

CURRICULUM VITAE  
Barbara Sue Ryden

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Employment history:

October 2010 –  
Professor  
Ohio State University, Department of Astronomy  
October 1998 – September 2010  
Associate professor  
Ohio State University, Department of Astronomy  
October 1992 – September 1998  
Assistant professor  
Ohio State University, Department of Astronomy  
September 1990 – August 1992  
Postdoctoral research fellow  
Canadian Institute for Theoretical Astrophysics  
September 1987 – August 1990  
Postdoctoral research fellow  
Harvard-Smithsonian Center for Astrophysics

Education:

Ph. D. (1987) Princeton University  
Astrophysics  
Thesis adviser: James E. Gunn  
B. A. (1983) Northwestern University  
Physics and Integrated Science Program

Honors, etc.:

Chambliss Astronomical Writing Award (2006)  
NSF Young Investigator (1993-98)  
Participant, Summer Program for  
Young Investigators in Cosmology (1990-91)  
Smithsonian Postdoctoral Fellow (1987-90)  
Jacobus Honorary Fellow (1986-87)  
NSF Graduate Fellow (1983-86)  
Phi Beta Kappa (1982)

#### Membership in Professional Societies:

American Association for the Advancement of Science  
American Astronomical Society  
Astronomical Society of the Pacific

#### Thesis Students Supervised:

Aniruddha Thakar (Ph.D. March 1997)  
A Numerical Study of Counterrotating Disks in Spiral Galaxies  
Alberto Conti (Ph.D. September 2000)  
Evolution of the Properties of Galaxies  
S. M. Khairul Alam (M.S. March 2002)  
The Shapes of Galaxies in the Sloan Digital Sky Survey

#### Talks, Colloquia, & Other Presentations:

7/13: Lifelong Learning Institute, Central Ohio Technical College, Pataskala, OH  
Course: Life in the Universe  
7/12: Lifelong Learning Institute, Central Ohio Technical College, Pataskala, OH  
Course: The History of the Universe  
6/12: Gordon Research Conference, Physics Research & Education, Waterville, ME  
Discussion Leader: Gravitational Radiation & Interesting Objects  
7/11: “Using Astronomy to Teach Physics” workshop, Lincoln, NE  
Invited talk: Interpreting Hubble’s law  
12/10: IDPASC, Sesimbra, Portugal  
Lecture series: Introduction to cosmology  
6/06: Aspen Center for Physics, Aspen, CO  
Participant in “Cosmic Voids” workshop  
Public Dialogue: The shape of the universe  
1/04: College of Wooster, Wooster, OH  
Colloquium: The shape of space  
11/03: University of Kansas, Dept. of Physics & Astronomy, Lawrence, KS  
Colloquium: A shape of the universe report: Curved or flat?  
5/02: Caltech, Dept. of Astronomy, Pasadena, CA  
Colloquium: The morphological evolution of elliptical galaxies  
11/01: Ringberg Workshop, Ringberg Castle, Tegernsee, Germany  
Invited talk: The evolution of merger remnants  
5/01: Yale Cosmology Workshop, “The Shapes of Galaxies and Their Halos”, New Haven, CT  
Contributed talk: The morphological evolution of merger remnants  
8/00: “Kingston 2000” conference, CITA, Toronto, ON, Canada  
Contributed talk: The age – shape relation for elliptical galaxies  
2/00: Miami University, Dept. of Physics, Oxford, OH  
Colloquium: The large-scale structure of the universe  
6/99: “Instrumentation and Cosmology” conference, Princeton U., Princeton, NJ  
Invited talk: Galaxy formation – the analytic approach  
8/98: “Galaxy Dynamics” conference, Rutgers U., New Brunswick, NJ  
Contributed talk: Shapes of elliptical galaxies with massive dark objects

