

Curriculum vitae of R. Carey Woodward, Jr.

Personal

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Education

Degree	Year	Institution	Major	Minor
Ph.D.	1992	University of Wisconsin–Madison	Physics	Distributed (Astronomy, Mathematics, and Computer Science)
B.S.	1984	Yale University	Physics	—

Experience

06/2020–present *Department Chair* of the Department of Physics and Astronomy at the University of Wisconsin Oshkosh. Managed curriculum, staff (six ranked faculty and two support staff), facilities (classrooms and teaching laboratories), and budgets.

08/2006–present (academic years) *Professor* at University of Wisconsin Oshkosh, Fond du Lac campus. [Associate Professor prior to 08/2022. UW—Fond du Lac prior to 07/2018. Assistant Professor prior to 08/2012.] Developed curriculum for and taught introductory physics (algebra- and calculus-based, with lab), modern physics, physics for non-majors, and introductory astronomy (lecture and lab). Designed lab exercises for lab courses, and several innovative hands-on projects for non-lab courses. Developed and taught enrichment classes for K-12 students. Advised physics, astronomy, computer science, and engineering students. Served on numerous committees; chaired seven, including campus Steering and department Executive. Fielded astronomical questions from public. Organized and conducted public events, including a viewing of the transit of Venus. Gave talks on teaching innovations at regional and national conferences.

06/2013–08/2018 (summers) *Associate Professor L/I* at University of Wisconsin—Madison. Developed software tools for the analysis of high-spectral-resolution astronomical and atmospheric data. Developed correction for tropospheric scattering in geocoronal air-glow (Balmer- α and [O I] 6300Å) spectra.

06/2015–06/2018 *Department Chair* of the Department of Computer Science, Engineering, Physics, and Astronomy at the University of Wisconsin Colleges. Supervised 16 ranked faculty and approximately 25 contingent faculty throughout the 13 two-year campuses of the University of Wisconsin. Oversaw and revised curricula for all of the four aforementioned disciplines. Managed operating and professional development budgets for the department.

- 08/2003–08/2006 *Lecturer* at University of Wisconsin Colleges—Fox Valley. Taught calculus-based introductory physics (with lab), two one-semester introductory physics classes (one general with modern emphasis, one for nursing students), physical science (with lab), introductory astronomy, and engineering dynamics. Taught grade-school level astronomy and physics at Grandparent’s University (a UW—Fox Valley summer outreach program). Advised and helped found the Fox Valley Physics Club. Participated in faculty governance, including collegium and colloquium planning committee. Supervised student in an independent study of the use of labs and demos in middle school physical science classes.
- 06/2003–08/2003 *Lecturer* at University of Wisconsin—Madison. Taught algebra-based introductory physics (with lab); supervised two teaching assistants.
- 08/2002–05/2003 *Instructor* at Madison Area Technical College. Taught introductory physics (algebra- and calculus-based, with lab).
- 08/2002–12/2002 *Instructor* at Edgewood College (sabbatical leave replacement). Taught introductory physics (algebra- and calculus-based) in nontraditional format of combined lecture/lab/computer-exercise classes; designed curriculum for same, including laboratory exercises.
- 09/1995–08/2002 *Assistant Scientist* at University of Wisconsin—Madison. Acquired, analyzed, and published CCD images of [S II] 6731Å emission from the Io Plasma Torus through a modest (36") groundbased telescope. Assisted acquisition and reduction of ground-based high-resolution [O I] 6300Å emission spectra from Io, and oversaw undergraduate and graduate students’s work on the same. Reduced, analyzed, and published far ultraviolet spectrally resolved images of Jupiter’s moon Io from the Space Telescope Imaging Spectrograph of the Hubble Space Telescope. Wrote numerous data reduction and system administration tools. Administered several PCs and Digital computers and the network connecting them. Informally instructed colleagues in numerous computer-related topics.
- 07/1993–05/1997,
10/1992–03/1993 *Consulting Scientist* to Atmospheric & Environmental Research, Inc. Planned, developed software for, and produced a scientific visualization of modelled behavior of sodium and potassium atoms on Mercury. Constructed richly-featured semi-empirical model of the Jupiter plasma torus on the same platform.
- 03/1992–08/1992 *Research Associate* at the University of Wisconsin—Madison. Specified and expedited purchase of astronomical CCD camera and microcomputer control system. Developed data acquisition and analysis software for this and an existing CCD system. Diagnosed and repaired computer-controlled siderostat in the field.
- 01/1988–03/1992 *Research Assistant* at University of Wisconsin—Madison. Conducted thesis research under Dr. Frank Scherb: instrument design, observation, analysis, and publication for ground-based observing program of visible-wavelength $S^{+,++}$ emissions from the Jupiter-Io plasma torus, using Fabry-Perot interferometers.
- 06/1983–07/1983 *Teacher* at the Ulysses S. Grant Foundation (a summer school for talented and gifted inner city high school students) of Yale University. Developed curriculum for and taught math and computer science to grades 9–12.

