Curriculum Vitae - Q. Daniel Wang

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Summary

Q. Daniel Wang is a professor in the Astronomy Department at University of Massachusetts Amherst. He received his Ph.D. in astronomy in 1990 from Columbia University and was awarded the 1992 ASP Robert J. Trumpler Award for Outstanding North American Ph.D Dissertation Research in Astronomy. He was then a NASA Edwin P. Hubble Postdoctoral Fellow at University of Colorado and later a Lindheimer Fellow at Northwestern University. He was also a member of the Institute for Advanced Study at Princeton and a Raymond and Beverley Sackler Distinguished Visiting Astronomer at University of Cambridge. He was honored first as the Siyuan Visiting Professor and later as the Yixing Visiting Chair Professor in the School of Astronomy and Space Science at Nanjing University, later as a US Fulbright Scholar and a visiting professor at Pontificia Universidad Católica de Chile, and as a visiting professor at Tsung-Dao Lee Institute and Shanghai Jiao Tong University.

His research is primarily on high-energy astrophysics. He is recognized for his pioneering work on X-ray mapping and spectroscopy of diffuse hot plasma in and around galaxies and for leading several major surveys of the Milky Way Galaxy center, using state-of-the-art telescopes. He was the principal investigator of many national and international research projects (with multi-million US dollar funding), including several large observing projects with the Hubble Space Telescope, Chandra X-ray Observatory, and XMM-Newton X-ray Observatory. He has (co-)authored 240+ research papers published in refereed journals (including four in *Nature* and one in *Science* as the lead author and one single author review paper in Proceedings of the National Academy of Sciences). His publication covers a broad range of topics: compact stars, supernova remnants, superbubbles, and hot circumgalactic and intergalactic media, as well as galactic nuclei and their environments. His current research focuses on the feedback and ecosystem of galaxies and galactic nuclear regions. He mainly uses radio, infrared, ultraviolet, and X-ray observations to conduct these studies. He has also carried out theoretical and computational studies with his students and collaborators. He has mentored numerous students and postdocs, who are well-received by the community. His research was press-released by NASA on multiple occasions and was often covered by news media, nationally and internationally.

Professional Experience

2008 - present	Full Professor, University of Massachusetts, Amherst
2002 - 2008	Associate Professor, University of Massachusetts, Amherst
1999 - 2002	Assistant Professor, University of Massachusetts, Amherst
1994 - 1999	Research Assistant Professor, Northwestern University, Evanston
1993 - 1994	Research Scientist at University of Colorado, Boulder
1990 - 1993	Hubble Fellow, Joint Institute for Laboratory Astrophysics, Boulder

Professional Recognition

2018 - 2021	Visiting Professorship, Tsung-Dao Lee Institute and Shanghai Jiao Tong University
2018	Visiting Professorship, Pontificia Universidad Católica de Chile
2018	U.S. Fulbright Scholar
2017 - 2018	Fellow of the Chinese Academy of Sciences President's International Fellowship Initiative
2013 - 2016	Yixing Visiting Chair Professorship, Nanjing University
2013	Raymond and Beverley Sackler Distinguished Visiting Astronomer, University of Cambridge
2006 - 2009	Siyuan Visiting Chair Professorship, Nanjing University
2005	Distinguished Visitor Fellowship, Institute for Advanced Study, Princeton
1997	First-Class Award for the Science and Technology Advance from the National Education Committee of China
1994	Lindheimer Fellowship, Northwestern University

1992	Robert J. Trumpler Award for Outstanding North American Ph.D Dissertation Research in Astronomy from the Astronomical Society of Pacific
1990 - 1993	Hubble Postdoctoral Fellowship
1990	Harvard-Smithsonian Center for Astrophysics Fellowship (declined)
1990	Canadian Institute for Theoretical Astrophysics Fellowship (declined)
1985	Nanjing University "New Star" Award

Professional Advisory Boards

2023 - present	Science working group member on Line Emission Mapper (for an NASA X-ray Probe for the 2030s; PI: Ralph Kraft, Harvard-Smithsonian Center for Astrophysics)
2011 - present	Member of the ALMA Central Molecular Zone Exploration Survey (PI: Steve Longmore, Astrophysics Research Institute)
2018 - 2019	Member of the NASA Great Observatory Science Analysis Group
2017 - present	Science working group member on the IGM and CGM for Hot Universe Baryon Surveyor (Concept study; PI: Wei Cui, Hsinghua University)
2017 - present	Science working group member on Census of WHIM, Accretion and Feedback Explorer (Concept study; PI: Li Ji, Purple Mountain Astronomical Observatory)
2016 - 2017	Overseas Expert for Chinese Academy of Sciences
2014 - 2017	Executive Committee Member of the High-Energy Astrophysics Division of the American Astronomical Society
2011 - present	Member of the international CHANGES-ES research consortium (PI: Judith Irwin, Queens University)
2009	Frontier Science Panel Member of US Astro 2010 - the Decadal Survey on Astronomy and Astrophysics

Professional Associations

American Astronomical Society

International Astronomical Union

International Committee on Space Research

International Astrostatistics Association

Major Current Research Projects

Galactic Nuclear Region:

Systematic X-ray study of the Galactic supermassive black hole Sgr A* and its immediate environment

Magnetic, molecular, and dust properties of the Galactic central molecular zone

Feedback and Ecosystem of Galaxies:

Analysis of the deep X-ray observations of the 30 Dorado nebula

Multi-wavelength investigation of selected nearby face-on galaxies

Multi-wavelength study of edge-on galaxies, including CHANG-ES (Continuum HAlos in Nearby Galaxies – an EVLA Survey), as well as Chandra/XMM-Newton surveys

Multi-wavelength study of outer circumgalactic and intracluster media

Multi-wavelength study of the brightest galaxies in the universe: gravitationally lensed extreme dusty star-forming galaxies at high redshifts (PASSAGES collaboration)

Highlights of Research Achievements

The Universe is hot and energetic, as revealed by high-energy astrophysics – the main field of my research. Collaborating with astronomers around the globe, I have researched a broad range of topics, via theoretical/computational studies, as well as observations across the electromagnetic spectrum, using best available facilities. The following highlights a few research areas where I have made most significant contributions.

1) High-energy astrophysical phenomena and processes:
My research career started with the first calculation of quark matter viscosity and its application to the damping process of quark star vibration (Wang & Lu 1984, Physics Letters B; Wang et al. 1989, Nature). My interest in extreme astrophysics continued with my participation in the discovery and follow-up study of the fastest rotating young pulsar and its uniquely regular star quake pattern (e.g., Marshall et al. 1998, Wang et al. 1998, Middleditch et al. 2006, all in ApJ), as well as the pulsar in the supernova remnant G54.1+0.3 – a close cousin of the Crab Nebula (Camilo et al., Lu et al. 2002 ApJ). Later, as the lead author of a landmark paper, I presented the first evidence for the substantial mass loss from the accretion flow onto our Galaxy's central massive black hole, known as Sgr A* (Wang et al. 2013, Science). This work represents a major breakthrough in understanding the silent majority of galactic nuclei. We further extended the work on the accretion flow to include numeric hydrodynamic simulations, which led to the first estimation of both the flow's angular momentum (Roberts et al. 2017, MNRAS) and the quiescent X-ray emission from the immediate vicinity of the black hole (Ma et al. 2018). I was also part of the international team that detected the radio to sub-millimeter emission from the nearest tidal disruption event – the disruption of a Jupiter-sized planet by the central massive black hole – in the Virgo cluster galaxy NGC 4845 (Irwin et al. 2015, Yuan et al. 2016, MNRAS). This, together with our follow-up observations with VLBA, ALMA, and SWIFT, has provided a so far unique opportunity to conduct a spatially resolved study of evolving jets from such an event (Perlman et al. 2017, 2019, 2021, ApJ).

2) Galactic circumnuclear environment:
Lines of evidence show that galactic nuclear regions play a central role in galaxy evolution. So it is important to know how such regions work. I led several large observational campaigns to explore the nuclear region of our own Galaxy. I was the first to use the Chandra X-ray Observatory to survey the central molecular zone of our Galaxy, and also actively participated in subsequent deeper surveys, providing an unprecedented high-resolution view of numerous discrete energetic objects and diffuse hot plasma, as well as Sgr A* (Wang, Gotthelf, & Lang 2002, Nature; Muno et al. 2006, ApJ; Wang et al. 2013, Science). I also organized an ambitious multi-institution effort to map the near-infrared continuum and line emission in the central zone, using the Hubble Space Telescope (Wang et al. 2010, MNRAS), establishing an invaluable legacy data set. Results from the project itself include the discovery of many evolved massive stars, a large fraction of which are unexpectedly located outside known stellar clusters, and the detailed mapping of diffuse photo-ionized gas, providing a glimpse of various star formation modes. Later, I proposed and supervised a large-scale, high-resolution survey of millimeter emission from the central molecular zone with the Large Millimeter Telescope. Combined with complementary far-infrared data from the Herschel Space Observatory, this survey has allowed us to map the projected dust mass distribution (Tang, Wang, et al. 2021a,b, MNRAS). I am currently involved in a new pilot LMT/TolTEC survey of the magnetic field and the ALMA Central Molecular Zone Exploration Survey. Recently, I completed the largest Chandra mapping of the central $2^\circ \times 4^\circ$ field of the Galaxy, revealing a complex of X-ray-emitting threads plus plume-like structures emerging from the Galactic Center (Wang 2021, MNRAS). The initial results include the first observational evidence for magnetic field re-connection in interstellar space. The understanding of this process, theoretically predicted in analog to solar flares, can have strong implications for the study of interstellar hot plasma heating, cosmic ray acceleration, and turbulence. These surveys offer important insights into the interplay among various components of the Galactic central region, as well as a glimpse of what may occur in distant galaxies under similar extreme conditions.

