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## CURRICULUM VITAE

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### PERSONAL

Born: 1948 July 24, Fall River, Massachusetts, USA

### EDUCATION

1970 Brown University, Sc.B., Physics (with honors, *cum laude*)  
1975 California Institute of Technology, Ph.D., Planetary Science

### PROFESSIONAL EXPERIENCE

Research Assistant, Caltech (June 1970 – January 1975)  
Associate Scientist, Caltech (January 1975 – April 1975)  
Resident Research Associate (NASA-NRC), Jet Propulsion Laboratory (1975-1977)  
Contractor, Trend Western Technical Corporation at JPL (May 1977 – Sept 1977)  
Jet Propulsion Laboratory, Caltech (September 1970 – present)  
    Senior Scientist (September 1977- September 1979)  
    Member of the Technical Staff (October 1979 – June 1995)  
    Senior Research Scientist / Principal Scientist (June 1995 – present)

Co-Investigator, Pioneer Saturn Infrared Radiometer  
Interdisciplinary Scientist, Galileo Project  
Co-Investigator, Galileo Photometer-Polarimeter-Radiometer  
Co-Investigator, Galileo Probe Nephelometer  
Co-Investigator, Galileo Probe Net Flux Radiometer Experiment  
Chair (acting), Galileo Remote Sensing, Atmospheres Working Group (1992-2002)  
Associate Astronomer, Infrared Space Observatory Long-Wavelength Spectrometer  
    (European Space Agency)  
Co-Investigator, Cassini Composite Infrared Spectrometer  
Co-Investigator, Juno mission  
Associate Astronomer, SPIRE experiment, Herschel Space Telescope (European Space  
    Agency)  
Co-Investigator, Herschel Space Telescope Key Project “Water and Related Chemistry in the  
Solar System”

Study Scientist, Pre-Phase A Saturn Orbiter / Dual Probe Mission Study (1977-1980)  
Study Scientist, Pre-Phase A Outer Planets Advanced Missions Study (1980-1981)  
Associate Editor, *Icarus* (1980-1982); Editorial Board Member, *Icarus* 1982-1985)  
Study Scientist, Mariner Mark II Missions Study (1981-1982, 1983-1985)

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Telescope Allocation Committee, NASA Infrared Telescope Facility (1981-1982; 1989-1990)  
Member, NASA Planetary Atmospheres Management Operations Working Group (1986-1990)  
Chair, NASA Infrared Telescope Facility Shoemaker-Levy 9 Science Team (1994)  
Member, Herschel Calibration Subgroup, European Space Agency  
Member, NASA Jupiter System Observer Science Definition Team (2007)

NASA Research and Analysis sponsored research

Principal Investigator:

Outer Planet Atmospheric Structure (1979-1984, 1991-1997, 1999-present)  
Continuum Infrared Spectroscopy (1979-1995)  
Remote Sensing of Cloudy Atmospheres (1980-1990)  
Atmospheric Structures of Jupiter and Saturn (1981-2001)  
Infrared Observations of Planetary Atmospheres (1983-1999)  
Atmospheric Thermal Structure of Uranus (1987-1990)  
Atmospheric Structure and Dynamics of Neptune (1991-1993)  
Infrared Observations of the Impact of Comet Shoemaker-Levy 9 on Jupiter (1994)  
Infrared Observations of Jupiter to Support the Galileo Mission (1995-1997, 1998-2000)  
Analysis of ISO Long-Wavelength Spectrometer Observations of the Outer Planets  
(2000-2003)  
Temperature and Tracer Maps of Jupiter's Merging White Ovals (2003-2006)  
Infrared Observations of Saturn and Titan to Support the Cassini Atmospheric  
Investigation of Saturn and Titan (2006-2008)  
Spatially Resolved Models of Uranus and Neptune (2007-2009)  
Infrared Observations of Saturn to Support the Cassini Atmospheric Investigation  
(2010-2012)

Co-Investigator:

Outer Planet Cloud Structure (1982-1984)  
Outer Planet Atmospheric Structure (1984-1991)  
Oscillations in Jupiter's Equatorial Atmosphere (2006-2008)  
Spatially Resolved Infrared Observations of Uranus and Neptune (2009-2011)

NASA Space Telescope Science Institute sponsored research:

Photometry of Galileo-Observed Features (1999-2002), PI  
Merger of a 60-Year Old White Oval (2000-2003), Co-I  
Observations of Jupiter's Oval BA (2007-2008), Co-I

NASA Spitzer Space Telescope sponsored research:

Observations of Uranus and Neptune (Cycle 1) (2005-2007)  
Observations of Neptune (Cycle 2) (2006-2008)  
Observations of Uranus at Equinox (Co-I) (Cycle-4 Discretionary Time) (2007-2008)

NASA/ESA Herschel Space Telescope:

Associate Member: Key Project Guaranteed Time: Water and Related Chemistry in the  
Solar System

