Jennifer Wallace

jenwalls | jenwalls.github.io | jennifer.2.wallace@uconn.edu | 0009-0002-7459-4174

Research Interests

I am an observational astronomer primarily interested in the process of star formation and how it is influenced by local and galactic-scale environmental conditions. In particular, I am interested in the relation between gas dynamics and star formation and how it proceeds in our Galaxy's Central Molecular Zone. I am also curious about how mass flows from cloud to core-scales, and how this process changes at different points in a systems evolution, especially with respect to the formation of high-mass stars.

Education

Ph.D. Physics, University of Connecticut, *Advisor: Dr. Cara Battersby* — Expected Spring 2026
M.S. Physics, University of Connecticut, *Advisor: Dr. Cara Battersby* — Spring 2023
B.S. Physics, Miami University, *Advisor: Dr. Steven Alexander* — Spring 2019

Leadership Experience

Steering Group Member for the ACES Collaboration 2022–present

Lead Supervisor for Student Research:

Stefania Schuler	First author on a submitted paper	Schuler et al. submitted
Sophia Kempe	Co-Author on a manuscript in preparation	Lipman et al. in preparation
Taevis Kolz	Second Author on a manuscript in preparation	Wallace et al. submitted

Lead Organizer for the UConn Astronomy Journal Club 2023-2025

Executive roles in Physics Department Student Associations

UConn Physics Graduate Student Association	Treasurer	2021-2023
Miami University Society of Physics Students	Secretary	2017-2018

Research Highlights

Investigating the hierarchical continuum structure of star forming regions in the ALMAGAL survey

- Developed a dendrogram-based algorithm for identifying the hierarchical structures present in 1.38 mm continuum observations from the ALMAGAL survey. The 900 potentially high-mass star forming regions targeted by the survey span Galactocentric radii from 1-14 kpc and the full spectrum of evolution, from infrared dark clouds to HII regions.
- Used analysis with the dendrogram structures to quantify how the relative level of hierarchical substructure relates to the evolutionary stage of a clump and to investigate how mass flows from the clump down to the core-scale as star forming systems evolve.
- Gained familiarity with the technique of single-dish combination.

Generating a compact continuum source catalog for the CMZ using ACES

- Generated a pipeline for cataloging compact continuum sources in the ACES survey using both an automated dendrogram-based algorithm and a manual classification procedure using the citizen

science software Zooniverse.

- Discovered thousands of new compact continuum sources that may be potentially star forming and constrained the extent by which estimates of the current star formation rate in the CMZ might change when including this large sample of new compact detections.

Characterizing molecular filaments in the Sagittarius E star forming region

- Used spectral line observations from ALMA to analyze filamentary structure in the Sgr E region, a star forming complex located at the intersection of the 'far' dust lane of the Galactic bar and the Central Molecular Zone.
- Used moment analysis and position-velocity diagrams to estimate basic physical and kinematic properties of the filaments using three different CO isotopologues: ^{12}CO (1-0), ^{13}CO (1-0), and C^{18}O (1-0).
- Demonstrated that these newly discovered filaments are potentially gas parcels that have been "stretched" by the gravitational influence of the bar as they traveled along the "far" dust lane based on their parallel orientation with respect to the Galactic plane, kinematic properties, lack of continuum emission associated with star formation and supporting simulations.

Selected scientific presentations

Invited Talks

European Southern Observatory "Lunch Talk" Seminar	June 2024
University of Kansas Astronomy and Space Physics Seminar	October 2021

Additional Presentations

University of Connecticut Astronomy Seminar (Talk)	October 2025
Stellar Origins Conference (Poster)	September 2025
New England Star and Planet Formation Meeting (Talk)	August 2025
New England Star and Planet Formation Meeting (Poster)	July 2024
Protostars and Planets VII (Poster)	April 2023
Seeing the Future: Of the Universe, Data, Learning, & Digital Scholarship (Talk)	May 2022

Publications

Refereed:

Wallace, J., Battersby, C., Mills, E. A. C., Henshaw, J. D., Sormani, M. C., Ginsburg, A., Barnes, A. T., Hatchfield, H. P., Glover, S. C. O., and Anderson, L. D. (Nov. 2022). "ALMA Uncovers Highly Filamentary Structure toward the Sgr E Region". In: 939.1, 58, p. 58. DOI: 10.3847/1538-4357/ac951a. arXiv: 2209.11781 [astro-ph.GA].