3/98: University of Wisconsin, Dept. of Astronomy, Madison, WI  
 Colloquium: The expansion of the universe - slowing down or speeding up?  
 6/97: Aspen Center for Physics, Aspen, CO  
 Participant in "Precision Measures of Large Scale Structure" workshop  
 3/97: University of Michigan, Dept. of Astronomy, Ann Arbor, MI  
 Colloquium: The continuing search for  $q_0$   
 12/96: Very Large Array, NRAO, Socorro, NM  
 New Mexico State University, Dept. of Astronomy, Las Cruces, NM  
 Los Alamos National Laboratory, Theoretical Astrophysics, Los Alamos, NM  
 Colloquium: The formation of counterrotating disks in spiral galaxies  
 10/96: Case Western Reserve University, Cleveland, OH  
 Seminar: Voids in the universe - Past, present, and future  
 8/96: The Second Stromlo Symposium, Canberra, ACT, Australia  
 Contributed talk: Dwarf elliptical and dwarf S0 galaxies in the Virgo cluster  
 8/96: Canadian Institute for Theoretical Astrophysics, Toronto, ON, Canada  
 Seminar: Still searching for  $q_0$   
 8/96: "Cosmology – The Big Picture" conference, Iqaluit, NT, Canada  
 Contributed talk: Methods for measuring the deceleration parameter  
 1/96: University of Toledo, Dept. of Physics and Astronomy, Toledo, OH  
 Colloquium: The search for  $q_0$  and the fate of the universe  
 10/95: Johns Hopkins University, Applied Physics Laboratory, Laurel, MD  
 Colloquium: The fate of the universe  
 6/95: American Astronomical Society meeting, Pittsburgh, PA  
 Invited talk at "Dynamics of large scale structure" meeting

## Courses Taught:

### Undergraduate:

Astronomy 141/1141: Life in the Universe  
 Astronomy 143: History of the Universe  
 Astronomy 161: Introduction to Solar System Astronomy  
 Astronomy 162: Introduction to Stellar, Galactic, & Extragalactic Astronomy  
 Astronomy H162: Honors Introduction to Stellar, Galactic, & Extragalactic Astronomy  
 Astronomy 291: Basic Astrophysics & Planetary Astronomy  
 Astronomy 292: Stellar, Galactic, & Extragalactic Astronomy & Astrophysics  
 Astronomy 642: Extragalactic Astronomy  
 Astronomy 682: Introduction to Cosmology

### Graduate:

Astronomy 810: Order of Magnitude Astrophysics  
 Astronomy 822: Electromagnetic Radiation  
 Astronomy 825: Radiative Gas Dynamics  
 Astronomy 870: Stellar Systems  
 Astronomy 8871: Interstellar Medium & Intergalactic Medium  
 Astronomy 873: Cosmology & Structure Formation

## BIBLIOGRAPHY

### *Refereed papers*

1. “A Statistical Comparison of Voids in the Galaxy Distribution and n-body Simulations.” Barbara S. Ryden & Edwin L. Turner, 1984, ApJL, 287, L59-63
2. “Molecules in Galaxies. I. CO Observations in a Spiral Arm of M31.” Barbara S. Ryden & Antony A. Stark, 1986, ApJ, 305, 823-29
3. “Galaxy Formation by Gravitational Collapse.” Barbara S. Ryden & James E. Gunn, 1987, ApJ, 318, 15-31
4. “Galaxy Formation: The Role of Tidal Torques and Dissipational Infall.” Barbara S. Ryden, 1988, ApJ, 329, 589-611
5. “Collapse of Density Peaks in a Gaussian Random Field.” Barbara S. Ryden, 1988, ApJ, 333, 78-89
6. “The Area of Isodensity Contours as a Measure of Large Scale Structure.” Barbara S. Ryden, 1988, ApJL, 333, L41-44
7. “The Area of Isodensity Contours in Cosmological Models and Galaxy Surveys.” Barbara S. Ryden, Adrian L. Melott, David A. Craig, J. Richard Gott III, David H. Weinberg, Robert J. Scherrer, Suketu P. Bhavsar, & John M. Miller, 1989, ApJ, 340, 647-60
8. “Dynamical Evolution of Domain Walls in an Expanding Universe.” William H. Press, Barbara S. Ryden, & David N. Spergel, 1989, ApJ, 347, 590-604
9. “Single Mechanism for Generating Large Scale Structure and Providing Dark Missing Matter.” William H. Press, Barbara S. Ryden, & David N. Spergel, 1990, Phys. Rev. Lett., 64, 1084-87
10. “Oblate Spheroidal Mass Distributions of Varying Ellipticity.” Barbara S. Ryden, 1990, MNRAS, 244, 341-48
11. “The Evolution of Networks of Domain Walls and Cosmic Strings.” Barbara S. Ryden, William H. Press, & David N. Spergel, 1990, ApJ, 357, 293-300
12. “Global Texture as the Origin of Large Scale Structure: Numerical Simulations of Evolution.” David N. Spergel, Neil Turok, William H. Press, & Barbara S. Ryden, 1991, Phys. Rev., D43, 1038-46
13. “Compression of Dark Halos by Baryon Infall: Self-similar Solutions.” Barbara S. Ryden, 1991, ApJ, 370, 15-24
14. “Phase Shifts in Gravitationally Evolving Density Fields.” Barbara S. Ryden & Mirt Gramann, 1991, ApJL, 383, L33-36
15. “Projections of Ellipsoidal Galaxies.” Barbara S. Ryden, 1991, MNRAS, 253, 743-52
16. “Projections of Box-shaped Galaxies.” Barbara S. Ryden, 1992, ApJ, 386, 42-51
17. “The Intrinsic Shapes of Elliptical Galaxies.” Barbara S. Ryden, 1992, ApJ, 396, 445-52
18. “The Shapes of Brightest Cluster Galaxies.” Barbara S. Ryden, Tod R. Lauer, & Marc Postman, 1993, ApJ, 410, 515-19
19. “Self-similar Collapse of Axisymmetric Systems.” Barbara S. Ryden, 1993, ApJ, 418, 4-10