NASA SOFIA (airborne astronomical observatory)  
Basic Science: Radiometry of Uranus and Neptune with FORCAST

Advisor to NASA/National Research Council Resident Research Associates  
Kevin H. Baines (1982-1984)  
A. James Friedson (19896-1988)  
Brendan M. Fisher (1996-1998)  
Paul Parrish (2004-2005)

Advisor to NASA Postdoctoral Program (NPP) Fellows  
Paul Parrish (2005-2006)  
Leigh Fletcher (2008-2010)

Advisor to Spanish Government-Sponsored Postdoctoral Associate  
Jose Luis Ortiz (1995-1996)

Program Scientist, Student Independent Research Internship (SIRI) Program at JPL  
(2007-present)  
Member, Caltech Summer Undergraduate Research Fellowship (SURF) Administrative  
Committee (2009-2011)

Member, JPL Center for Exoplanet Science Advisory Group (CESAG)

#### HONORS, AWARDS

Eagle Rank, Boy Scouts of America (1963)  
American Baptist Churches Scholar (1966 – 1970)  
International Ladies Garment Workers Union Scholar (1966 – 1967)  
Member, Society of the Sigma Xi, Scientific Research Society of North America (1970-present)  
California State Graduate Fellow (1975-1976)  
NASA Group Achievement Award, Project Galileo Team (1996)  
NASA Group Achievement Award, Galileo Nephelometer Experiment (1996)  
NASA Group Achievement Award, Galileo Net Flux Radiometer Experiment (1996)  
NASA Medal for Exceptional Scientific Achievement (1997)

#### PROFESSIONAL SOCIETIES

American Astronomical Society (1976-present)  
American Astronomical Society Division for Planetary Sciences (1976-present)  
Nominating Committee (1977-1980)  
Executive Committee (1985-1988)  
Prize Committee (1992-1995)  
International Astronomical Union, commissions 14, 16 (1979-present)  
American Geophysical Union (1997-present)  
European Geophysical Union (2000-present)  
Co-Convener, Outer-Planets Sessions (2009-present)

PUBLICATIONS (Peer-Reviewed Contributed or Review Articles)

- G. L. Berge, D. O. Muhleman and G. S. Orton. 1972. High resolution interferometric observations of Venus at three radio wavelengths. *Icarus* **17**, 675 - 681.
- D. O. Muhleman, G. L. Berge and G. S. Orton. 1973. The brightness temperature of Venus and the absolute flux density scale at 608 MHz. *Astrophys. J.* **183**, 1081 - 1085.
- A. P. Ingersoll and G. S. Orton. 1974. Lateral inhomogeneities in the Venus atmosphere: Analysis of 8 - 14 micron thermal maps. *Icarus* **21**, 121 - 128.
- F. C. Gillett and G. S. Orton. 1975. Center-to-limb observations of Saturn in the thermal infrared. *Astrophys. J.* **195**, L47 - L49.
- A. P. Ingersoll, G. Munch, G. Neugebauer, D. Diner, G. S. Orton, B. Schupler, M. Schroeder, S. C. Chase, R. D. Ruiz and, L. M. Trafton. 1975. Pioneer 11 Infrared Radiometer experiment: The global heat balance of Jupiter. *Science* **188**, 472 - 473.
- G. S. Orton. 1975. Spatially-resolved absolute spectral reflectivity of Jupiter: 3390--8400 Angstroms. *Icarus* **26**, 159 - 174.
- G. S. Orton. 1975. The thermal structure of Jupiter: I. Implications of Pioneer 10 Infrared Radiometer data. *Icarus* **26**, 125 - 141.
- G. S. Orton. 1975. The thermal structure of Jupiter: II. Observations and analysis of 8-14 micron radiation. *Icarus* **26**, 142 - 158.
- A. P. Ingersoll, G. Munch, G. Neugebauer and G. S. Orton. 1976. Results of Infrared Radiometer experiment on Pioneers 10 and 11. In *Jupiter* (T. Gehrels, ed.), Univ. of Arizona Press, Tucson, 197-205.
- G. S. Orton and A.P. Ingersoll. 1976. Pioneer 10 and 11 and ground-based infrared data on Jupiter: The thermal structure and He/H<sub>2</sub> ratio. In *Jupiter* (T. Gehrels, ed.), Univ. of Arizona Press, Tucson, 206-215.
- H. H. Aumann and G. S. Orton. 1976. Jupiter's spectrum between 12 and 25 micrometers. *Science* **194**, 107-109.
- G. S. Orton. 1977. The atmosphere of Jupiter from earth based and spacecraft observations in the thermal infrared. In *Space Research*, Vol. 17. Proceedings of the XIX-th Plenary Meeting of COSPAR, Philadelphia (June 1976), Pergamon Press, London, 711-718.
- G. S. Orton. 1977. Recovery of the mean Jovian temperature structure from inversion of spectrally resolved thermal radiance data. *Icarus* **23**, 41-57.
- G. S. Orton and H.H. Aumann. 1977. The abundance of C<sub>2</sub>H<sub>2</sub> in the atmosphere of Jupiter. *Icarus* **32**, 341-346.
- G. S. Orton and R. J. Terrile. 1978. Multiple frequency sounding of a Jovian cloud. *Icarus* **35**, 297-307.
- H. H. Aumann and G. S. Orton. 1979. The 12- to 20-micron spectrum of Venus: Implications for temperature and cloud structure. *Icarus* **38**, 251-266.
- D. O. Muhleman, G. S. Orton, G. L. Berge. 1979. A model of the Venus atmosphere from radio, radar and occultation observations. *Astrophys. J.* **234**, 733-745.
- A. P. Ingersoll, G. S. Orton, G. Munch, G. Neugebauer and S. C. Chase. 1980. Pioneer Saturn Infrared Radiometer: Preliminary results. *Science* **207**, 439-443.
- W. M. Sinton, W. W. Macy and G. S. Orton. 1980. Infrared scans of Jupiter. *Icarus* **42**, 86-92.
- W. M. Sinton, W. W. Macy, J. Good and G. S. Orton. 1980. Infrared scans of Saturn. *Icarus* **42**, 251-256.