Nonhebel, M., Barnes, A. T., Immer, K., Armijos-Abendaño, J., Bally, J., Battersby, C., Burton, M. G., Butterfield, N., Colzi, L., García, P., Ginsburg, A., Henshaw, J. D., Hu, Y., Jiménez-Serra, I., Klessen, R. S., Kruijssen, J. M. D., Liang, F. -H., Longmore, S. N., Lu, X., Martín, S., Mills, E. A. C., Nogueras-Lara, F., Petkova, M. A., Pineda, J. E., Rivilla, V. M., Sánchez-Monge, Á., Santa-Maria, M. G., Smith, H. A., Sofue, Y., Sormani, M. C., Tolls, V., Walker, D. L., **Wallace, J.**, Wang, Q. D., Williams, G. M., and Xu, F. -W. (Nov. 2024). "Disruption of a massive molecular cloud by a supernova in the Galactic Centre: Initial results from the ACES project". In: 691, A70, A70. DOI: 10.1051/0004-6361/202451190. arXiv: 2409.12185 [astro-ph.GA].

Wells, M. R. A., Beuther, H., Molinari, S., Schilke, P., Battersby, C., Ho, P., Sánchez-Monge, Á., Jones, B., Scheuck, M. B., Syed, J., Gieser, C., Kuiper, R., Elia, D., Coletta, A., Traficante, A., **Wallace, J.**, Rigby, A. J., Klessen, R. S., Zhang, Q., Walch, S., Beltrán, M. T., Tang, Y., Fuller, G. A., Lis, D. C., Möller, T., van der Tak, F., Klaassen, P. D., Clarke, S. D., Moscadelli, L., Mininni, C., Zinnecker, H., Maruccia, Y., Pezzuto, S., Benedettini, M., Soler, J. D., Brogan, C. L., Avison, A., Sanhueza, P., Schisano, E., Liu, T., Fontani, F., Rygl, K. L. J., Wyrowski, F., Bally, J., Walker, D. L., Ahmadi, A., Koch, P., Merello, M., Law, C. Y., and Testi, L. (Oct. 2024). "Dynamical accretion flows: ALMAGAL: Flows along filamentary structures in high-mass star-forming clusters". In: 690, A185, A185. DOI: 10.1051/0004-6361/202449794. arXiv: 2408.08299 [astro-ph.GA].

Molinari, S., Schilke, P., Battersby, C., Ho, P. T. P., Sánchez-Monge, Á., Traficante, A., Jones, B., Beltrán, M. T., Beuther, H., Fuller, G. A., Zhang, Q., Klessen, R. S., Walch, S., Tang, Y. -W., Benedettini, M., Elia, D., Coletta, A., Mininni, C., Schisano, E., Avison, A., Law, C. Y., Nucara, A., Soler, J. D., Stroud, G., **Wallace, J.**, Wells, M. R. A., Ahmadi, A., Brogan, C. L., Hunter, T. R., Liu, S. -Y., Pezzuto, S., Su, Y. -N., Zimmermann, B., Zhang, T., Wyrowski, F., De Angelis, F., Liu, S., Clarke, S. D., Fontani, F., Klaassen, P. D., Koch, P., Johnston, K. G., Lebreuilly, U., Liu, T., Lumsden, S. L., Moeller, T., Moscadelli, L., Kuiper, R., Lis, D., Peretto, N., Pfalzner, S., Rigby, A. J., Sanhueza, P., Rygl, K. L. J., van der Tak, F., Zinnecker, H., Amaral, F., Bally, J., Bronfman, L., Cesaroni, R., Goh, K., Hoare, M. G., Hatchfield, P., Hennebelle, P., Henning, T., Kim, K. -T., Kim, W. -J., Maud, L., Merello, M., Nakamura, F., Plume, R., Qin, S. -L., Svoboda, B., Testi, L., Veena, V. S., and Walker, D. (Apr. 2025). "ALMAGAL: I. The ALMA evolutionary study of high-mass protocluster formation in the Galaxy: Presentation of the survey and early results". In: 696, A149, A149. DOI: 10.1051/0004-6361/202452702. arXiv: 2503.05555 [astro-ph.GA].

