

CURRICULUM VITAE

- Name:** Joanna Marie Rankin
- Address:** Department of Physics, Cook Building A405,
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Telephone: 802-656-0051/656-2644
- Education:** University of Iowa, Ph.D. (Astrophysics), June 1970
Tulane University, M.S. (Physics), August 1966
Southern Methodist University, B.S., June 1965
- Citizenship:** Ireland, United States
- Positions:** Professor of Physics, University of Vermont (1988-)
Visiting Committee, Arecibo Observatory (2004-6)
Visiting Scientist, Sterrenkundig Instituut ‘Anton Pannekoek’
University of Amsterdam, Netherlands (2001, 2002, 2005, 2009)
Visiting Scientist, Raman Research Institute, Bangalore,
India (1988, 1991, 1993-97, 1999, 2001, 2004)
Associate Professor of Physics, Univ. of Vermont (1980-88)
Senior Research Associate, History Dept. and Center for
Radiophysics and Space Research, Cornell Univ. (1978-80)
Acting Head, Computer Dept., Arecibo Observatory (1975)
Assistant Professor of Astronomy, Cornell Univ (1974-78)
Scientific Staff, Arecibo Observatory, Arecibo (1970-78)
Visiting Scientist, Radiophysics Div., C.S.I.R.O., Sydney, Australia (1972)
- Pre- and Post-
doctoral
Students &
Colleagues:** Jeffrey Herfindal (Auburn); Patrick Weltevrede (Amsterdam);
Stephen Redman (Penn); Joeri van Leeuwen (Utrecht);
R. Ramachandran (Raman Research Institute, Berkeley);
Dipanjan Mitra (Raman Research Institute, MPI Radioastronomy);
Jeffrey Kern (New Mexico Tech); Mark McKinnon (New Mexico Tech),
Kyriakh Xilouris (Thessaloniki); N. Rathnasree (UVM);
Gordon Gullahorn, Daniel Stinebring & Richard Isaacman (Cornell);
John Benson, Steven Spangler, & Joel Weisberg (Iowa)
- Courses
Taught:** Astronomy 5—Introductory Astronomy (complete)
(Fall 2001-03)
Astronomy 57—History and Practice of Ancient Astronomy
(Spring 2002-04,06; Fall 2007-9)
Physics 214—Electrodynamics
(Spring 1982, 85, Fall 2000,04,-06,09)
Physics 257—Astrophysics
(Spring 1983, 96.00; Fall 1984, 86, 88, 91, 93, 95-6, 97-8, 04,06-8)
Physics 323—Physics and Philosophy

(Spring 1981)
Physics 323—Pulsar Radio Astronomy
(Spring 1996, 2003, 06)
Women's Studies 174—Women, Science and Nature
(Fall 1990, Spring 1993, 95, 96, 98, 00,02,04,07)

Research 2007-2011 National Science Foundation (AST 07-07669)
Support: 2002-5 Visitor Grant, Netherlands National Science Foundation
2001-2006 National Science Foundation (AST 00-98685)
2000-2005 National Science Foundation (AST 99-86754)
1997-2001 National Science Foundation (INT 97-00668)
1993-

Language Skills: Russian (reading and some conversation)
German (reading and some conversation)
Spanish (reading and some conversation)
Sanskrit (some reading)
French (some reading)
Latin (some reading)

LECTURES & COLLOQUIA (2001—):

Inter-University Centre for Astronomy & Astrophysics, Pune, India “Pulsar Subbeam Circulation Mapping: Touching the Physics of Pulsar Emission” (January 2001).

Sterrenkundig Instituut Utrecht, Utrecht University, Utrecht, Netherlands “Pulsar Subbeam Circulation Mapping: Touching the Physics of Pulsar Emission” (February 2001).

Kapteyn Institute, Groningen University, Groningen, Netherlands “Pulsar Subbeam Circulation Mapping: Touching the Physics of Pulsar Emission” (March 2001).

Max Planck Institut für Radioastronomie, Bonn, “Pulsar Subbeam Circulation Mapping: Touching the Physics of Pulsar Emission” (March 2001).