3) Stellar feedback and galactic ecosystem:
In galaxies, feedback from stars, plus occasional active galactic nuclei, is manifested by the presence of chemically enriched galactic coronae. They can dominate the energetics of the interstellar medium, drive outflows into galactic halos, and regulate galaxy evolution (Tang et al. 2009, MNRAS; Tang & Wang 2010, MNRAS). My research has played a pioneering and leading role in the study of galactic coronae. As a graduate student, I conducted the first systematic X-ray study of diffuse hot plasma in the nearby Large Magellanic Cloud galaxy. Later I initiated the first detection of the corona around a spiral galaxy (Wang et al. 1995, 2001, ApJL) and then initiated a systematic X-ray survey of galactic coronae around large samples of disk galaxies, using Chandra and XMM-Newton observations (e.g., Li & Wang 2013; Li, Crain, & Wang 2014; Wang et al. 2016, MNRAS; Li et al. 2018, ApJL; Jiang et al. 2019, ApJ). This later survey, for example, provides critical tests for theories of galaxy evolution by showing that 1) the coronae trace the stellar feedback, 2) the X-ray efficiency of a corona decreases with increasing surface star formation rate, 3) substantial discrepancies exist between observations and simulations, 4) the coronae of galaxies are insufficient to explain their "missing

baryons", and 5) the interplay between hot and cool gases may play an important role in the X-ray emission at the galactic disk/halo interface. Recently I started a systematic study nearby face-on spiral galaxies, based chiefly on deep Chandra observations. Our initial study on M83 (Wang et al. 2021, MNRAS) has led to new findings: (1) the X-ray emission is enhanced not only along the galaxy's grand spiral arms, but also clearly in their down-streams; (2) the spectrum of the emission can be well characterized by a supersolar metallicity plasma with a lognormal temperature distribution, plus an X-ray absorption of a lognormal column density distribution; and (3) the intensity of the emission is strongly anti-correlated with the dust obscuration seen in optical images of the galaxy. These findings provide important insights into the coupling of the stellar feedback with the interstellar medium in active star forming galaxies. I further initiated an X-ray absorption line survey of the diffuse hot plasma in our Galaxy (e.g., Wang et al. 2005, ApJ; Yao & Wang 2005, ApJ). For this survey, we developed state-of-the-art tools for the joint analysis of X-ray absorption and emission lines and provided the first global characterization of the spatial extent, chemical abundances, kinematics, and thermal state of the X-ray-emitting/absorbing gas in and around our Galaxy (e.g., Wang 2010, PNAS).

4) X-ray emission spectroscopy of diffuse hot plasma:
Despite these advances, the interpretation of X-ray emission can be complicated, even for galaxies with no bright active galactic nuclei. In a series of spectroscopic studies that I initiated, we demonstrate that a considerable fraction of diffuse soft X-ray emission observed in such galaxies cannot simply arise from collisional processes in optically thin thermal gas, as has been commonly assumed (Liu et al. 2010, 2011, MNRAS; Zhang et al. 2014, 2019 ApJ; Yang et al. 2018, ApJ). This is important for understanding the nature of the emission and for correctly inferring the thermal and chemical properties of the hot plasma. We show that in active star-forming galaxies such as M82, part of the soft X-ray emission most likely originates in charge exchange between ions and neutral atoms at the interface between hot and cool gases (Zhang et al. 2014). We have directly confirmed such charge exchange induced emission at the shock front of a supernova remnant (Roberts & Wang 2015, MNRAS). In a relatively quiescent circumstance such as the stellar bulge of our neighboring Andromeda galaxy, the hot plasma can be optically thick for strong resonance lines. We show that photon scattering could play a major role in shaping the observed X-ray spectrum and spatial distribution (Yang et al. 2018). We have further demonstrated that modeling the effects of these processes can yield key information about the velocity structure of the hot plasma or its interface area with cool gas, which could hardly be measured otherwise (Zhang et al. 2014; Yang et al. 2018). Furthermore, we show X-ray spectroscopic evidence for the over-ionization of the plasma, most likely due to the presence of an AGN about half a million years ago at the center of the galaxy (Zhang et al. 2019). This work points out a way to explore relics of AGN, based on their effects on X-ray spectroscopic properties of diffuse hot plasma in and around galaxies, which has long recombination timescale. With these pioneering studies, we are well positioned to take advantage of future X-ray observing facilities with their greatly improved spectroscopic capabilities to further our investigations.

5) Evolution of galaxies in intergalactic environments:
Galactic ecosystems are not completely isolated and can be strongly affected by their intergalactic environments. I initiated multiple innovative projects to provide the first lines of observational evidence for galaxy transformation and destruction during galaxy cluster formation (Wang et al. 2004, ApJ), for diffuse hot plasma spanning the deep intergalactic space between clusters and groups of galaxies (Wang, Connelly, & Brunner 1997, ApJL; Wang et al. 2004, ApJ), and for the dearth of UV-absorbing cool gas in and around clusters and their embedded galaxies (Burchett et al. 2018, MNRAS). More recently, we have developed an all-sky fitting method to statistically characterize the intrinsic radial profile of the diffuse X-ray intensity in outskirts of galaxy clusters. This method uses known optically identified halos as a prior to separate the contributions from merging and projected halos. We find that the derived profile is substantially steeper than that obtained without this separation and that the physical state of diffuse hot plasma in merging halos changes systematically with cluster centric radius. These results place fundamental constraints on theories on the environmental dependence of galaxy and cluster evolution.