Sánchez-Monge, Á., Brogan, C. L., Hunter, T. R., Ahmadi, A., Avison, A., Beltrán, M. T., Beuther, H., Coletta, A., Fuller, G. A., Johnston, K. G., Jones, B., Liu, S. -Y., Mininni, C., Molinari, S., Schilke, P., Schisano, E., Su, Y. -N., Traficante, A., Zhang, Q., Battersby, C., Benedettini, M., Elia, D., Ho, P. T. P., Klaassen, P. D., Klessen, R. S., Law, C. Y., Lis, D. C., Liu, T., Maud, L., Möller, T., Moscadelli, L., Pezzuto, S., Rygl, K. L. J., Sanhueza, P., Soler, J. D., Stroud, G., Tang, Y., van der Tak, F. F. S., Walker, D. L., **Wallace, J.**, Walch, S., Wells, M. R. A., Wyrowski, F., Zhang, T., Allande, J., Bronfman, L., Dann, E., De Angelis, F., Fontani, F., Henning, Th., Kim, W. -J., Kuiper, R., Merello, M., Nakamura, F., Nucara, A., and Rigby, A. J. (Apr. 2025). "ALMAGAL: II. The ALMA evolutionary study of high-mass protocluster formation in the Galaxy: ALMA data processing and pipeline". In: 696, A150, A150. DOI: 10.1051/0004-6361/202452703. arXiv: 2503.05559 [astro-ph.GA].

Sofue, Y., Oka, Tomo., Longmore, S. N., Walker, D., Ginsburg, A., Henshaw, J. D., Bally, J., Barnes, A. T., Battersby, C., Colzi, L., Ho, P., Jimenez-Serra, I., Kruijssen, J. M. D., Mills, E., Petkova, M. A., Sormani, M. C., **Wallace, J.**, Armijos-Abendano, J., Dutkowska, K. M., Enokiya, R., Fukui, Y., Garcia, P., Guzman, A., Henkel, C., Hsieh, P. -Y., Hu, Y., Immer, K., Jeff, D., Klessen, R. S., Kohno, K., Krumholz, M. R., Lipman, D., Martin, S., Morris, M. R., Nogueras-Lara, F., Nonhebel, M., Ott, J., Pineda, J. E., Requena-Torres, M. A., Rivilla, V. M., Riquelme-Vasquez, D., Sanchez-Monge, A., Santa-Maria, M. G., Smith, H. A., Tanvir, T. S., Tolls, V., and Wang, Q. D. (Apr. 2025). "The Galactic-Centre Arms inferred from ACES (ALMA CMZ Exploration Survey)". In: *arXiv e-prints*, arXiv:2504.03331, arXiv:2504.03331. DOI: 10.48550/arXiv.2504.03331. arXiv: 2504.03331 [astro-ph.GA].

Zhang, S., Lu, X., Ginsburg, A., Budaiev, N., Cheng, Y., Liu, H. B., Liu, T., Zhang, Q., Qiu, K., Feng, S., Pillai, T., Tang, X., Mills, E. A. C., Luo, Q., Li, S., Issac, N., Liu, X., Xu, Fengwei, **Wallace, J.**, Mai, X., Zhang, Y., Battersby, C., Longmore, S. N., and Shen, Z. (Mar. 2025). "Subclustering and Star Formation Efficiency in Three Protoclusters in the Central Molecular Zone". In: 982.1, L10, p. L10. DOI: 10.3847/2041-8213/adb30b. arXiv: 2503.00878 [astro-ph.GA].

Submitted:

Battersby, C., Santa-Maria, M.G, Lipman, D., Paré, D. M., Lee, Rachel, García, P., Jim-Serra, I., Pan, X., Walker, D. L., Sullivan, J., Alboslani, D., Hatchfield, H. P., Hu, Y., Lazarian, A., **Wallace, J.**, Zhang, Q., Lu, X., Mills, E. A. C., Ginsburg, A., Barnes, A. T., Hsieh, P., Henshaw, J., Longmore, S. N., Bally, J., Colzi, L., Ho, P. T. P., Petkova, M. A., Sormani, M. C., Bulatek, A., Butterfield, N. O., Federrath, C., Glover, S. C. O., Gorski, M. D., Gramze, S., Henkel, C., Karoly, J., Klessen, R. S., Martín, S., Nogueras-Lara, F., Pineda, J. E., Riquelme-Vásquez, D., Rivilla, V. M., Sánchez-Monge, A., Schmiedeke, A., Sofue, Y., and Volker, T. (July 2025). "ACES VI. ALMA Large Program Reveals a Highly Filamentary Central Molecular Zone". Submitted.