Awards

- 2018–19 Wisconsin Teaching Scholar (UW System Office of Professional and Instructional Development)
2017–18 Arthur M. Kaplan Award for Teaching and Service
2016–17 Arthur M. Kaplan Award for Teaching and Service
2015–16 Arthur M. Kaplan Award for Teaching and Service

Offices

- 2011–date Two-Year College Representative of the Wisconsin Association of Physics Teachers

Memberships

- American Association of Physics Teachers
American Astronomical Society (Division for Planetary Sciences)
American Geophysical Union
Wisconsin Association of Physics Teachers

Refereed publications and presentations

- WOODWARD, R. C.. “Hands-On Physics Labs in a Hands-Off Era.” *OPID (University of Wisconsin System) Spring Conference*, April 2021.
- NOSSAL, S. M., E. J. MIERKIEWICZ, F. L. ROESLER, R. C. WOODWARD, D. D. GARDNER, AND L. M. HAFFNER. “Geocoronal hydrogen emission variations over two solar cycles.” *J. Geophys. Res.*, **124**, 12, 2019. doi: 10.1029/2019JA026903
- NOSSAL, S. M., E. J. MIERKIEWICZ, F. L. ROESLER, L. M. HAFFNER, R. J. REYNOLDS, AND R. C. WOODWARD. “Geocoronal hydrogen observations spanning three solar minima.” *J. Geophys. Res.*, **113**, A11307, 2008. doi:10.1029/2008JA013380.
- OLIVERSEN, R. J., F. SCHERB, W. H. SMITH, M. E. FREED, R. C. WOODWARD, JR., M. L. MARCONI, K. D. RETHERFORD, O. L. LUPIE, AND J. P. MORGENTHALER. “Sunlit Io atmospheric [O I] 63000Å emission and plasma torus.” *J. Geophys. Res.*, **106**, 26183–26193, 2001.
- FELDMAN, P. D., D. F. STROBEL, H. W. MOOS, K. D. RETHERFORD, B. C. WOLVEN, M. A. McGRATH, F. L. ROESLER, R. C. WOODWARD, JR., R. J. OLIVERSEN, AND G. E. BALLESTER. “Lyman- α imaging of the SO₂ distribution on Io.” *Geophys. Res. Lett.*, **27**, 1787, 2000.
- ROESLER, F. L., H. W. MOOS, R. J. OLIVERSEN, R. C. WOODWARD, JR.,* K. D. RETHERFORD, F. SCHERB, M. A. McGRATH, W. H. SMYTH, P. D. FELDMAN, AND D. F. STROBEL. “Far-ultraviolet imaging spectroscopy of Io’s atmosphere with HST/STIS.” *Science*, **283**, 353–357, 1999.
- WOODWARD, JR., R. C., F. SCHERB, AND F. L. ROESLER. “Variations in optical S⁺ emission from the Io plasma torus: Evidence for quasiperiodicity.” *Astrophys. J.*, **479**, 984–991, 1997.
- WOODWARD, JR., R. C., F. SCHERB, F. L. ROESLER, AND R. J. OLIVERSEN. “Periodic intensity variations in sulfur emissions from the Io plasma torus.” *Icarus*, **111**, 45–64, 1994.