Publications in Referred Journals

[Mentees whose co-authorship took place under my direct supervision are marked: postdocs (*), graduate (**), undergraduate (***), and high-school (****) students]

247. "Multistructured accretion flow of Sgr A* I: Examination of a RIAF model", Balakrishnan, M., Corrales, L, Calderón, D., Cuadra, J., Markoff, S., Nowak, M., Haggard, D., **Wang, Q.D.**, Neilsen, J. Russell, C.M.P., Calderón, D., Cuadra, J., & Frederick B., ApJ, 2024, in press

246. "Multistructured accretion flow of Sgr A* II: Signatures of a Cool Accretion Disk in Hydrodynamic Simulations of Stellar Winds", Balakrishnan, M., Russell, C.M.P., Corrales, L, Markoff, S., Nowak, M., Haggard, D., **Wang, Q.D.**, Neilsen, J., & Frederick B., ApJ, 2024, in press

245. "CO-CHANGES - I. IRAM 30-m CO observations of molecular gas in the sombrero galaxy", Jiang, Y., Li,

J.-T., Gao, Y., Bregman, J.N., Ji, L., Jiang, X.J., Tan, Q-H., Wang, J-F., **Wang, Q.D.**, &Yang, Y., ApJ, 2024, 528, 4160

244. "Birds of a Feather: Resolving Stellar Mass Assembly With JWST/NIRCam in a Pair of Kindred z∼2 Dusty Star-forming Galaxies Lensed by the PLCK G165.7+67.0 Cluster", Kamieneski, P.S., et al. (including **Wang, Q.D.**), ApJ, 2024, in press

243. "A Broad Line-width, Compact, Millimeter-bright Molecular Emission Line Source near the Galactic Center", Ginsburg, A. et al. (including **Wang, Q.D.**), ApJL, 2024, 968, 11

242. "CHANG-ES XXXI?A Decade of CHANG-ES: What We Have Learned from Radio Observations of Edge-on Galaxies", Yang, Y., Li, J-T., Wiegert, T., Li, Z.-Y., Guo, F., Irwin, J., **Wang, Q.D.**, Dettmar, R.-J., Beck, R., English, & J., Ji, L., Galaxies, 2024, 12, 22

241. "eDIG-CHANGES. II. Project Design and Initial Results on NGC 3556", Li, J.-T., et al. (including **Wang, Q.D.**), ApJ, 2024, 967, 78

240. "Resolving a rare hyperluminous rotating disk in an Einstein ring 10 billion years ago", Liu, D. et al. (including **Wang, Q.D.**), Nature Astronomy, 2024, in press

239. "FEASTS Combined with Interferometry (I): Overall Properties of Diffuse HI and Implications for Gas Accretion in Nearby Galaxies", Wang, J., Lin, X., Yang, D., Staveley-Smith, L., Walter, F., **Wang, Q.D.**, Wang, R., Battisti, A. J., Catinella, B., Chen, H-W., Cortese, L., Fisher, D.B., Ho, L. C., Ji, S., Jiang, P., Kauffmann, G., Kong, X., Liu, Z., Shao, L., Wang, J., Wang, L., and Wang, S. ApJ, 2024, 968, 48

238. "PASSAGES: the wide-ranging, extreme intrinsic properties of Planck-selected, lensed dusty star-forming galaxies", Kamieneski, P.S., Yun, M.S., Harrington, K.C., Lowenthal, J.D., **Wang, Q.D.**, Frye, B.L., Jimenez-Andrade, E.F., Vishwas, A., Coope, O., Pascale, M., Foo, N., Berman, D., Englert, A., Garcia Diaz, C. ApJ, 2024, 961, 2

237. "X-ray detection of the most extreme star-forming galaxies at the cosmic noon via strong lensing", **Wang, Q.D.**, Garcia Diaz, C.**, Kamieneski, P.S., Harrington, K.C., Yun, M.S., Foo, N., Frye, B.L., Jimenez-Andrade, E.F., Liu, D-Z., Lowenthal, J.D., Alcalde Pampliega, B., Pascale, M., Vishwas, A., MNRAS, 2024, 527,10584

236. "Properties of the Line-of-Sight Velocity Field in the Hot and X-ray Emitting Circumgalactic Medium of Nearby Simulated Disk Galaxies", ZuHone, J. A., Schellenberger, G., Ogorzalek, A. et al. (including **Wang, Q.D.**), MNRAS, 2024, 967, 49

235. "Mapping the imprints of stellar and AGN feedback in the circumgalactic medium with X-ray microcalorimeters", Schellenberger, G., Bogdán, Á., ZuHone, J.A., et al. (including **Wang, Q.D.**), MNRAS, ApJ, 2023, in press

234. "X-ray metal line emission from the hot circumgalactic medium: probing the effects of supermassive black hole feedback", Truong, N., Pillepich, A., Nelson, D. et al. (including **Wang, Q.D.**), MNRAS, 2023, 525, 1976