Netherlands Foundation for Radio Astronomy, Dwingeloo, Netherlands “Pulsar Subbeam Circulation Mapping: Touching the Physics of Pulsar Emission” (March 2001).

Astrophysics Program, Nijmegen University, Nijmegen, Netherlands “Pulsar Subbeam Circulation Mapping: Touching the Physics of Pulsar Emission” (April 2001).

Netherlands Pulsar Research Group, “Observational Methods for Understanding Pulsar Radio Emission” (three talks, June 2001).

MFO Coordination Meeting, Sterrenkundig Instituut, University of Amsterdam “Rotating Subbeam Systems & the Physics of Pulsar Emission” (May 2002).

University of Amsterdam, Sterrenkundig Instituut ‘Anton Pannekoek “Rotating Subbeam Systems, the Eur-Asian Polarimetric Observations Project & the Problem of Pulsar Emission” (June 2002).

Netherlands Foundation for Radio Astronomy, Dwingeloo, Netherlands “Rotating Subbeam Systems, the Eur-Asian Polarimetric Observations Project & the Problem of Pulsar Emission” (June 2002).

Pushchino Radio Astronomy Observatory, Pushchino, Russia “Rotating Subbeam Systems, the Eur-Asian Polarimetric Observations Project & the Problem of Pulsar Emission” (July 2002)

Astro-Space Center of the Lebedev Physical Institute of the Russian Academy of Sciences, Moscow “Rotating Subbeam Systems, the Eur-Asian Polarimetric Observations Project & the Problem of Pulsar Emission” (July 2002)

Physics Department, McGill University “Rotating Subbeam Systems & the Problem of Pulsar Emission” (October 2002).

Arecibo Observatory, Puerto Rico, “Rotating Subbeam Systems & the Problem of Pulsar Emission” (October 2002).

Astronomy Department, UC Berkeley “Rotating

Subbeam Systems & the Physics of Pulsar Emission” (September 2003).

Physics & Astronomy Department, Univ. of Iowa “Rotating Subbeam Systems & the Physics of Pulsar Emission” (November 2003).

Raman Research Institute, Bangalore, India “Rotating Subbeam Systems & the Physics of Pulsar Emission” (January 2004).

National Centre for Radio Astrophysics, Pune, India, “Pulsar Emission Dynamics: Not As Our Mothers Taught Us” (January 2007).

Raman Research Institute, Bangalore, India “Connecting Pulsar Phenomena with the Emission Physics” (January 2007).

Physics Department, University of Vermont, “Connecting Radio Pulsar Phenomena with the Emission Physics” (March 2007).

University of Amsterdam, Sterrenkundig Instituut ‘Anton Pannekoek “Connecting Radio Pulsar Phenomena with the Emission Physics” (March 2007).

Physics Department, University of Vermont, “Connecting Radio Pulsar Phenomena with the Emission Physics” (April 2007).

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(with V. N. Mansfield), *Vistas in Astronomy* **21**, 393-405 (1977).

The Crab Nebula pulsar: Six years of radio frequency arrival times (with G. E. Gullahorn, R. Isaacman and R. R. Payne), *Astronomical Journal* **82**, 309-312 (1977).

Orthogonal modes of polarization from pulsar PSR 2020+28 (with J. M. Cordes and D. C. Backer), *Astrophysical Journal* **223**, 961 (1978).

Calibration of the Arecibo Observatory six-channel, 30-MHz adding polarimeter for use at 21-cm wavelength (with J. M. Weisberg and K. Sellgren, N.A.I.C. Report **113**, Cornell Univ., Ithaca, NY (1979).

Pulsar timing results from Arecibo Observatory (with G. E. Gullahorn), *Astronomical Journal* **83**, 1219-1224 (1978).

Pulsar proper motions from timing observations (with G. E. Gullahorn), *Astrophysical Journal* **225**, 963-969 (1978).

Neutral hydrogen absorption in the spectra of four low-latitude pulsars (with J. M. Weisberg and V. Boriakoff), *Astronomy & Astrophysics* **77**, 204-209 (1979).