- G. S. Orton and A. G. Robiette. 1980. A line parameter list for the  $\nu_2$  and  $\nu_4$  bands of  $^{12}\text{CH}_4$  and  $^{13}\text{CH}_4$ , expanded to  $J' = 25$  and its application to planetary atmospheres. *J. Quant. Spectrosc. Radiative. Transf.* **24**, 81-95.
- G. S. Orton and A. P. Ingersoll. 1980. Saturn atmospheric temperature structure and heat budget. *J. Geophys. Res.* **85**, 5871-5881.
- G. S. Orton, A. P. Ingersoll, L. Froidevaux, G. Neugebauer, G. Munch and S. C. Chase. 1981. Scientific results from the Pioneer Saturn Infrared Radiometer. Proceedings of the XIIIrd Plenary Meeting of COSPAR, Budapest (June 1980), *Adv. Space Res.* **1**, 179-182.
- G. S. Orton. 1981. Atmospheric structure of the outer planets from thermal emission data. In *Infrared Astronomy*, IAU Symposium 96 (D. Cruikshank and C. Wynn-Williams, eds.), D. Reidel Publishing Co., Dordrecht, 35-56.
- J. T. Bergstralh, G. S. Orton, D. J. Diner, K. H. Baines, J. S. Neff and M. A. Allen. 1981. Spatially-resolved absolute spectrophotometry of Saturn: 3390 Å to 8080 Å *Icarus* **46**, 27-39.
- G. S. Orton. 1981. Modifications to Scott's method for direct integration of gaseous transmission to improve speed and accuracy. *J. Quant. Spectrosc. Radiat. Transf.* **26**, 463-466.
- G. S. Orton, A. P. Ingersoll, R. J. Terrile and S. R. Walton. 1981. Images of Jupiter from the Pioneer 10 and 11 infrared radiometers: A comparison with visible and 5- $\mu\text{m}$  images. *Icarus* **47**, 145-158.
- N. Husson, A. Goldman and G. Orton. 1981. Spectroscopic line parameters of  $\text{NH}_3$  and  $\text{PH}_3$  in the far infrared. *J. Quant. Spectrosc. Radiat. Transf.* **27**, 505-515.
- G. Orton and A. Robiette. 1982. Errata: A line parameter list for the  $\nu_2$  and  $\nu_4$  bands of  $^{12}\text{CH}_4$  and  $^{13}\text{CH}_4$ , expanded to  $J' = 25$  and its application to planetary atmospheres. *J. Quant. Spectrosc. Radiative Transf.* **29**, 283-284.
- H. H. Aumann, J. V. Martonchik and G. S. Orton. 1982. Airborne spectroscopy and spacecraft radiometry of Venus in the far infrared. *Icarus* **49**, 227-243.
- G. S. Orton, H. H. Aumann, J. F. Appleby and J. V. Martonchik. 1982. Airborne spectroscopy of Jupiter in the 100 - 300  $\text{cm}^{-1}$  region: Global properties of ammonia gas and ice haze. *Icarus* **52**, 81-93.
- G. S. Orton, J. F. Appleby and J. V. Martonchik. 1982. The effect of ammonia ice clouds in the atmosphere of Jupiter on outgoing thermal radiation. *Icarus* **52**, 94-116.
- J. Caldwell, A. T. Tokunaga and G. S. Orton. 1983. Further observations of 8- $\mu\text{m}$  polar brightening on Jupiter. *Icarus* **53**, 133 - 140.
- A. T. Tokunaga, G. S. Orton and J. Caldwell. 1983. New observational constraints on the temperature inversions of Uranus and Neptune. *Icarus* **53**, 141-146.
- G. Orton. 1983. Thermal infrared constraints on ammonia ice particles as candidates for clouds in the atmosphere of Saturn. *Icarus* **53**, 293-300.
- G. S. Orton, A. Tokunaga and J. Caldwell. 1983. Observational constraints on the atmospheres of Uranus and Neptune from new measurements near 10  $\mu\text{m}$ . *Icarus* **56**, 147-164.
- J. V. Martonchik and G. S. Orton. 1984. Optical properties of  $\text{NH}_3$  ice from the far IR to the near UV. *Applied Optics* **23**, 541-551.
- M. Tomasko, R. West, G. Orton and V. Tejfel. 1984. Clouds and aerosols in Saturn's atmosphere. In *Saturn* (T. Gehrels and M. Matthews, eds.), Univ. of Arizona Press, Tucson, 150-194.
- R. H. Hildebrand, R. F. Loewenstein, D. A. Harper, G. S. Orton, J. Keene and S. E. Whitcomb. 1985. Far infrared and submillimeter brightness temperatures of the giant planets. *Icarus* **64**, 64--87.