20. "Self-similar Expansion of Axisymmetric Voids." Barbara S. Ryden, 1994, *ApJ*, 423, 534-38
21. "The Flattening Distribution of Dwarf Elliptical Galaxies in the Virgo Cluster." Barbara S. Ryden & Donald M. Terndrup, 1994, *ApJ*, 425, 43-50
22. "A Comparison of the Intrinsic Shapes of Globular Clusters in Four Different Galaxies." Cheongho Han & Barbara S. Ryden, 1994, *ApJ*, 433, 80-87
23. "Measuring  $q_0$  from the Distortion of Voids in Redshift Space." Barbara S. Ryden, 1995, *ApJ*, 452, 25-32
24. "Formation of Massive Counterrotating Disks in Spiral Galaxies." Aniruddha R. Thakar & Barbara S. Ryden, 1996, *ApJ*, 461, 55-71
25. "The Intrinsic Shapes of Stellar Systems." Barbara S. Ryden, 1996, *ApJ*, 461, 146-154
26. "Voids in Real Space and in Redshift Space." Barbara S. Ryden & Adrian L. Melott, 1996, *ApJ*, 470, 160-171
27. "The Shapes of Dense Cores and Bok Globules." Barbara S. Ryden, 1996, *ApJ*, 471, 822-31
28. "NGC 4138 – A Case Study in Counterrotating Disk Formation." Aniruddha R. Thakar, Barbara S. Ryden, Katherine P. Jore, & Adrick H. Broeils, 1997, *ApJ*, 479, 702-22
29. "Quasar Clustering and Spacetime Geometry." Piotr A. Popowski, David H. Weinberg, Barbara S. Ryden, & Patrick S. Osmer, 1998, *ApJ*, 498, 11-25
30. "A Comparison of the Intrinsic Shapes of Two Different Types of Dwarf Galaxies: Blue Compact Dwarfs and Dwarf Ellipticals." Eon-Chang Sung, Cheongho Han, Barbara S. Ryden, Mun-Suk Chun, & Ho-Il Kim, 1998, *ApJ*, 499, 140-148
31. "The Intrinsic Shapes of Low-Surface-Brightness Dwarf Irregular Galaxies and Comparison to Other Types of Dwarf Galaxies." Eon-Chang Sung, Cheongho Han, Barbara S. Ryden, Richard J. Patterson, Mun-Suk Chun, Ho-Il Kim, Woo-Baik Lee, & Dong-Jin Kim, 1998, *ApJ*, 505, 199-206
32. "SPH Simulations of Counterrotating Disk Formation in Spiral Galaxies." Aniruddha R. Thakar & Barbara S. Ryden, 1998, *ApJ*, 506, 93-115
33. "Detailed Surface Photometry of Dwarf Elliptical and Dwarf S0 Galaxies in the Virgo Cluster." Barbara S. Ryden, Donald M. Terndrup, Richard W. Pogge, & Tod R. Lauer, 1999, *ApJ*, 517, 650-660
34. "The Size and Shape of Voids in Three-dimensional Galaxy Surveys." Jason Schmidt, Barbara S. Ryden, & Adrian L. Melott, 2001, *ApJ*, 546, 609-619
35. "Structural Evolution in Elliptical Galaxies: The Age - Shape Relation." Barbara S. Ryden, Duncan A. Forbes, & A. I. Terlevich, 2001, *MNRAS*, 326, 1141-1148
36. "The Shapes of Galaxies in the Sloan Digital Sky Survey." S. M. Khairul Alam & Barbara S. Ryden, 2002, *ApJ*, 570, 610-617
37. "The Ellipticity of the Disks of Spiral Galaxies." Barbara S. Ryden, 2004, *ApJ*, 601, 214-220
38. "The Dependence of Galaxy Shape on Luminosity and Surface Brightness Profile." R. Anthony Vincent & Barbara S. Ryden, 2005, *ApJ*, 623, 137-147
39. "Dependence of Galaxy Shape on Environment in the Sloan Digital Sky Survey." Frederick Kuehn & Barbara S. Ryden, 2005, *ApJ*, 634, 1032-1042