Ginsburg, A., Walker, D., Sánchez-Monge, A., Barnes, A. T., Lu, X., Pineda, J. E., Immer, K., Zhang, Q., Bally, J., Budaiev, N., Colzi, L., García, P., Gramze, S. R., Henshaw, J. D., Hsieh, P., Jeff, D., Jiménez-Serra, I., Klessen, R. S., Dicker, S. R., Longmore, S. N., Nogueras-Lara, F., Rivilla, V. M., Santa-Maria, M., Wang, Q. D., Xu, F., Battersby, C., Ho, P. T. P, Kruijssen, J. M. D., Mills, E. A. C., Petkova, M., Sormani, M. C., Tress, R. G., **Wallace, J.**, Armijos-Abendaño, J., Armillotta, L., Bijas, N., Buddhacharya, R., Bulatek, A., Busch, L. A., Butterfield, N. O., Chevance, M., Cook, C., Crowe, S., Díaz-Rodríguez, A. K., Dutkowska, K. M., Fedriani, R., Federrath, C., Glover, S. C. O., Gu, Q., Houghton, R. J., Hu, Y., Issac, N., Karoly, J., Krumholz, M. R., Liang, F., Martín, S., Mazoochi, F., Pan, X., Paré, D., Pillai, T., Pound, M. W., Riquelme-Vásquez, D., Schmiedeke, A., Sofue, Y., Tolls, V., Williams, G. M., Zhang, S., Moravec, E., Romero, C. E., Mason, B. S., and Orlowski-Scherer, J. (July 2025). "ALMA Central Molecular Zone Exploration Survey (ACES) II: 3mm continuum images". Submitted.

Gramze, S., Ginsburg, A., Budaiev, N., Bulatek, A., Richardson, T., Barnes, A. T., Santa-Maria, Miriam G., Sormani, M. C., Lu, X., Nogueras-Lara, F., Gaches, B. A. L., Battersby, C. D., **Wallace, J.**, Walker, D. L., Mills, E. A. C., and Mattern, M. (Sept. 2025). "Mapping CO Ice in a Star-Forming Filament in the 3 kpc Arm with JWST". In: *arXiv e-prints*, arXiv:2509.21763, arXiv:2509.21763. arXiv: 2509.21763 [astro-ph.GA].

Hsieh, P., Walker, D., Ginsburg, A., Barnes, A. T., Armijos-Abendaño, J., Budaiev, N., Gramze, S. R., Cook, C., Henshaw, J. D., Immer, K., Issac, N., Liang, F., and Longmore, S. N. and Lu, X. and Martín, S. and Pan, X. and Pineda, J. E. and Pound, M. W. and Sánchez-Monge, A. and Zhang, Q. and Bally, J. and Battersby, C. and Colzi, L. and Ho, P. T. P and Jiménez-Serra, I. and Kruijssen, J. M. D. and Mills, E. A. C. and Petkova, M. and Sormani, M. C. and Tress, R. G. and **Wallace, J.** and Armillotta, L. and Bijas, N. and Buddhacharya, R. and Busch, L. A. and Butterfield, N. O. and Chevance, M. and Díaz-Rodríguez, A. K. and Federrath, C. and Fedriani, R. and García, P. and Gu, Q. and Houghton, R. J. and Hu, Y. and Karoly, J. and Klessen, R. S. and Krumholz, M. R. and Mazoochi, F. and Nogueras-Lara, F. and Paré and Riquelme-Vásquez, D. and Rivilla, V. M. and Santa-Maria, M. and Schmiedeke, A. and Sofue, Y. and Tolls, V. and Wang, Q. D. and Williams, G. M. and Xu, F. and Zhang, S. (July 2025). "ALMA Central molecular zone Exploration Survey (ACES) V: CS(2-1), SO($2_3 - 1_2$), CH_3CHO ($5_{(1,4)} - 4_{(1,3)}$), HC_3N(11-10) and H40α lines data preview". Submitted.