- S. J. Kim, J. Caldwell, A. R. Rivolo, R. Wagener and G. S. Orton. 1985. Infrared polar brightenings on Jupiter. III. Spectrometry from the Voyager 1 IRIS experiment. *Icarus* **64**, 233-248.
- G. S. Orton. 1986. The thermal spectrum of Uranus: Implications for large helium abundance. *Science* **231**, 836-840.
- M. J. Griffin, P. A. R. Ade, G. S. Orton, E. I. Robson, W. K. Gear, I. Nolt and J.V. Radostitz. 1986. Millimeter and submillimeter observations of Jupiter. *Icarus* **65**, 244-256.
- N. Husson, A. Chedin, N. Scott, D. Bailly, G. Graner, N. Lacombe, A. Levy, C. Rossetti, G. Tarrago, C. Camy-Peyret, J.-M. Flaud, A. Bauer, J. M. Colmont, N. Monnanteuil, J. C. Hilico, G. Pierre, M. Loete, J. P. Champion, L. S. Rothman, L. R. Brown, G. Orton, P. Varanasi, C. P. Rinsland, M. A. H. Smith and A. Goldman. 1986. The GEISA spectroscopic line parameters data bank in 1984. *Annales Geophysicae* **4**, 185-190.
- G. Orton, M. J. Griffin, P. A. R. Ade, I. G. Nolt, J. V. Radostitz, E. I. Robson and W. K. Gear. 1986. Submillimeter and millimeter observations of Uranus and Neptune. *Icarus* **67**, 289-304.
- G. S. Orton, K. H. Baines, J. T. Bergstralh, R. H. Brown, J. Caldwell and A. T. Tokunaga. 1987. Infrared radiometry of Uranus and Neptune at 21 and 32  $\mu\text{m}$ . *Icarus* **69**, 230-238.
- G. Orton, D. Aitken, P. Roche, C. Smith, J. Caldwell and R. Snyder. 1987. The spectra of Uranus and Neptune at 7-14 and 17-23  $\mu\text{m}$ . *Icarus* **70**, 1-12.
- R. Halthore, J. Caldwell, G. Orton and J. Bergstralh. 1988. Infrared polar brightening on Jupiter. IV. Spatial properties of methane emission. *Icarus* **74**, 331-339.
- B. Carlson, W. Rossow and G. Orton. 1988. Cloud microphysics in the atmospheres of the giant planets. *J. Atmos. Sci.* **45**, 2066-2081.
- G. S. Orton and C. D. Kaminski. 1989. An exploratory 5- $\mu\text{m}$  spectrum of Uranus. *Icarus* **77**, 109-117.
- R. A. West, G. S. Orton, B.T. Draine and E.A. Hubbell. 1989. Infrared absorption features for tetrahedral ammonia ice crystals. *Icarus* **80**, 220-223.
- G. S. Orton, K. H. Baines, J. Caldwell, P. Romani, A.T. Tokunaga, and R.A. West 1990. Calibration of 7- to 14  $\mu\text{m}$  brightness spectra of Uranus and Neptune. *Icarus* **85**, 257-265.
- G. S. Orton, A. J. Friedson, J. Caldwell, H. B. Hammel, K. H. Baines, J. T. Bergstralh, T. Z. Martin, M. E. Malcom, R. A. West, A. T. Tokunaga, D. M. Griep, W. F. Golisch, C. D. Kaminsky, R. Baron and M. Shure. 1991. Thermal maps of Jupiter: Spatial organization and time dependence of stratospheric temperatures, 1980-1991. *Science* **252**, 537-542.
- B. J. Conrath, J. C. Pearl, J. F. Appleby, G. F. Lindal, G. S. Orton and B. Bézard. 1990. Thermal structure and heat balance of Uranus. In *Uranus* (J. Bergstralh and M. Matthews, Eds.) Univ. of Arizona Press, Tucson, 204-252.
- G. S. Orton, J. Caldwell, A. J. Friedson, and T. Z. Martin 1991. Middle-infrared thermal maps of Venus at the time of the Galileo Venus encounter. *Science* **253**, 1536-1538.
- C. B. Leovy, A. J. Friedson, and G. S. Orton. 1991. The quasiquadrennial oscillation of Jupiter's equatorial stratosphere. *Nature* **354**, 380-382.
- H. B. Hammel, L. A. Young, D. K. Lynch, R. Russell, J. Hackwell, and G. S. Orton. 1992. Variability of Neptune's 12.2- $\mu\text{m}$  ethane emission feature. *Icarus* **9**, 347-352.
- G. S. Orton, J. H. Lacy, J. M. Achtermann, P. Parmar, and W. E. Blass. 1992. Thermal spectroscopy of Neptune: the stratospheric temperature, hydrocarbon abundances and isotopic ratios. *Icarus* **100**, 541-555.
- M. J. Griffin and G. S. Orton. 1993. The near-millimeter spectra of Uranus and Neptune. *Icarus* **105**, 537-547.