40. "The Intrinsic Shape of Spiral Galaxies in the 2MASS Large Galaxy Atlas." Barbara S. Ryden, 2006, ApJ, 641, 773-784
41. "Inclination-Dependent Extinction Effects in Disk Galaxies in the Sloan Digital Sky Survey." Cayman T. Unterborn & Barbara S. Ryden, 2008, ApJ, 687, 976
42. "Relative Orientation of Pairs of Spiral Galaxies in the Sloan Digital Sky Survey." Jesse Buxton & Barbara S. Ryden, 2012, ApJ, 756, 135
43. "Shape Alignment of Early-Type and Late-Type Galaxies in the Sloan Digital Sky Survey." Barbara S. Ryden & Tereasa G. Brainerd, 2012, in preparation

*Books, theses, & manuals*

1. *Galaxy Formation by Gravitational Collapse in a Universe Dominated by Cold Dark Matter*, Barbara Sue Ryden, 1987, PhD thesis, Princeton University
2. *Introduction to Cosmology*. Barbara Ryden, 2003 (San Francisco: Addison Wesley)
3. *Uchuuron Nyuumon*. Barbara Ryden, 2003, trans. Nobuyoshi Makino (Tokyo: Pearson Education Japan) [Japanese translation of *Introduction to Cosmology*]
4. *Foundations of Astrophysics*. Barbara Ryden & Bradley M. Peterson, 2010 (San Francisco: Addison Wesley)
5. *Instructor Solution Manual for Foundations of Astrophysics*. Barbara Ryden, Bradley M. Peterson, & Jessica Orwig, 2010 (On-line publication)
6. *Foundations of Astrophysics (International Edition)*. Barbara Ryden & Bradley M. Peterson, 2010 (Upper Saddle River, NJ: Pearson Education)

*Other works*

1. "The Forms of Galaxy Haloes in Universes Dominated by Heavy Neutral Particles." B. S. Ryden & J. E. Gunn, 1984, BAAS, 16, 487 (abstract)
2. "The Formation of Galactic Halos in Universes Dominated by Cold Dark Matter." Barbara S. Ryden & James E. Gunn, 1987, in *Dark Matter in the Universe, IAU Symposium 117*, ed. J. Kormendy & G. R. Knapp (Dordrecht: Reidel), p. 364 (abstract)
3. "The Milky Way and Mankind: from Myth to Science." Barbara S. Ryden, 1987, StarDate, 15, January, p. 6-8
4. "The Phantom Moon of Venus." Barbara Ryden, 1987, StarDate, 15, August, p. 4-5
5. "The Astronomical Odyssey of Monsieur Le Gentil." Barbara S. Ryden, 1988, Griffith Observer, 52, February, p. 3-10
6. "The Area of Isodensity Contours in Gaussian and non-Gaussian Fields." Barbara S. Ryden, 1988, PASP, 100, 1360-63
7. "The Astronomer and the Guillotine." Barbara Ryden, 1989, StarDate, 17, Jan.-Feb., p. 16-18
8. "The Great Moon Hoax." Barbara S. Ryden, 1989, StarDate, 17, May/June, p. 16-17