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Other professional works

- WOODWARD, ROLAND C. “Blended lab teams: From pandemic ‘hack’ to online innovation” Presented at the *American Association of Physics Teachers* summer meeting, Grand Rapids, MI, July 2022. doi: 10.48448/zvvv-ye71.
- NOSSAL, SUSAN L., E. MIERKIEWICZ, L. QIAN, J. MCINERNEY, R. WOODWARD, M. HAFFNER, S. SOLOMON, H. LIU, A. RANABHAT, AND O. BARR. “Influences of Natural Variability and Anthropogenic Change on Thermospheric Hydrogen.” Talk at the fall meeting of the *American Geophysical Union*, hybrid, December 2021.
- NOSSAL, SUSAN L., E. MIERKIEWICZ, L. QIAN, R. WOODWARD, M. HAFFNER, S. SOLOMON, J. MCINERNEY, H. LIU, D. GARDNER, A. RANABHAT, AND N. ABYAZANI. “Multidecadal Variability of Upper Atmospheric Hydrogen.” Poster at the fall meeting of the *American Geophysical Union*, virtual, December 2020.
- WOODWARD, ROLAND C. “Could less be more in the introductory physics lab?” Presented as a talk at the *American Association of Physics Teachers* winter meeting, Houston, TX, January 2019; as a poster at the *UW System OPID spring conference*, Madison, WI, April 2019; and as a poster at the *Physics Teachers Education Coalition (PhysTEC)* annual conference, Boulder, CO, February 2020.
- NOSSAL, SUSAN L., E. MIERKIEWICZ, F. ROESSLER, R. WOODWARD, D. GARDNER, M. HAFFNER, AND A. RANABHAT. “Geocoronal hydrogen emission observations during different solar periods.” Poster at the fall meeting of the *American Geophysical Union*, New Orleans, LA, December 2018.
- WOODWARD, ROLAND C. “Free-fall acceleration lab.” Workshop led at the *Wisconsin Association of Physics Teachers* annual meeting, Whitewater, WI, October 2018.
- WOODWARD, ROLAND C. “An inexpensive lab timer that enhances student learning” Presented at the *American Association of Physics Teachers* winter meeting, San Diego, CA, January 2018.
- NOSSAL, SUSAN L., E. MIERKIEWICZ, F. ROESSLER, R. WOODWARD, D. GARDNER, AND L. HAFFNER. “Observed Increase in Geocoronal Hydrogen Emissions.” Presented at the *Coupling, Energetics and Dynamics of Atmospheric Regions* annual conference, Keystone, CO, June 2017.
- MORGENTHALER, JEFFREY P., MAX MARCONI, RONALD J. OLIVERSEN, AND ROLAND C. WOODWARD. “Radial transport from the Io plasma torus: driven from the inside out or outside in?” Presented at the *American Geophysical Union* fall meeting, San Francisco, CA, December 2016.
- WOODWARD, ROLAND C. “Hacking the Pasco Power Brick for Direct Analog Measurements.” Presented at the *American Association of Physics Teachers* summer meeting, Sacramento, CA, July 2016.
- NOSSAL, SUSAN L., E. MIERKIEWICZ, F. ROESSLER, R. WOODWARD, D. GARDNER, AND L. HAFFNER. “Observed increase in the Wisconsin Northern hemisphere hydrogen emission data set.” Presented at the *Coupling, Energetics and Dynamics of Atmospheric Regions* annual conference, Santa Fe, NM, June 2016.
- NOSSAL, SUSAN L., L. QIAN, S. SOLOMON, A. BURNS, W WANG, E. MIERKIEWICZ, F. ROESSLER, AND R. WOODWARD. “Response of Thermospheric Hydrogen to Solar Variability and Greenhouse Gases.” Invited talk at the fall meeting of the *American Geophysical Union*, San Francisco, CA, December 2015.
- WOODWARD, ROLAND C. “‘But what good is it?’ The 3-D printer in the physics and astronomy classroom.” Presented at the annual meeting of the *Wisconsin Association of Physics Teachers*, La Crosse, WI, October 2015.