Longmore, S. N., Bally, J., Barnes, A. T., Battersby, C., Colzi, L., Ginsburg, A., Henshaw, J. D., Ho, P. T. P., Jim-Serra, I., Kruijssen, J. M. D., Mills, E. A. C, Petkova, M., Sormani, M. C., Tress, R. G., Walker, D. L, **Wallace, J.**, Alkhuja, E., Armilotta, L., Budaiev, N., Bhuddacharya, R., Bulatek, A., Burton, M., Butterfield, N. O., Busch, L., Caselli, P., Chevance, M., Cook, C., Crowe, S., Díaz-Rodríguez, A. K., DiTeodoro, E., Dicker, S. R., Dutkowska, K. M., Fairley, A., Federrath, C., Fedriani, R., Fiteni, K., Fuller, G., García, P., Goicoechea, J., Girichidis, P., Glover, S. C. O., Gorski, M., Gramze, S. R., Gu, Q., Hatchfield, H. P., Houghton, R. J., Hsieh, P., Hu, Y., Immer, K., Jeff, D., Karoly, J., Kauffmann, J., Klessen, R. S., Krumholz, M. R., Lazarian, A., Levesque, E. M., Liang, F., Lipman, D., Liu, X., Lu, X., Luo, Q., Lupi, A., McCafferty, L., Martín, S., Mazoochi, Farideh, Morris, M. R., Nonhebel, M., Nogueras-Lara, F., Oka, T., Ott, J., Padovani, M., Pan, X., Pineda, J.E., Pillai, T. G. S., Pound, M. W., Torres, M. R., Riquelme-Vásquez, D., Rivilla, V. M., Salo, G., Sánchez-Monge, A., Santa-Maria, M. G., Schoedel, R., Schmiedeke, A., Schultheis, M., Smith, H. A., Sofue, Y., Testi, L., Tremblay, G. R., Vasini,

A., Vermariën, G., Vikhlinin, A., Viti, S., Wang, Q. D., Xu, F., Zhang, S., and Zhang, Q. (July 2025). "ALMA Central Molecular Zone Exploration Survey (ACES) overview paper". Submitted.

Lu, X., Walker, D., Ginsburg, A., Barnes, A. T., Armijos-Abendaño, J., Budaiev, N., Gramze, S. R., Cook, C., Henshaw, J. D., Hsieh, P., Immer, K., Issac, N., Liang, F., and Longmore, S. N. and Martín, S. and Pan, X. and Pineda, J. E. and Pound, M. W. and Sánchez-Monge, A. and Zhang, Q. and Bally, J. and Battersby, C. and Colzi, L. and Ho, P. T. P and Jiménez-Serra, I. and Kruijssen, J. M. D. and Mills, E. A. C. and Petkova, M. and Sormani, M. C. and Tress, R. G. and **Wallace, J.** and Armillotta, L. and Bijas, N. and Buddhacharya, R. and Busch, L. A. and Butterfield, N. O. and Chevance, M. and Díaz-Rodríguez, A. K. and Federrath, C. and Fedriani, R. and García, P. and Gu, Q. and Houghton, R. J. and Hu, Y. and Karoly, J. and Klessen, R. S. and Krumholz, M. R. and Liu, X. and Mazoochi, F. and Nogueras-Lara, F. and Paré and Riquelme-Vásquez, D. and Rivilla, V. M. and Santa-Maria, M. and Schmiedeke, A. and Sofue, Y. and Tolls, V. and Wang, Q. D. and Williams, G. M. and Xu, F. and Zhang, S. (July 2025). "ALMA Central molecular zone Exploration Survey (ACES) IV: Data of the two intermediate-width spectral windows". Submitted.

Schuler, S. F., **Wallace, J.**, Battersby, C., Hatchfield, H. P., Gutermuth, R., Lu, X., Zhang, S., and Zhang, Q. (July 2025). "Mass Segregation in the CMZoom Survey". Submitted. URL: https://www.overleaf.com/read/vnvytvhyznbp#ef190c.