9. "The Galaxy Next Door." Barbara Ryden, 1989, *StarDate*, 17, Sept./Oct., p. 21-22
10. "The Earl and the Leviathan." Barbara S. Ryden, 1989, *Griffith Observer*, 53, Nov., p. 2-14
11. "Silent Star: The Life of John Goodricke." Barbara Ryden, 1989, *StarDate*, 17, Nov./Dec., p. 8-9
12. "Spots on the Sun." Barbara Ryden, 1990, *StarDate*, 18, Jan./Feb., p. 19-20
13. "Alfonso the Wise." Barbara Ryden, 1990, *StarDate*, 18, Mar./Apr., p. 16-17
14. "Adam Schall: An Astronomer in China." Barbara Ryden, 1990, *StarDate*, 18, May/June, p. 16-17
15. "The Trials and Triumphs of Mary Somerville." Barbara Ryden, 1990, *StarDate*, 18, Sept./Oct., p. 8-9
16. "The Origin of the Telescope." Barbara Ryden, 1990, *StarDate*, 18, Nov./Dec., p. 8-9
17. "Domain Walls and Large Scale Structure." Barbara S. Ryden, 1991, in *Proceedings of the Workshop on Large-Scale Structures and Peculiar Motions in the Universe*, ed. D. W. Latham & L. N. da Costa (San Francisco: Astronomical Society of the Pacific), p. 327-31
18. "On the Intrinsic Shape of Elliptical Galaxies." B. S. Ryden, 1991, *BAAS*, 23, 1457 (abstract)
19. "The Formation and Evolution of Domain Walls." W. H. Press, B. S. Ryden, & D. N. Spergel, 1991, in *High Energy Astrophysics. American and Soviet Perspectives*, ed. W. H. G. Lewin, et al. (Washington, DC: National Academy Press), p. 322-28
20. "Cosmology, Galaxy Formation." Barbara Ryden, 1992, in *The Astronomy and Astrophysics Encyclopedia*, ed. S. P. Maran (New York: Van Nostrand Reinhold), p. 156-57
21. "The Amazing Cassinis." Barbara Ryden, 1994, *StarDate*, 22, Jan./Feb., p. 16-18
22. "Expansion of Axisymmetric Voids." Barbara S. Ryden, 1994, in *Cosmic Velocity Fields*, ed. F. R. Bouchet & M. Lachièze-Rey (Gif-sur-Yvette, France: Editions Frontières), p. 573-4 (abstract)
23. "The Cosmological Distortion of Voids in Redshift Space." B. S. Ryden, 1994, *BAAS*, 26, 1407 (abstract)
24. "Sticky Particle Simulations of Counterrotating Disk Formation." A. R. Thakar & B. S. Ryden, 1994, *BAAS*, 26, 1441 (abstract)
25. "Cosmological Distortions in Redshift Space." B. S. Ryden, 1995, *BAAS*, 27, 849 (abstract)
26. "NGC 4138 - A Smoking Gun for Counterrotating Disk Formation." A. R. Thakar, B. S. Ryden, K. P. Jore, & A. H. Broeils, 1995, *BAAS*, 27, 1442 (abstract)
27. "The Shapes of Dense Molecular Cloud Cores." B. S. Ryden, 1996, *BAAS*, 28, 886 (abstract)
28. "Captain Cook and Mister Green." Barbara Ryden, 1997, *StarDate*, 25, Mar./Apr., p. 4-9
29. "Dwarf Elliptical and Dwarf S0 Galaxies in the Virgo Cluster." Barbara S. Ryden, Donald M. Terndrup, Richard W. Pogge, & Tod R. Lauer, 1997, in *The Second*