- MORGENTHALER, JEFFREY P., MAX MARCONI, CAREY WOODWARD, MARK THOMPSON, AND RONALD J. OLIVERSEN. “Using Io as a plasma probe: Statistical comparison of the Oliverson et al. (2001) plasma torus model to the Io [OI] 6300 Å dataset.” Presented at the annual *Magnetospheres of the Outer Planets* conference, Atlanta, June 2015.
- MORGENTHALER, JEFFREY P., RONALD J. OLIVERSEN, MAX MARCONI, AND CAREY WOODWARD. “The Io Plasma Torus: Motivation for Abandoning the ‘Active Sector’ Concept in favor of System IV Modulation.” Presented at the *American Geophysical Union* fall meeting, San Francisco, CA, December 2014.
- NOSSAL, SUSAN, L. QIAN, S. SOLOMON, W WANG, A. BURNS, E. J. MIERKIEWICZ, F. L. ROESSLER, AND ROLAND WOODWARD. “Thermospheric Hydrogen Response to Increases in Greenhouse Gases’ Presented at the *Coupling, Energetics and Dynamics of Atmospheric Regions* annual conference, Seattle, WA, June 2014.
- WOODWARD, JR., R. C. “A Sunspot Tracking Project for Introductory Astronomy.” Presented at *Wisconsin Association of Physics Teachers* annual conference, UW—Eau Claire, October 2013.
- MORGENTHALER, J. P., N. SCHNEIDER, M. MENDILLO, J. BAUMGARDNER, R. OLIVERSEN, C. WOODWARD, D. POTTER, M. YONEDA, S. HESS, M. MARCONI, AND C. PETERSON. “The Io I/O Concept: Synoptic Monitoring of Io’s Volcanic Output and the System IV Periodicity.” Presented at the *Magnetospheres of the Outer Planets* conference, Athens, Greece, July 2013.
- WOODWARD, JR., R. C. “A Collaborative Variable Star Observing Project for Introductory Astronomy.” Presented at the *Wisconsin Association of Physics Teachers* annual meeting, Stevens Point, WI, 2011.
- NOSSAL, S. M., E. J. MIERKIEWICZ, F. L. ROESLER, AND R. C. WOODWARD. “Observed and Modeled Solar Cyclic Variation in Geocoronal Hydrogen using NRLMSISE-00 Thermospheric Conditions and the Bishop Analytic Exospheric Model.” Presented at the *Coupled Energetics and Dynamics of Atmospheric Regios (CEDAR)* annual meeting, 2011.
- WOODWARD, JR., R. C. “A Video Analysis of Projectile Motion... Without Fancy Equipment.” Presented at the *American Association of Physics Teachers* summer meeting, Ann Arbor, MI, 2009.
- WOODWARD, JR., R. C., F. L. ROESLER, R. J. OLIVERSEN, F. SCHERB, AND H. W. MOOS. “Persistence and variability of large-scale longitudinal structure in the Io plasma torus.” *Bull. Am. Astron. Soc.*, **33**, 1065, 2001.
- WOODWARD, JR., R. C., F. L. ROESLER, R. J. OLIVERSEN, W. H. SMYTH, F. SCHERB, AND H. W. MOOS. “Simultaneous HST/STIS and groundbased observations of sulfur in the Io plasma torus.” *Eos*, **81**, S290–S291, 2000.
- WOODWARD, JR., R. C. *The Sulfur Emission and Periodicity of the Jupiter Plasma Torus in 1988*. PhD thesis, University of Wisconsin—Madison, 1992.