- G. S. Orton, A. J. Friedson, P. A. Yanamandra-Fisher, J. Caldwell, H. Hammel, K. H. Baines, J. T. Bergstralh, T. Z. Martin, R. A. West, G. J. Veeder, Jr., D. K. Lynch, R. Russell, M. E. Malcom, W. F. Golisch, D. M. Griep, C. D. Kaminski, A. T. Tokunaga, R. Baron, T. Herbst and M. Shure. 1994. Thermal maps of Jupiter: Spatial organization and time dependence of tropospheric temperatures, 1980 - 1993. *Science* **265**, 625-631.
- A. Marten, C. de Bergh, T. Owen, D. Gautier, J.-P. Maillard, P. Drossart, B. L. Lutz, and G. S. Orton. 1994. Four-micron high-resolution spectra of Jupiter in the North Equatorial Belt: H<sub>3</sub><sup>+</sup> emissions and the <sup>12</sup>C/<sup>13</sup>C ratio. *Planetary & Space Sci.* **42**, 391-399.
- T. Takata, J. D. O'Keefe, T. J. Ahrens, and G. S. Orton. 1994. Comet Shoemaker-Levy 9: Impact on Jupiter and plume evolution. *Icarus* **109**, 3-19.
- T. Takata, T. J. Ahrens, J. D. O'Keefe, and G. S. Orton. 1994. Impact of Comet Shoemaker-Levy-9 on Jupiter. *Geophys. Res. Lett.* **21**, 1087-1091.
- T. J. Ahrens, T. Takata, J. D. O'Keefe, and G. S. Orton. 1994. Radiative signatures from impact of Comet Shoemaker-Levy 9 on Jupiter. *Geophys. Res. Lett.* **21**, 1087-1090.
- J. V. Martonchik and G. S. Orton. 1995. Optical constants of liquid and solid methane. *Appl. Opt.* **33**, 8306 - 8317.
- G. Orton, M. A'Hearn, K. Baines, D. Deming, T. Dowling, J. Goguen, C. Griffith, H. Hammel, W. Hoffmann, D. Hunten, D. Jewitt, T. Kostiuik, S. Miller, K. Noll, K. Zahnle, N. Achilleos, A. Dayal, L. Deutsch, F. Espenak, P. Esterle, J. Friedson, K. Fast, J. Harrington, J. Hora, R. Joseph, D. Kelly, R. Knacke, J. Lacy, C. Lisse, J. Rayner, A. Sprague, M. Shure, K. Wells, P. Yanamandra-Fisher, D. Zipoy, G. Bjoraker, D. Buhl, W. Golisch, D. Griep, C. Kaminski, C. Arden, A. Chaikin, J. Goldstein, D. Gilmore, G. Fazio, T. Kanamori, H. Lam, T. Livengood, M.-M. MacLow, M. Marley, T. Momary, D. Robertson, P. Romani, J. Spitale, M. Sykes, J. Tennyson, D. Wellnitz, and S.-W. Ying. 1995. The NASA Infrared Telescope Facility investigation of Comet Shoemaker-Levy 9 and its collision with Jupiter. 1995. *Science* **267**, 1277-1282.
- H. B. Hammel, R. F. Beebe, A. O. Ingersoll, G. S. Orton, J. R. Mills, A. A. Simon, P. Chodas, J. T. Clarke, E. DeJong, T. E. Dowling, J. Harrington, L. F. Huber, E. Karkoschka, C. M. Santori, A. Toigo, D. Yeomans, and R. A. West. 1995. Hubble Space Telescope Imaging of Jupiter: Atmospheric phenomena created by the impact of Comet Shoemaker-Levy 9. 1995. *Science* **267**, 1288-1296.
- J. Bishop, S. K. Atreya, P. N. Romani, G. S. Orton, B. R. Sandel, and R. V. Yelle. 1995. The middle and upper atmosphere of Neptune. In Neptune and Triton (J. Bergstralh and M. Matthews, Eds.) Univ. of Arizona Press, Tucson, 427-488.
- T. Z. Martin, G. S. Orton, L. D. Travis, L. I. Tamppari, and I. Claypool. 1995. Observation of Shoemaker-Levy impacts by the Galileo Photopolarimeter Radiometer. *Science* **268**, 1875-1879.
- A. J. Friedson, W. F. Hoffmann, J. D. Goguen, K. K. Deutsch, G. S. Orton, J. L. Hora, A. Dayal, J. N. Spitale, W. K. Wells, and G. G. Fazio. 1995. Thermal infrared lightcurves of the impact of Comet Shoemaker-Levy 9 fragment R. *Geophys. Res. Lett.* **22**, 1569-1572.
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- S. Miller, N. Achilleos, B.M. Dinelli, H. A. Lam, J. Tennyson, M.-F. Jagod, T. Oka, T.R. Geballe, L.M. Trafton, R. D. Joseph, G. E. Ballester, K. Baines, T.Y. Brooke and G. Orton.