233. "X-rays Trace the Volatile Content of Interstellar Objects", Cabot, S.H.C.**, **Wang, Q.D.**, & Seligman, D.Z., ApJ, 2023, 956, 121

232. "The JWST PEARLS View of the El Gordo Galaxy Cluster and of the Structure It Magnifies", Frye, B., L., Pascale, M., Foo, N., et al. (including **Wang, Q.D.**), 2023, ApJ, 952, 81

231. "Tracing the Energetic Outflows from Galactic Nuclei: Observational Evidence for a Large-Scale Bipolar Radio and X-ray-emitting Bubble-like Structure in M106", Zeng, Y.**, **Wang, Q.D.**, Fraternali, F. MNRAS, 2023, 526, 483

230. "Scientific objectives of the Hot Universe Baryon Surveyor (HUBS) mission", Bregman, J., Cen, R-Y., Chen, Y. et al. (including **Wang, Q.D.**), 2023, Science China Physics, Mechanics & Astronomy, 66, 9, article id.299513

229. "An XMM-Newton View of the Andromeda Galaxy as Explored in a Legacy Survey (New-ANGELS). I. The X-Ray Source Catalog", Huang, R., Li, J-T., Cui, W., Bregman, J.N., Li, X-D., Ponti, G., Qu, Z., **Wang, Q. Daniel**, Zhang, Y. 2023, ApJS, 268, 36

228. "CO-CHANGES I: IRAM 30m CO Observations of Molecular Gas in the Sombrero Galaxy", Jiang, Y., Li, J-T., Gao, Y., Bregman, J.N., Ji, L., Jiang, X., Tan, Q., Wang, J., **Wang, Q.D.**, Yang, Y., MNRAS, 2023, in press

227. 'The X-ray variation of M81* resolved by Chandra and NuSTAR", Niu, S., Xie, F.-G., **Wang, Q.D.**, Ji, L., Yuan, F., Long, M. MNRAS, 2023, 522, 2644

226. "eDIG-CHANGES I: extended Hα emission from the extraplanar diffuse ionized gas (eDIG) around CHANG-ES galaxies", Lu, L-Y., Li, J.-T., Vargas, C.J., et al. (including **Wang, Q.D.**), MNRAS, 2023, 522, 2644,

225. "FEASTS: IGM cooling triggered by tidal interactions through the diffuse HI phase around NGC 4631", Wang, J., Yang, D., Oh, S-H., Staveley-Smith, L., Wang, J., **Wang, Q.D.**, Hess, K.M., Ho, L. C., Hou, L., Jing, Y., Li, F., Lin, X., Liu, Z., Shao, L., Wang, S., & Zhu, M. ApJ, 2023, 944, 102

224. "X-ray Insight into High-Energy Processes in Extreme Galactic Nuclear Environment", **Wang, Q.D.**, Universe, 2022, 8, 515

223. "X-ray Spectroscopic Evidence of Charge Exchange Emission in the Disk of M51", Zhang, S.-N., **Wang, Q.D.**, Sun, W., Long, M., Sun, J., & Ji, L. 2022, ApJ, 941, 68

222. "Y Gem: A White Dwarf Symbiotic Star?" Yu, Z.-l., Xu, X.-j., Shao, Y., **Wang, Q.D.**, & Li, X.-D. 2022, ApJ, 932, 132

221. "PASSAGES: The Large Millimeter Telescope and ALMA Observations of Extremely Luminous High Redshift Galaxies Identified by the Planck", Berman, D.A., Yun, M.S., Harrington, K. C., Kamieneski, P., Lowenthal, J., Frye, B. L., **Wang, Q.D.**, et al. MNRAS, 2022, 515, 3911

220. "CHANG-ES XXIX: The Sub-kpc Nuclear Bubble of NGC 4438", Li, J.-T., **Wang, Q.D.**, et al. MNRAS, 2022, 515, 3911

219. "Decomposing Magnetic Fields in Three Dimensions over the Central Molecular Zone", Hu, Y., Lazarian, A., & **Wang, Q.D.** 2022, MNRAS, 513, 3493

218. "CHANG-ES. XXIV. First Detection of a Radio Nuclear Ring and Potential LLAGN in NGC 5792", Yang, Y., Irwin, J., Li, J.-T., Wiegert, T., **Wang, Q. D.**, Sun, W., Damas-Segovia, A., Li, Z., Shen, Z.-Q., Walterbos, R.A. M., & Vargas, C.J. 2022, ApJ, 927, 4

217. "CHANG-ES XXV: HI Imaging of Nearby Edge-on Galaxies - Data Release 4", Zheng, Y., Wang, J., Irwin, J., English, J., Ma, Q., Wang, R., Wang, K., **Wang, Q.D.**, Krause, M.K., Randriamampandry, T.H., Li, J.-T., & Beck, R. 2022, MNRAS, 513, 1329

216. Xu, X.-J.*, **Wang, Q.D.**, & Li, X.-D. "Statistical Properties of Cataclysmic Variables in the Local Galactic Disk: a Joint Analysis of Gaia and XMM-Newtron data", ApJ, 2022, 516, 1263