Walker, D., Ginsburg, A., Barnes, A. T., Armijos-Abendaño, J., Budaiev, N., Bulatek, A., Gramze, S. R., Cook, C., Henshaw, J. D., Hsieh, P., Immer, K., Issac, N., Jeff, D., Liang, F., and Longmore, S. N. and Lu, X. and Mills, E. A. C. and Martín, S. and Pan, X. and Pillai, T. and Pineda, J. E. and Pound, M. W. and Sánchez-Monge, A. and Zhang, Q. and Bally, J. and Battersby, C. and Colzi, L. and Ho, P. T. P and Jiménez-Serra, I. and Kruijssen, J. M. D. and Petkova, M. and Sormani, M. C. and Tress, R. G. and **Wallace, J.** and Armillotta, L. and Bijas, N. and Buddhacharya, R. and Busch, L. A. and Butterfield, N. O. and Chevance, M. and Crowe, S. and Díaz-Rodríguez, A. K. and Dutkowska, K. M. and Federrath, C. and Fedriani, R. and García, P. and Glover, S. C. O. and Gu, Q. and Houghton, R. J. and Hu, Y. and Karoly, J. and Klessen, R. S. and Krumholz, M. R. and Mazoochi, F. and Nogueras-Lara, F. and Paré and Riquelme-Vásquez, D. and Rivilla, V. M. and Santa-Maria, M. and Schmiedeke, A. and Sofue, Y. and Tolls, V. and Wang, Q. D. and Williams, G. M. and Xu, F. and Zhang, S. (July 2025). "ALMA Central molecular zone Exploration Survey (ACES) III: Molecular line data reduction and HNCO and HCO^+ data preview". Submitted.

Wallace, J., Kolz, T., Battersby, C., Kuznetzova, A., Sánchez-Monge, A., Schisano, E., Coletta, A., Zhang, Q., Molinari, S., Schilke, P., Ho, P. T. P, Kuiper, R., Zhang, T., Möller, T., Klessen, R. S., Beltrán, M. T., van der Tak, F., Pezzuto, S., Beuther, H., Traficante, A., Elia, D., Bronfman, L., Klaassen, P., Lis, D. C., Moscadelli, L., Rygl, K., Benedettini, M., Law, C. Y., González, J., Nucara, A., Koch, P., Kim, W., Sanhueza, P., Fuller, G., Stroud, G., Jones, B., Brogan, C., Hunter, T., Ahmadi, A., Avison, A., Johnston, K., Liu, S., Mininni, C., and Su, Y. (Oct. 2025). "ALMAGAL VIII. The Hierarchical Continuum Structure Catalog". Submitted. URL: https://www.overleaf.com/read/tsrhrydgfmmt#077bd7.

Advanced Drafts:

Wallace, J., Battersby, Cara, Budaiev, Nazar, Hatchfield, H. P., A., Barnes, and Yoo, T. (Dec. 2025). "The ACES Compact Continuum Source Catalog". Manuscript in preparation. URL: https://www.overleaf.com/read/czyfssfkrxpd#4d0042.

Skills and Additional Training

Penn State Astrostatistics Summer School

- Developed skills relating to the statistical interpretation of astronomical data.

- Learned statistical methods and the implementation of statistics in an astronomical context.

NRAO Summer School

- Learned the fundamentals of radio astronomy through online lectures and interactive tutorials.
- Gained experience with reducing interferometric data products using CASA (Common Astronomy Software Applications).

Technical Skills

- Proficient in Python
- Familiar with CASA (Common Astronomy Software Applications)
- Proficient with using astronomical data visualization software such as DS9, CARTA, and glueviz.
- Basic proficiency with Fortran and Matlab

Personal Skills

- Elementary level Japanese

Teaching Experience

Graduate Teaching Assistant Aug 2019 - May 2022

– Helped lead the lab portion of introductory level electromagnetism for engineering students and for students with non-STEM majors.

– Led students through demonstrations and problem-solving tutorials during class.

– Graded quizzes, pre-lab assignments, lab reports, and exams.

– Hosted office hours and assisted students taking various different physics courses, such as astronomy, quantum mechanics, and the physics of sound.

Undergraduate Teaching Assistant Aug 2018 - Dec 2018

– Taught students about basic circuitry and coding for the Miami University electronics lab

– Helped students develop skills with troubleshooting technical issues during lab