Statistical summaries of polarized pulsar radiation (with D. C. Backer), *Astrophysical Journal Supplement Series* **42**, 143-173 (1980).

HI absorption measurements of seven low-latitude pulsars (with J. M. Weisberg and V. Boriakoff), *Astronomy & Astrophysics* **88**, 84-93 (1980).

Irregular pulsar timing behavior (with G. E. Gullahorn), *Astrophysical Journal* **260**, 520 (1982).

Statistics of neutral hydrogen absorption toward pulsars (with J. M. Dickey, J. M. Weisberg, and V. Boriakoff), *Astronomy and Astrophysics* **101**, 332-341 (1981).

Pulsar polarization: Weak features and sources at 430 MHz (with J. M. Benson), *Astronomical Journal* **82**, 618-632 (1981).

Toward an empirical theory of pulsar emission: I. morphological taxonomy *Astrophysical Journal* **274**, 333-358 (1983).

Toward an empirical theory of pulsar emission: II. on the spectral behavior of component width *Astrophysical Journal* **274**, 359-368 (1983).

Pulsar polarization fluctuations I. 1404-MHz statistical summaries (with D. R. Stinebring, J. M. Cordes, J. M. Weisberg, and V. Boriakoff) *Astrophysical Journal Supplement Series* **55**, 247-277 (1984).

Pulsar polarization fluctuations II. 800-MHz statistical summaries (with D. R. Stinebring, J. M.

Cordes, J. M. Weisberg, and V. Boriakoff) *Astrophysical Journal Suppl. Ser.* **55**, 279-288 (1984).

Null transition times, quantized drift modes, and no memory across nulls for PSR 1944+17 (with W. T. S. Deich, J. M. Cordes, and T. H. Hankins) *Astrophysical Journal* **300**, 540-550 (1986).

Toward an empirical theory of pulsar emission: III. mode changing, drifting subpulses, and nulling *Astrophysical Journal* **301**, 901 (1986).

On the spindown of pulsar 0656+14 (with D. Domingue, J. M. Weisberg, and P. R. Backus) *Astronomy & Astrophysics* **161**, 303 (1986).

Mode changing and quasi-periodic modulation in pulsar 1737+13, a bright, five-component pulsar (with A. Wolszczan, and D. R. Stinebring) *Astrophysical Journal* **324**, 1048-55 (1988).

On the polarization-modal construction of triplicity in pulsar 1604 00 *Astrophysical Journal* **325**, 314-319 (1988).

Neutral hydrogen absorption measurements for ten pulsars and the electron density in the galactic plane (with J. M. Weisberg and V. Boriakoff) *Astronomy & Astrophysics* **186**, 307 (1988).

The Crab Nebula: Secular variations in the Faraday rotation of the pulsar and the great 1974-75

Society **370**, 673 (2006).

Is pulsar B0656+14 a very nearby RRAT source? (with P. Weltevrede, B. W. Stappers & G. A. E. Wright) *Astrophysical Journal* **645**, L149 (2006).

The bright spiky emission of pulsar B0656+14 (with P. Weltevrede, B. W. Stappers & G. A. E. Wright) *Astronomy & Astrophysics* **459**, 597 (2006).

A model for double notches and bifurcated components in radio profiles of pulsars and magnetars; evidence for the parallel acceleration maser in the pulsar magnetosphere (with J. Dyks & B. Rudak) *Astronomy & Astrophysics* **465**, 981 (2007).

Further evidence for alignment of the rotation and velocity vectors in pulsars *Astrophysical Journal* **664**, 443 (2007).

Absolute broadband polarization behaviour of PSR B0329+54: A glimpse of the core emission process (with D. Mitra & Y. Gupta) *Monthly Notices of the Royal Astronomical Society* **379**, 932 (2007).

Interaction between nulls and emission in pulsar B0834+06 (with G.A.E. Wright) *Monthly Notices of the Royal Astronomical Society* **379**, 507 (2007).

Periodic Nulls in Pulsar B1133+16 (with J. L. Herfindal) *Monthly Notices of the Royal Astronomical Society* **380**, 430 (2007).