215. Hu, Y., Lazarian, A., & **Wang, Q.D.**, "Multiscale magnetic fields in the central molecular zone: inference from the gradient technique", 2022, MNRAS, 511, 829

214. Irwin, J., Dyer, J.., Drake, L.***, **Wang, Q.D.**, Stil, S., Stein, Y., English, J., & Wiegert, T. "CHANG-ES XXVII: A Radio/X-ray Catalogue of Compact Sources in and around Edge-on Galaxies", 2022, MNRAS, 512, 5755

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211. **Wang, Q.D.**, Zeng, Y.X.***, Bogdán, Á, & Ji, L. "Deep Chandra observations of diffuse hot plasma in M83", 2021, MNRAS, 508, 6155

210. Cheng, Y.J.**, **Wang, Q.D.**, & Lim, S.H. "X-ray spectroscopy of the starburst feedback in 30 Doradus'", 2021, MNRAS, 504, 1627

209. **Wang, Q.D.**, "Chandra large-scale mapping of the Galactic center: Probing high-energy structures around the central molecular zone", 2021, MNRAS, 504, 1609

208. Tang, Y.P.**, **Wang, Q.D.**, Wilson, G.W., Heyer, M.H., Gutermuth, R.A. et al. "AzTEC Survey of the Central Molecular Zone: Data Reduction, Analysis and Preliminary Results", 2021, MNRAS, 505, 2392

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193. Ge, C.**, **Wang, Q.D.**, Tripp, T.M., Burchett, J.N.**, Sun, M., Li, Z., Gu, Q., & Ji, L. "Probing the dynamical state, baryon content, and multiphase nature of galaxy clusters with bright background QSOs", MNRAS, 481, 2018, 4111

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1. **Wang, Q.D.**, and Lu, T. "The Damping Effects of the Vibrations in the Core of a Neutron Star", Phys Letter B, 148B, 1984, 211

Edited Conference Proceedings

"The Galactic Center: a Window to the Nuclear Environment of Disk Galaxies", edited by Mark R. Morris, Q. Daniel Wang, & Feng Yuan; ASP Conference Series Vol. 439

Recent Invited Conference Talks (Since 2013)

"X-ray view of Sgr A* and its environment" in the Improving Black Hole Accretion Models with Plasma Theory workshop, Princeton, 2023

"X-ray Insight into High-Energy Processes in Extreme Galactic Nuclear Environment" at the 31st Texas Symposium on Relativistic Astrophysics, Prague, 2022

"X-ray galactic ecosystems of nearby disk galaxies", keynote seminar of IAU Commission H1 ?The Local Universe?, 2022

"Toward X-ray spectroscopy of the CGM around nearby disk galaxies" a virtual invited talk at Hot Gas in the Universe: the 2nd HUBS International Workshop, Xiamen, China, 2022

"The Panchromatic Circumgalactic Medium", in the CHANG-ES International Workshop on CGM Science Frontier, Nanjing, 2019

"Dissecting X-ray emission of Sgr A*", The Central Arcsecond: Towards Testing General Relativity in the Galactic Center, Ringberg Castle, Germany, 2018

"Probing Astrophysical Black Holes via Gravitational Lensing", IWARA2018 - 8th International Workshop on Astronomy, Ollantaytambo, Peru, 2018

"Time-domain astrophysics of galactic nuclei in radio to submillimeter", The 3rd PANDA Symposium on Time Domain Astronomy, Chengdu, China, 2018

"Flows and Flares Around the Nearest Supermasive Black Hole — Sgr A*", plenary keynote at the #230 American Astronomical Society, Austin, USA, 2017

"Ideas on Chandra Key Projects for the Next 15 Years", at the Chandra Science for the Next Decade workshop, Cambridge, USA, 2016

"Cosmic Structure Formation: Far-UV/Soft X-ray Spectroscopy", at the Tsinghua Circum-galactic and Intergalactic Gas mini-workshop, Beijing, China, 2016

"X-ray Spectroscopy of Nearby Galactic Nuclear Region", at the Universe in High-resolution X-ray Spectra workshop, Cambridge, USA, 2015

"Feedback from Starbursts: 30 Dorado as a Case Study", McCray Symposium, Bern, Switzerland, 2015

"Galactic Neighborhood and (Chandra-enabled) X-ray Astrophysics" in the 15-year Chandra Conference, Boston, USA, 2014

"Diffuse X-ray Emission of Disk Galaxies", in the X-ray View of Galaxy Ecosystems workshop, Boston, USA, 2014

"Galactic Feedback and Ecosystem", in the From Dark Matter to Galaxies workshop, Xian, China, 2014

"What do Complementary X-ray Data Tell Us about CHANG-ES galaxies?" in the Change-es Survey workshop, Kingston, Canada, 2014

"Astronomical Frontier Problems of Cosmic-ray Origins" at the Cosmic-ray conference, Beijing, China, 2014

"LMT/AzTEC 1.1-mm Observations of the Galactic Center" in the 2014 LMT workshop, Mexico, 2014

"Supernovae and the Galactic Ecosystem" in the IAU Symposium 296, Supernova Environmental Impacts, Raichak, India, 2013