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- G. Birnbaum, A. Borysow, and G. S. Orton. 1996. Collision-induced absorption of H<sub>2</sub>-H<sub>2</sub> and H<sub>2</sub>-He in the rotational and fundamental band for planetary applications. *Icarus* **123**, 4-22.
- S. J. Kim, G. S. Orton, and C. Dumas. 1996. Infrared spectroscopy of Jupiter's atmosphere after the A, D and E impacts of comet Shoemaker-Levy 9. *Icarus* **120**, 326-331.
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- L. A. Sromovsky, F. A. Best, A. D. Collard, P. M. Fry, H. E. Revercomb, R. S. Freedman, G. Orton, J. Hayden. 1996. Preliminary results of the Galileo Net Flux Radiometer Experiment. *Science* **272**, 851-854.
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 G. Orton et al. Spatially Resolved Thermal Infrared Observations of Uranus and Neptune from the ESO very large Telescope in Sept. 2006  
 2007 (*San Francisco*)  
 G. Orton et al. Properties of Jupiter During a Period of "Global Upheaval"  
 2008 (*San Francisco*)  
 G. Orton et al. Polar Phenomena in Outer Planet Atmospheres  
 L. Fletcher et al. Deuterium in the Outer Planets: New Constraints and New Questions from

Infrared Spectroscopy.

T. Greathouse et al. A General Radiative Seasonal Climate Model Applied to Saturn, Uranus and Neptune.

Western Pacific Geophysics Conference Presentation:

2004 (*Honolulu*)

G. Orton et al. An Infrared Assessment of Saturn's Atmosphere

European Geophysical Union Presentations:

2001 (*Nice*)

G. Orton et al. Thermal IR Characterization of Jupiter's Great Red Spot from Cassini CIRS;

G. Orton et al. Ground-Based Thermal Characterization of Jupiter's Atmosphere

2002 (*Nice*)

G. Orton et al. Galileo PPR and ground-based thermal observations of the evolution of merged white oval "BA" from 1999 to 2001

G. Orton et al. Longitudinal study of thermal waves in Jupiter's atmosphere.

2003 (*Nice*)

G. Orton et al. Neptune's 28-135 micron Spectrum from the Long- and Short-Wavelength ISO Spectrometers;

G. Orton et al. The Exploration of Jupiter's Arctic Polar Vortex by NASA IRTF and Cassini CIRS Observations

2004 (*Nice*)

G. Orton et al. Exploring the 18-20 Micron Window in Titan's Atmosphere: Rotational and Time Variability

2005 (*Vienna*)

G. Orton et al. Mixing Ratio of CH<sub>4</sub> in Saturn's Atmosphere from Cassini CIRS spectra;

M. Burgdorf et al. Spitzer IRS Detection of New Hydrocarbons in Uranus

G. Orton et al. The CH<sub>4</sub>/H<sub>2</sub> Mixing Ratio in the Stratosphere of Uranus;

V. Meadows et al. Spitzer IRS Detection of New Hydrocarbons in Neptune

2007 (*Vienna*)

G. Orton et al. Spatial Inhomogeneity in Thermal Infrared Images of Uranus and Neptune: The Context for Spitzer IRS Spectral Analysis

T. Encrenaz et al. Stratospheric Temperatures in Neptune from Analysis of Spatially Resolved Observations of the H<sub>2</sub> S(1) Quadrupole

2008 (*Vienna*)

G. Orton et al. Mid-Infrared Imaging of Neptune's Stratospheric Emission from Gemini and Spectroscopy from the Spitzer IRS

G. Orton et al. Mid-Infrared Imaging of Uranus from the VLT and Spectroscopy from the Spitzer IRS

A. Mainzer et al. Spitzer Mid-Infrared Spectroscopy of Uranus at Equinox

2009 (Vienna)