On the Subpulse Modulation, Polarization and Subbeam Carousel Configuration of Pulsar B1857—26 (with D. Mitra) *Monthly Notices of the Royal Astronomical Society* **385**, 606 (2008).

On the 'periodic nulls' of pulsar J1819+1305: a subbeam carousel in which most of the beamlets are missing (with G.A.E. Wright) *Monthly Notices of the Royal Astronomical Society* **385**, 1923 (2008).

Deep analyses of nulling in Arecibo pulsars reveal further periodic behavior (with Jeffrey Herfindal) *Monthly Notices of the Royal Astronomical Society* **393**, 1391 (2009).

Random and non-random pulsar nulling (with S. R. Redman) *Monthly Notices of the Royal Astronomical Society* **395**, 1529 (2009).

Topology and polarisation of subbeams associated with pulsar B0943+10's 'drifting'-subpulse emission: V. A new look at the low frequency 'B'urst-mode emission (with S. A. Suleymanova) *Monthly Notices of the Royal Astronomical Society* **396**, 870 (2009).

Arecibo multi-frequency time-aligned pulsar average-profiles and polarization database *Astronomical Journal* (with T. H. Hankins) **139**, 168 (2010).

The beam topology and dynamic emission prop-

erties of pulsar B0943+10 — VI. Discovery of a 'Q'-mode precursor and comparison with pulsar B1822-09 (with Isaac Backus and Dipanjan Mitra) *Monthly Notices of the Royal Astronomical Society* (in press, accepted, 3/10).

Subpulse modulation, moding and nulling of the five-component pulsar B1737+13 (with Megan Force) *Monthly Notices of the Royal Astronomical Society* (submitted, in revision, 3/10).

On the nulls, modes and interpulse emission of radio pulsar B1944+17 (with Isabel M. Kloumann) *Monthly Notices of the Royal Astronomical Society*

103 (August 1970).

Time variability of the dispersion measure of the Crab Nebula pulsar (with J. A. Roberts) *Proceedings, I.A.U. Symposium No. 46, Jodrell Bank*, p. 114 (August 1970).

On the case for magnetic field line sweep-back in pulsars 0950+08 and 1133+16 (with T. H. Hankins, V. A. Izvekova, V. M. Malofeev, Yu. P. Shitov, and D. R. Stinebring), *The Magnetospheric Structure and Emission Mechanisms of Radio Pulsars (IAU Colloquium #128)*, Lagów, Poland (June 1990), Pedagogical University of Zielona Gora Press, 1992.

An empirical theory of pulsar emission, *The Magnetospheric Structure and Emission Mechanisms of Radio Pulsars (IAU Colloquium #128)*, Lagów, Poland (June 1990), Pedagogical University of Zielona Gora Press, 1992.

The importance of the class of pulsars with five profile components, *The Magnetospheric Structure and Emission Mechanisms of Radio Pulsars (IAU Colloquium #128)*, Lagów, Poland (June 1990), Pedagogical University of Zielona Gora Press, 1992.

Two notable cases of conal profile evolution, observed over a seven octave frequency range (with T. H. Hankins, D. R. Stinebring, and M. M. McKinnon), *The Magnetospheric Structure and Emission Mechanisms of Radio Pulsars (IAU Colloquium #128)*, Lagów, Poland (June 1990), Pedagogical University of Zielona Gora Press, 1992.

On the separation of components in the mean profile of PSR 1451-68 (with X. Wu and W. Xu), *The Magnetospheric Structure and Emission Mechanisms of Radio Pulsars (IAU Colloquium #128)*, Lagów, Poland (June 1990), Pedagogical University of Zielona Gora Press, 1992.

Polarimetric observations of 20 weak pulsars at 1720 MHz (with K. Xilouris, J. Seiradakis, and W. Seiber), *The Magnetospheric Structure and Emission Mechanisms of Radio Pulsars (IAU Colloquium #128)*, Lagów, Poland (June 1990), Pedagogical Univ. of Zielona Gora Press, 1992.