- Stromlo Symposium: The Nature of Elliptical Galaxies*, ed. M. Arnaboldi, G. S. Da Costa, & P. Saha (San Francisco: Astronomical Society of the Pacific), p. 283-6
30. "Star-crossed Constellations." Barbara Ryden, 1997, *StarDate*, 25, Nov./Dec., p. 15-19
  31. "SPH Simulations of Counterrotating Disk Formation in Spirals." A. R. Thakar & B. S. Ryden, 1997, *BAAS*, 29, 1332 (abstract)
  32. "A Rock-Solid Case." Barbara Ryden, 1998, *StarDate*, 26, Nov./Dec., p. 4-7
  33. "The Formation of Kinematically Decoupled Bulges and Cores in Spirals." A. R. Thakar & B. S. Ryden, 1998, *BAAS*, 30, 1408 (abstract)
  34. "The Shapes of Elliptical Galaxies with Massive Dark Objects and Central Density Cusps." Barbara S. Ryden, 1999, in *Galaxy Dynamics*, ed. D. Merritt, J. A. Sellwood, & M. Valluri (San Francisco: Astronomical Society of the Pacific), p. 142-45
  35. "A Theoretical Framework for Interpreting Principal Component Analysis of the Properties of Galaxies." A. Conti, B. S. Ryden, & D. H. Weinberg, 1999, *BAAS*, 31, 1387 (abstract)
  36. "Tough Little German Sister." Barbara Ryden, 2000, *StarDate*, 28, May/June, p. 4-9
  37. "The Size and Shape of Voids in Three-Dimensional Galaxy Surveys." J. D. Schmidt, B. S. Ryden, & A. L. Melott, 2000, *BAAS*, 32, 684 (abstract)
  38. "The Age – Shape Relation for Elliptical Galaxies." B. S. Ryden, D. A. Forbes, & A. I. Terlevich, 2000, *BAAS*, 32, 717 (abstract)
  39. "The Morphological Evolution of Merger Remnants." Barbara Ryden & Jeremy Tinker, 2002, in *The Shapes of Galaxies and Their Halos*, ed. P. Natarajan (Singapore: World Scientific), p. 132-39
  40. "Evolution of Merger Remnants with Supermassive Black Holes." Jeremy Tinker & Barbara Ryden, 2003, in *Astrophysical Supercomputing Using Particle Simulations, IAU Symposium 208*, ed. J. Makino & P. Hut (San Francisco: Astronomical Society of the Pacific), p. 455-56.
  41. "Life and Work of Gerard Kuiper." Barbara Ryden, 2005, *StarDate*, 33, Nov/Dec, p. 16-19
  42. "A Planet is a Planet is a Planet...or is It?" Barbara Ryden, 2007, *StarDate*, 35, Mar/Apr, p. 4-7
  43. "Galaxy Orientation and Alignment Effects in the SDSS DR6." Robert Siverd, Barbara S. Ryden, & B. Scott Gaudi, 2009 (arXiv:0903.2264)
  44. "The Pen is Migher than the Telescope." Barbara Ryden, 2011, *StarDate*, 39, Mar/Apr, p. 4-9
  45. "Tuning in to the Radio Universe." Barbara Ryden, 2011, *StarDate*, 39, Nov/Dec, p. 16
  46. "Henrietta and the Cepheids." Barbara Ryden, 2012, *StarDate*, 40, Mar/Apr, p. 4
  47. "Book Review: The Construction of the Heavens." Barbara Ryden, 2013, *Physics in Perspective*, 15, in press
  48. "Great Walls and the Large-scale Structure of the Universe." Barbara Ryden, 2013, in *Discoveries in Modern Science: Exploration, Invention, Technology*, ed. James Trefil, in preparation



49. “Heavy Elements.” Barbara Ryden, 2013, in *Discoveries in Modern Science: Exploration, Invention, Technology*, ed. James Trefil, in preparation
50. “Big Bang.” Barbara Ryden, 2013, in *Discoveries in Modern Science: Exploration, Invention, Technology*, ed. James Trefil, in preparation

Last update: 2012 Dec 17