G. Orton et al. Spitzer Spectroscopy of Uranus

G. Orton et al. (invited) Problems in Analysis of Spitzer IRS Spectroscopy of Uranus

2010 (Vienna)

G. Orton et al. Global-Mean Temperature and Composition of Uranus from Spitzer Spectroscopy

2011 (Vienna)

G. Orton et al. Herschel SPIRE Observations of Uranus and Neptune

European Planetary Science Congress:

2006 (Berlin)

G. Orton et al. Anomalous Behavior of Jupiter's Giant Anticyclonic Vortex, Oval BA

2007 (Potsdam)

G. Orton et al. Rapid Time Variability in the Atmosphere of Jupiter

2010 (Rome)

G. Orton et al. Recovery of Neptune's Stratospheric Offset Polar Hot Spot

## MENTORING EXPERIENCE

Mentor for undergraduate students in Caltech's SURF (Summer Undergraduate Research Fellowship), NASA's USRP (Undergraduate Summer Research Program), the NASA Space Grant program (including graduate and undergraduate students), JPL's SIRI (Student Independent Research Internship) program (local community college interns), and for "regular" Academic Part-Time (APT) undergraduate employees.

FY	Program	Student (institution)
1985	<i>SURF</i>	Michael Malcolm (Caltech)
1988	<i>SURF</i>	Ian Max Avruch (Brandeis U)
1989	<i>SURF</i>	Mark Huie, Eric Russell
1990	<i>SURF</i>	Nyut Ha, Christopher Campos
1991	<i>SURF</i>	Thomas Thaller (Mt. San Antonio College) Tadashi ("Ted") Kanamori (Caltech)
1991-1992	<i>SURF</i>	Adrian Castillo (U Texas, Austin)
1992	<i>SURF</i>	Suneal Chaudary, Hung Fai ("Tony") Fong
1993	<i>SURF</i>	Duncan O'Dell, Ivy Tsui, See Chin Woon
1994	<i>SURF</i> <i>SURF</i> <i>APT</i>	Joseph Spitale (Caltech) Caitlin Arden (Cambridge U) Ted Kanamori (Caltech)
1995	<i>SURF</i> <i>SURF</i> <i>SURF</i> <i>SURF</i> <i>SURF</i> <i>SURF</i> <i>APT</i>	Darryl Robertson (U Leicester) Keng Guan Lim (Imperial Coll.) Ford Long Wong (Imperial Coll.) George Torrieri (Oxford U) Jason Barnes (Caltech) Obadiah Manley (Caltech) Zoran Hadzibabic (Oxford U) Joseph Spitale (Caltech)
1995-1996	<i>SURF</i>	Kartik Parija (Drake U)
1996	<i>SURF</i> <i>SURF</i> <i>SURF</i> <i>SURF</i> <i>SURF</i>	Lawrence Wegener (Cambridge U) Helenja Banjevic (U Toronto) Zoran Hadzibabic (Cambridge U) Griffith John (Cambridge U) Milena Marinova (Caltech)

	<i>SURF</i>	Sasha Hinkley (Reid College)
	<i>SURF</i>	Hiranya Peiris (Cambridge U; with T. Martin)
	<i>SURF</i>	Christopher Connor (Cambridge U; with T. Martin)
1996-1997	<i>SURF</i>	Eldar Noe-Dobrea (Florida Tech)
1997	<i>SURF</i>	Bruce Marriage (Cambridge)
	<i>SURF</i>	Viswanathan Krishnan (Cambridge)
	<i>SURF</i>	Milan Masanovic (U Belgrade)
	<i>SURF</i>	Jelena Tesic (U. Belgrade)
	<i>SURF</i>	Tiffany Churukian (William & Mary)
	<i>SURF</i>	Tze Lei Poo (Cambridge)
1997-1998	<i>SURF</i>	Andreas Tziolas (U. Leicester)
	<i>SURF</i>	Scott Jackson (Brown U)
1998	<i>SURF</i>	Elenor Newman (U. Edinburgh)
	<i>SURF</i>	Tanja Bosak (U. Zagreb)
	<i>SURF</i>	Alex King (U. Leicester)
	<i>SURF</i>	Predrag Krstajic (U Belgrade)
	<i>SURF</i>	See Chin Woon (Imperial College)
2001	<i>SURF</i>	Christa Hasenkopf (Penn. State)
2002	<i>SURF</i>	Ori Fox (Boston U)
2003	<i>SURF</i>	Brian Jackson (Georgia Tech)
	<i>USRP</i>	Brett Beach-Kimball (Welesyan U)
2004	<i>SURF</i>	Alison Winfield (Columbia)
	<i>SURF</i>	Amber Swenson (Caltech)
	<i>USRP</i>	Jennifer Katz (Columbia)
	<i>Space Grant</i>	Brian Jackson (Georgia Tech)
2005	<i>SIRI</i>	Hagop Hagopian (Glendale Community College)
	<i>SIRI</i>	Jun Liu (Pasadena City College)
	<i>SIRI</i>	Zohrab Basmajian (Glendale Community College)
	<i>SURF</i>	Marissa Vogt (MIT)
	<i>SURF</i>	David Sanford (Caltech)
	<i>SURF</i>	Gary Shih (UCLA)
	<i>Space Grant</i>	Thomas Laakso (Harvard)
	<i>Space Grant</i>	Jeremy Burnison (Pittsburgh State).
2006	<i>SIRI</i>	Arin Barkhordarian (Glendale Community College)
	<i>SIRI</i>	Shariss Khalatiance (Glendale Community College)