Why do the two fastest millisecond pulsars have strange profiles?, *The Magnetospheric Structure and Emission Mechanisms of Radio Pulsars (IAU Colloquium #128)*, Lagów, Poland (June 1990).

Chaos and strange attractors in pulsar intensity records (with R. W. Romani, and D. C. Backer), *The Magnetospheric Structure and Emission Mechanisms of Radio Pulsars (IAU Colloquium #128)*, Lagów, Poland (June 1990), Pedagogical Univ. of Zielona Gora Press, 1992.

Recent dual-frequency observations of pulsar microstructure from the Arecibo Observatory (with D. R. Stinebring, S. E. Thorsett, J. M. Klein, and T.

H. Hankins), *The Magnetospheric Structure and Emission Mechanisms of Radio Pulsars (IAU Colloquium #128)*, Lagów, Poland (June 1990), Pedagogical University of Zielona Gora Press, 1992.

An empirical theory of pulsar emission, NATO Advanced Study Institute "Neutron Stars: An Interdisciplinary Field", Agia Pelagia, Crete, Greece, p. 349 (September 1990), Kluwer Academic Publ., 1991.

An empirical theory of pulsar emission, Texas/European Southern Observatory-CERN Conference on Relativistic Astrophysics, Brighton, UK, p. 619 (December 1990), New York Academy of Sciences, New York, 1992.

On the approach to stability of pulsar average profiles (with N. Rathnasree), Discussion Meeting on Pulsars, Raman Research Institute, Bangalore (March 1994), Indian Academy of Sciences, 1995.

Properties of individual and integrated pulses drawn into mode changing phenomenon (with S. A. Suleymanova and V. A. Izvekova), *Pulsars: Problems & Progress (IAU Colloquium #160)*, Sydney, Australia, p. 223 (January 1996), Astronomical Society of the Pacific, San Francisco, 1996.

Geometry of emission in PSR 1929+10 (with N. Rathnasree), *Pulsars: Problems & Progress (IAU Colloquium #160)*, Sydney, Australia, p. 227 (January 1996), Astronomical Society of the Pacific, San Francisco, 1996.

Pulsar polarization, emission and beaming, *Pulsars: Problems & Progress (IAU Colloquium #160)*, Sydney, Australia, p. 237 (January 1996), Astronomical Society of the Pacific, San Francisco, 1996.

A study of the polarisation modes in B0823+26 (with N. Rathnasree), *Pulsars: Problems & Progress (IAU Colloquium #160)*, Sydney, Australia, p. 263 (January 1996), Astronomical Society of the Pacific, San Francisco, 1996.

On the polarisation of high intensity pulses in radio pulsars (with N. Rathnasree), *Pulsars: Problems & Progress (IAU Colloquium #160)*, Sydney, Australia, p. 265 (January 1996), Astronomical Society of the Pacific, San Francisco, 1996.

Polar-fluxtube emission "weather" of pulsar 0943+10: polarisation, modes, & theoretical implications (with A. A. Deshpande) *Pulsar Astronomy—2000 and Beyond (IAU Colloquium #177)*, Bonn, Germany, p. 155 (January 2000), Astronomical Society of the Pacific, San Francisco, 2000.

Single-pulse polarimetry of the Vela pulsar (with J. S. Kern & T. H. Hankins) *Pulsar Astronomy—2000 and Beyond (IAU Colloquium #177)*, Bonn, Germany, p. 257 (January 2000), Astronomical Society of the Pacific, San Francisco, 2000.

Pulse-Sequence Cartography of Conal Single Pulsars (with A. A. Deshpande) *Pulsar Astronomy*

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Department of Psychology, University of Vermont, Burlington, "First-Strike Weapons: Technology and Strategies" (February 1984).

University Honors Series, University of Maine, Presque Isle, "Weapons and Technology: Development and Implications of the New Nuclear Arms Race" (February 1984).

"Military Shadow Hovers Over Our Space Program" (Op-Ed piece) Burlington Free Press (March 18, 1984).

"A Costly Error in Space" (Op-Ed piece) Sunday -