"Multi-wavelength Study of Nearby edge-on Galaxies", in the Lorentz Center@Snellius Radio Halos of Galaxies workshop, Leiden, Netherlands, 2013

Departmental Colloquium/Seminar Talks

Astrophysics Science Division of NASA/Goddard Space Flight Center; Wesleyan University; University of Connecticut; University of Maryland; University of Missouri; University of Massachusetts Amherst; Harvard-Smithsonian Astrophysical Observatory Center for Astrophysics; University of Georgia at Athens; University of Colorado at Boulder; California Institute of Technology; Institute for Advanced Study, Princeton; University of Wisconsin at Madison; Yale University Center for Astronomy and Astrophysics; Space Telescope Science Institute; Penn State University; NASA/GSFC/Lab. for High-Energy Astrophysics; John Hopkins University; Columbia University; Los Alamos National Lab; University of Illinois at Urbana-Champaign; Bell Laboratory; University of Pittsburgh; National Radio Astronomy Observatory/Very Large Array; Rutgers University; Massachusetts Institute of Technology; University of Alabama at Huntsville; Northwestern University; State University of New York at Stony Brook; New Mexico State University; University of California at Berkeley INAF-Osservatorio Astronomico di Brera; The Kavli Institute for Astronomy and Astrophysics at Beijing; the Joint ALMA Observatory/European South Observatory; Cerro Tololo Inter-American Observatory/Gemini Telescope; Universidad de Chile; Pontificia Universidad Católica de Chile; Dublin Institute for Advanced Studies; Beijing Normal University; Yunnan University; Yunnan Astronomical Observatory; Institute de Astrofísica de Andalucia (Granada, Spain); Astronomical Institute of the Academy of Sciences (Prague, Czech); University of Potsdam; Fudan University (Shanghai, China); Cambridge University; Mullard Space Science Laboratory; University College London; University of Leicester; Shanghai Jia-tong University; Institute for High-Energy Physics; Chinese Academy of Sciences; University of Science and Technology of China; Purple Mountain Observatory (Nanjing, China); Nanjing University; Tsinghua University (Beijing, China); Shanghai Astronomical Observatory; Xiamen University (Xiamen, China); Chinese National Astronomical Observatories

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Teaching Experience

I have taught the following courses:

Undergraduate level:

AST 100: Exploring Universe

AST 191A: Astronomy 1st-year Seminar

AST 330: High-Energy Astrophysics

Graduate level:

AST 643: Stellar Astrophysics & Populations

AST 650: Extragalactic Astronomy

AST 792A: Seminar and Literature Review

AST 850: High-Energy Astrophysics

UMass Students that I am mentoring for their research

Andrew Wright, Liam Yanulis, Leo Drake, Giselle Hoermann, Luan Luan, Miriam Eleazer, & Carlos Garcia Diaz

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Former Postdoctoral Research Associates/Visiting Scholars and Students

Postdoctoral Associates/Visiting Scholars:

Stefan Immler 3/2000-8/2002 (Program Scientist at the Astrophysics Division at NASA Headquarters)

Cornelia Lang 2000-2002 (Professor at U. of Iowa)

Fangjun Lu 2001-2002 (professor at Institute for High-Energy Physics, China)

Rosa Williams 2001-2003 (professor at Columbus State University, Georgia)

Yu Gao 2002-2003 (professor at Xiamen University, China)

Yang Chen, 2002-2003 (professor at Nanjing U., China)

Donald Honer, 2003-2004 (staff at GSFC)

David Smith 2003-2004 (returned to England; lost contact)

Yangsen Yao, 2003-2005 (postdoc at MIT and U. of Colorado; IT staff)

Jiren Liu, 2008-2010 (2008-2010; astrophysicist at National Astronomical Observatory of China)

Shiyin Shen 2011 (professor, Shanghai Astronomical Observatory, China)

Qiang Yuan 2014-2016 (astrophysicist at Purple Mountain Observatory, China)

Shuinai Zhang 2017-2018 (astrophysicist at Purple Mountain Observatory, China)

Renyi Ma 2017-2018 (associated Professor at Xiamen University, China)

Xiaojie, 2019 (research scientist at Nanjing U., China)

Ph.D. Students:

Li Ji 2006 Ph.D. (postdoc at MIT; currently on faculty of Purple Mountain Observatory, China)

Zhiyuan Li 2008 (postdoc at CfA, UCLA, professor of Nanjing University (NJU))

Shikui Tang 2009 (postdoc at Mass. General, residency at U. Penn; now a medical physicist)

Bing Jiang 2009 (jointly supervised with Yang Chen at NJU; currently on faculty of NJU)

Jiangtao Li 2010 (jointly supervised with Yang Chen at NJU; currently research associate professor at U. of Michigan)

Hui Dong 2011 (postdoc at National Optical Astronomical Observatory and now at Instituto de Astrofsica de Andaluca - CSIC, Granada, Spain; data scientist with the Washington State government)

Chong Ge 2015 (jointly supervised with Qiusheng Gu at NJU; postdoc at U. of Alabama)