*SURF* Jacob Searcy (New Mexico Tech)  
*Space Grant* Jeffrey Sadino (Montana State Univ.)  
*Space Grant* David Hill (Fisk University)  
*Space Grant* Jesse Nelson (Univ. of Maine)  
*Space Grant* Steven Kollmansberger (Oregon State Univ.)

2006-2008 *USRP* Michael Line (U. Wisconsin)

2007 *SIRI* Justin Kemerer (Citrus College)  
*SIRI* Jimmy Yang (Santa Monica College)

*SURF* David Ye (Caltech)  
*SURF* Rachel Reddick (Caltech; with )  
*SURF* David Renshaw (Caltech)  
*SURF* Jesse Nelson (U. Maine)  
*SURF* Sean Jezewski (Caltech)  
*SURF* Jared Joels (Principia College)  
*SURF/JPLUS* Erin Edkins (Moorpark College)  
*SIRI* Shakeh Elizabeth Khudikyan (Glendale Community College)

2008 *SIRI* Shoghakat Chilingaryan (Glendale Community College)  
*SIRI* Richard Lam (Calif. State Univ., Pomona)

*SURF* Erin Edkins (Univ. Calif. Santa Barbara)  
*SURF* Robert Jang (Univ. Calif. San Diego)  
*SURF* Noah Tanabe (Caltech)  
*Space Grant* Holly Grimes (Portland State Univ.)  
*Space Grant* Matthew Broderick (Univ. Idaho)

*SIRI* Hrant Harutyunyan (Glendale Community College)  
*SIRI* Meri Marutyunyan (Glendale Community College)  
*SIRI* Alex Wood (Calif. State Univ. Pomona)  
*SIRI* Andie Cheung (Calif. State Univ. Pomona)  
*SIRI* Mauricio Pinto (Calif. State Univ. Pomona)  
*SIRI* Fernando Navarro (Calif. State Univ. Pomona)

2009 *SIRI* Casey Quon (Mt. San Antonio College)  
*SIRI* Hayk Kotelyan (Glendale Community College)  
*SIRI* Julian Ang (Calif. State Univ. Pomona)  
*SIRI* Donny Chau (Calif. State Univ. Pomona)

*USRP* Matthew Shannon (U. British Columbia)  
*USRP* Nicholas Reshetnikov (Harvard Univ.)  
*USRP* Gregorio Villar (Calif. State Univ. Pomona)

*SURF* Zachary Greene (UCLA)  
*SURF* Stephany Lai (Caltech)

2010	<i>SIRI</i>	Christopher Conow (Calif. State Univ. Pomona)
	<i>SIRI</i>	Ryan Goetz (Calif. State Univ. Pomona)
	<i>SIRI</i>	Shirley Trinh (Calif. State Univ. Pomona)
	<i>SIRI</i>	Jose Pacheco (Calif. State Univ. Long Beach)
	<i>USRP</i>	Nicholas Reshetnikov (Harvard Univ.)
	<i>SURF</i>	Matthew Shannon (U. British Columbia)
	<i>SURF</i>	Agape Allaverdi (Univ. S. California)
	<i>SURF</i>	Jennifer Greco (Caltech)
2011	<i>Research Apprentice</i>	
		Shirley Trinh (Calif. State Univ. Pomona)
		Jose Pacheco (Calif. State Univ. Long Beach)
		Ryan Goetz (Calif. State Univ. Pomona)
	<i>USRP</i>	Michael Sola (Embry-Riddle Aeronautical Institute)
	<i>USRP</i>	Steffi Valkov (Calif. State Univ. Pomona)
	<i>USRP</i>	Sarah Katie Brown (Georgia Inst. of Technology)
	<i>SIRI</i>	Kimberly Lokovitch (Calif. State Univ. Long Beach)
	<i>SIRI</i>	Steffi Valkov (Calif. State Univ. Pomona)
	<i>SIRI</i>	Laura Wakefield (Calif. State Univ. Pomona)
	<i>SIRI</i>	Jay Chen (Univ. S. California)
	<i>SURF</i>	Charlotte Mason (Oxford Univ.)
	<i>SURF</i>	Jennifer Greco (Caltech)
	<i>SURF</i>	Roshan Nanu (Caltech)