020), "Properties of the circumgalactic medium in cosmic ray-dominated galaxy haloes," Monthly Notices of the Royal Astronomical Society, **496**, 4221.
37. Hopkins, P. F., Chan, T. K., Garrison-Kimmel, S., ... including **Hummels, C.** (2020), "But what about...: cosmic rays, magnetic fields, conduction, and viscosity in galaxy formation," Monthly Notices of the Royal Astronomical Society, **492**, 3465.
36. Li, Z., Hopkins, P. F., Squire, J., ... including **Hummels, C.** (2020), "On the survival of cool clouds in the circumgalactic medium," Monthly Notices of the Royal Astronomical Society, **492**, 1841.
35. Werk, J. K., Rubin, K. H. R., Bish, H. V., ... including **Hummels, C.** (2019), "The Nature of Ionized Gas in the Milky Way Galactic Fountain," The Astrophysical Journal, **887**, 89.
34. Rudie, G. C., Steidel, C. C., Pettini, M., ... including **Hummels, C.** (2019), "Column Density, Kinematics, and Thermal State of Metal-bearing Gas within the Virial Radius of z 2 Star-forming Galaxies in the Keck Baryonic Structure Survey," The Astrophysical Journal, **885**, 61.
33. Brummel-Smith, C., Bryan, G., Butsky, I., ... including **Hummels, C.** (2019), "ENZO: An Adaptive Mesh Refinement Code for Astrophysics (Version 2.6)," The Journal of Open Source Software, **4**, 1636.
32. Hafen, Z., Faucher-Giguère, C. A., Anglés-Alcázar, D., ... including **Hummels, C.** (2019), "The origins of the circumgalactic medium in the FIRE simulations," Monthly Notices of the Royal Astronomical Society, **488**, 1248.
31. **Hummels, C. B.**, Smith, B. D., Hopkins, P. F., ... (2019), "The Impact of Enhanced Halo Resolution on the Simulated Circumgalactic Medium," The Astrophysical Journal, **882**, 156.
30. Tollerud, E., Smith, A., Price-Whelan, A., ... including **Hummels, C.** (2019), "Sustaining Community-Driven Software for Astronomy in the 2020s," Bulletin of the American Astronomical Society, **51**, 180.
29. Smith, A., Norman, D., Cruz, K., ... including **Hummels, C.** (2019), "Elevating the Role of Software as a Product of the Research Enterprise," Bulletin of the American Astronomical Society, **51**, 52.
28. Bauer, A., Lundgren, B., O'Mullane, W., ... including **Hummels, C.** (2019), "A Need for Dedicated Outreach Expertise and Online Programming," Bulletin of the American Astronomical Society, **51**, 130.
27. Chen, H. W., Johnson, S. D., Rudie, G. C., ... including **Hummels, C.** (2019), "Tracking the Baryon Cycle in Emission and in Absorption," Bulletin of the American Astronomical Society, **51**, 329.

26. Newman, A., Bezanson, R., Johnson, S., ... including **Hummels, C.** (2019), "Resolving Galaxy Formation at Cosmic Noon," Bulletin of the American Astronomical Society, **51**, 145.
25. Rudie, G. C., Chen, H. W., Newman, A. B., ... including **Hummels, C.** (2019), "Observing Galaxies and Dissecting their Baryon Cycle at Cosmic Noon," Bulletin of the American Astronomical Society, **51**, 148.
24. Oppenheimer, B., Kollmeier, J., Kravtsov, A., ... including **Hummels, C.** (2019), "Imprint of Drivers of Galaxy Formation in the Circumgalactic Medium," Bulletin of the American Astronomical Society, **51**, 280.
23. Peeples, M. S., Corlies, L., Tumlinson, J., ... including **Hummels, C.** (2019), "Figuring Out Gas & Galaxies in Enzo (FOGGIE). I. Resolving Simulated Circumgalactic Absorption at 2 z 2.5," The Astrophysical Journal, **873**, 129.
22. Hopkins, P. F., Wetzel, A., Kereš, D., ... including **Hummels, C.** (2018), "FIRE-2 simulations: physics versus numerics in galaxy formation," Monthly Notices of the Royal Astronomical Society, **480**, 800.
21. Pessa, I., Tejos, N., Barrientos, L. F., ... including **Hummels, C.** (2018), "A VLT/MUSE galaxy survey towards QSO Q1410: looking for a WHIM traced by BLAs in inter-cluster filaments," Monthly Notices of the Royal Astronomical Society, **477**, 2991.
20. Catinella, B., Saintonge, A., Janowiecki, S., ... including **Hummels, C.** (2018), "xGASS: total cold gas scaling relations and molecular-to-atomic gas ratios of galaxies in the local Universe," Monthly Notices of the Royal Astronomical Society, **476**, 875.