Shawn Roberts (2016; data scientist at U.S. Census Bureau)

Yuping Tang (2019, jointly supervised with Grant Wilson; postdoc at U. de Chile)

Jun Li, 2018-2020 (jointly supervised with Biwei Jiang at Beijing Normal U., China; postdoc at Guangzhou University)

Graduate students who did other research projects with me:

Aimee D'Onofrio (2000-2001; 2nd-year project; MIT Lincoln Lab)

Chow-Choong Ngeow (2000-2001; 1st-year project; National Central University, Taiwan)

Tara Chevas (2001-2002, visiting student from Queen's University, Canada)

Shikui Tang (2003-2004; 1st-year project)

Zhiyuan Li (2004-2005; 2nd-year project)

Hui Dong (2005-2006; 1st-year project)

Bing Jiang (2006-2008; visiting graduate student from NJU)

Zhaoyu Zuo (2007-2008; visiting graduate student from NJU)

Seth Johnson (2007-2008; 1st-year project)

Roger Ledgister (2008-2009; 1st-year project)

David Welch (2008-2009; 1st-year project)

Zhankui Lu (2009-2010; 1st-year project)

Xiaojie Xu (2010-2012; visiting student from NJU)

Shuinai Zhang (2011; visiting student from NJU)

Michael Petersen (2010-2011; 1st-year project)

Shawn Roberts (2011-2012; 1st-year project)

Frank Ripple (2011-2012; 2nd-year project)

Seunghwan Lim (2013-2014; 1st-year project)

Yaping Li (visiting student from Xiamen University; 2014)

Patrick Kamieneski (2015-2016; 1st-year project)

Zhiyuan Ji (2017-2018; 2nd-year project)

Luan Luan (2018-2019; 1st-year project)

Yingjie Cheng (2020; 1st-year project)

Carlos Garcia Diaz (2021-2023, research jointly supervised by Min Yun)

Miriam Eleazer (2022-2024, research jointly supervised by Alex Pope)

Undergraduates (who conducted research under my supervision):

Ted Markowsky (2003; Fox Broadcasting)

Wakako Fukui (Mt. Holyoke College; 2003)

Ben Farley (2004, graduate student at American University)

Kate Whitaker (2004; Yale University graduate student, NASA postdoc, Hubble fellow, UMass faculty), winner of the Mary Dailey Irvine Prize and the College Outstanding Undergraduate Student Award for Academic Excellence

Chris Duston (2003-2005, Penn State University graduate student, Florida State Univ), winner of the David J. Van Blerkom Research Scholarship in Astronomy

Pat Dragon (2005)

Mike Okrochkov (2007)

Jake McCoy (2010-2011; U.of Iowa graduate student; NASA Space Technology Research Fellow at Penn State University), winner of the David J. Van Blerkom Research Scholarship in Astronomy

Aaron Dunbrack (2014-2015; Stony Brook University physics graduate student), 2015 Goldwater Scholar

Kendall Sullivan (2015-2016, University of Texas at Austin graduate student)

Dylan Pare (2015-2017; University of Iowa graduate student; postdoc at Villanova University)

Yuxuan (Mark) Zeng (2017-2020; University of Groningen graduate student)

Manesh Mishra (2019 summer/fall; Worcester Polytechnic Institute graduate student)

Rafi Rubenstein, Brandeis University (2020, virtual summer research internship; 2022 US Fulbright Scholar)

Leo Drake (2020 summer/fall, 2022-2023, honor thesis)

Shamus Flynn (2021 summer -2022 spring, honor thesis; Newgrange Design)

Andrew Wright (2021 fall -2023)

Alex Miller (2022 spring)

Giselle Hoermann (2022 spring -2023)

Liam Yanulis (2022 spring -2023, honor thesis)

High-School Students Whom I Mentored:

Dan Hussain (Richland Senior High School in Johnstown; Siemens Westinghouse National Science Award, MIT undergraduate; now an inventor, entrepreneur and patent agent)

Sam Cabot (Berkshire School, Sheffield; Princeton U. undergraduate; Cambridge and Yale graduate students)

Service

My committee service has been quite nominal at various department, college, and campus levels. Outside the UMass campus, I served as thee scientific organizing committee member or chair of various international astronomical meetings and as the member, chair, or deputy chair on numerous facility, theory, and observing time allocation panels for NASA and NSF. I also helped to review research proposals or prize nominations for various international science funding agencies or fundations. I refereed papers for such scientific journals as Physics Review Letters, Nature, Astrophysical Journal, Astronomy Journal, Astronomy & Astrophysics, and Monthly Notices of the Royal Astronomical Society. I further served on a Frontier Science Panel of the US 2010 Decadal Survey on Astronomy and Astrophysics, on the executive committee of the High-Energy Astrophysics Division of the American Astronomical Society, and on the NASA Great Observatory Science Analysis Group, which led to the 2021 report "Great Observatories: The Past and Future of Panchromatic Astrophysics" (87 pages, 23 figures), as commissioned by NASA's Cosmic Origins, Physics of the Cosmos, and Exoplanet Exploration Program Analysis Groups.