19. **Hummels, C. B.**, Smith, B. D., Silvia, D. W. (2017), "Trident: A Universal Tool for Generating Synthetic Absorption Spectra from Astrophysical Simulations," The Astrophysical Journal, **847**, 59.
18. Smith, B. D., Bryan, G. L., Glover, S. C. O., ... including **Hummels, C.** (2017), "GRACKLE: a chemistry and cooling library for astrophysics," Monthly Notices of the Royal Astronomical Society, **466**, 2217.
17. Kim, J. h., Agertz, O., Teyssier, R., ... including **Hummels, C.** (2016), "The AGORA High-resolution Galaxy Simulations Comparison Project. II. Isolated Disk Test," The Astrophysical Journal, **833**, 202.
16. Simpson, C. M., Bryan, G. L., **Hummels, C.**, ... (2015), "Kinetic Energy from Supernova Feedback in High-resolution Galaxy Simulations," The Astrophysical Journal, **809**, 69.
15. Salem, M., Bryan, G. L., **Hummels, C.** (2014), "Cosmological Simulations of Galaxy Formation with Cosmic Rays," The Astrophysical Journal, **797**, L18.
14. Bryan, G. L., Norman, M. L., O'Shea, B. W., ... including **Hummels, C.** (2014), "ENZO: An Adaptive Mesh Refinement Code for Astrophysics," The Astrophysical Journal Supplement Series, **211**, 19.
13. Kim, J. h., Abel, T., Agertz, O., ... including **Hummels, C.** (2014), "The AGORA High-resolution Galaxy Simulations Comparison Project," The Astrophysical Journal Supplement Series, **210**, 14.
12. Catinella, B., Schiminovich, D., Cortese, L., ... including **Hummels, C.** (2013), "The GALEX Arecibo SDSS Survey - VIII. Final data release. The effect of group environment on the gas content of massive galaxies," Monthly Notices of the Royal Astronomical Society, **436**, 34.
11. **Hummels, C. B.**, Bryan, G. L., Smith, B. D., ... (2013), "Constraints on hydrodynamical subgrid models from quasar absorption line studies of the simulated circumgalactic medium," Monthly Notices of the Royal Astronomical Society, **430**, 1548.
10. Catinella, B., Schiminovich, D., Kauffmann, G., ... including **Hummels, C.** (2012), "The GALEX Arecibo SDSS Survey. VI. Second data release and updated gas fraction scaling relations," Astronomy and Astrophysics, **544**, A65.
9. **Hummels, C. B.**, Bryan, G. L. (2012), "Adaptive Mesh Refinement Simulations of Galaxy Formation: Exploring Numerical and Physical Parameters," The Astrophysical Journal, **749**, 140.
8. Catinella, B., Kauffmann, G., Schiminovich, D., ... including **Hummels, C.** (2012), "The GALEX Arecibo SDSS Survey - IV. Baryonic mass-velocity-size relations of massive galaxies," Monthly Notices of the Royal Astronomical Society, **420**, 1959.

7. Moran, S. M., Heckman, T. M., Kauffmann, G., ... including **Hummels, C.** (2012), "The GALEX Arecibo SDSS Survey. V. The Relation between the H I Content of Galaxies and Metal Enrichment at Their Outskirts," The Astrophysical Journal, **745**, 66.
6. **Hummels, C.** (2012), "Comparing Simulations and Observations of Galaxy Evolution: Methods for Constraining the Nature of Stellar Feedback," Ph.D. Thesis.
5. Schiminovich, D., Catinella, B., Kauffmann, G., ... including **Hummels, C.** (2010), "The GALEX Arecibo SDSS Survey - II. The star formation efficiency of massive galaxies," Monthly Notices of the Royal Astronomical Society, **408**, 919.
4. Catinella, B., Schiminovich, D., Kauffmann, G., ... including **Hummels, C.** (2010), "The GALEX Arecibo SDSS Survey - I. Gas fraction scaling relations of massive galaxies and first data release," Monthly Notices of the Royal Astronomical Society, **403**, 683.
3. Crotts, A. P. S., **Hummels, C.** (2009), "Lunar Outgassing, Transient Phenomena, and the Return to the Moon. II. Predictions and Tests for Outgassing/Regolith Interactions," The Astrophysical Journal, **707**, 1506.
2. Majewski, S. R., Kunkel, W. E., Law, D. R., ... including **Hummels, C.** (2004), "A Two Micron All Sky Survey View of the Sagittarius Dwarf Galaxy. II. Swope Telescope Spectroscopy of M Giant Stars in the Dynamically Cold Sagittarius Tidal Stream," The Astronomical Journal, **128**, 245.
1. Kundu, A., Majewski, S. R., Rhee, J., ... including **Hummels, C.** (2002), "Exploring Halo Substructure with Giant Stars. III. First Results from the Grid Giant Star Survey and Discovery of a Possible Nearby Sagittarius Tidal Structure in Virgo," The Astrophysical Journal, **576**, L125.