

DOUGLAS RAY

I am a visionary, collaborative and inspirational leader with a passion for public education; a strong record of effective management; belief and skill in open, transparent communication and extensive experience creating, strengthening, coaching, leading and managing highly productive teams, organizations and partnerships.

I aspire to lead a research university campus that intends to elevate itself and more effectively serve its stakeholders. I am excited about the position of Chancellor, WSU Tri-Cities because my skills, experiences and leadership approach, especially my communication and team building skills, position me to have significant positive impact on WSU Tri-Cities and WSU more broadly as Chancellor, WSU Tri-Cities.

EDUCATION

Postdoctoral Research Associate, 1985-1990
Joint Institute for Laboratory Astrophysics
University of Colorado/Boulder
Advisor: Professor W. Carl Lineberger

Ph. D., Chemistry, 1985
University of California/Berkeley
Thesis Advisor: Professor Richard J. Saykally

A. B. Physics, 1979
Kalamazoo College
Kalamazoo, Michigan 49007

PROFESSIONAL SOCIETY RECOGNITION and MEMBERSHIP

I was elected a Fellow of the American Association for the Advancement of Science in 2013 for "distinguished contributions to physical chemistry and molecular spectroscopy and for building a world-class chemistry organization at PNNL". I am also a member of the American Chemical Society, the American Physical Society, the American Geophysical Union and the Materials Research Society.

EMPLOYMENT HISTORY

PACIFIC NORTHWEST NATIONAL LABORATORY

1990 - 2017

Director, Strategic Partnerships

2015 – 2017

- Responsible for identifying and creating alliances with other institutions: public and private, to further PNNL's institutional strategy and the impact of the laboratory
- Co-created PNNL-Washington State University Distinguished Graduate Research Program
- Doubled size of PNNL's Joint Appointment program to >50 people at 20 research universities (19 in the U.S. and 1 in Australia – complete list at http://www.pnl.gov/about/institutional_partnerships/joint_appointments.asp).
- Created mechanism for PNNL researchers to receive funding from Moore and Gates Foundations
- Served on PNNL Leadership Team

Associate Laboratory Director,

2006 - 2015

Fundamental & Computational Sciences Directorate

- Responsible for >\$200M/yr of research expenditures at PNNL, including all research at PNNL sponsored by the Department of Energy's Office of Science and PNNL's leadership of the Atmospheric Radiation Measurement Climate Research Facility, all research at PNNL sponsored by the National Institutes of Health, approximately \$50M/yr in internal funds, and the staff, postdocs and students in the Fundamental & Computational Sciences Directorate
- PNNL recognized as a leader in advanced computing, biological systems science, chemical and materials sciences, climate and earth systems science, and particle physics
- Created the Fundamental & Computational Sciences Directorate with >500 staff, postdocs and students in 4 Divisions, 120 research laboratories, and one research aircraft.
- Recruited >30 senior scientists and grew Directorate to >600 staff, postdocs and students.
- Significantly expanded gender diversity of scientific and technical leaders at PNNL
- Recruited/retained and supported the first 2 PNNL researchers elected members of the National Academies
- Supported development and transfer to the private sector of numerous innovations by Fundamental & Computational Sciences Directorate staff in clean energy, biomedical and computing technologies
- Grew PNNL's fundamental and computational science programs by \$50M/yr by establishing new and growing existing programs via new proposal development methods, new partnerships and effective engagement of legislators and their staff
- Established \$100M program in data analytics jointly with Mississippi State University
- Doubled size of University of Maryland-PNNL Joint Global Change Research Institute
- Created University of Washington-PNNL Northwest Institute for Advanced Computing
- Created Oregon Health & Science University-PNNL Northwest Co-Laboratory for Integrated 'Omics
- Served on PNNL Leadership Team

- Deputy Laboratory Director for Science and Technology (interim) 2007 – 2009
- Responsible for PNNL's science and technology strategy and its execution
 - Managed PNNL's ~\$50M/yr internal science and technology investment portfolio
 - Responsible for PNNL's Institutional Review Board, Institutional Animal Care and Use Committee, etc.
 - Tireless advocate for PNNL scientists and engineers
 - Served on PNNL Leadership Team
- Chief Research Officer 2005 – 2006
- Responsible for PNNL's science and technology strategy and its execution
 - Managed PNNL's ~\$50M/yr internal science and technology investment portfolio
 - Responsible for PNNL's Institutional Review Board, Institutional Animal Care and Use Committee, etc.
 - Tireless advocate for PNNL scientists and engineers
 - Served on PNNL Leadership Team
- Director, Chemical Sciences Division, Fundamental Science Directorate 2002 – 2005
- Responsible for >\$30M/yr in expenditures, all research at PNNL sponsored by DOE's Basic Energy Sciences program, approximately \$10M/yr in internal funds and the staff, students and postdocs in the Chemical Sciences Division
 - Created Chemical Sciences Division with >100 staff, postdocs and students in 4 technical groups and 35 research laboratories.
 - Recruited 5 senior scientists and grew Division to 130 staff, postdocs and students.
 - Grew PNNL's DOE Basic Energy Sciences program from \$8M/yr to \$16M/yr.
 - Increased Division funding from \$15M/yr to \$25M/yr.
 - Served on Directorate Leadership Team
- Deputy Associate Laboratory Director, Fundamental Science Directorate 2001 – 2002
- Developed strategy to expand PNNL's NIH research program and commenced execution
 - Served on Directorate Leadership Team
- Deputy Director, Environmental Molecular Sciences Laboratory 1998 – 2001
- First EMSL Deputy Director for User and Research Operations
 - Developed initial EMSL User Policy, User Agreements, etc.
 - Created EMSL's Instrument Shop
 - Managed 2 technical groups (20 staff): User Operations, Instrument Development Laboratory
 - Served on EMSL Leadership Team
- Senior Research Scientist, Environmental Molecular Sciences Laboratory 1990 – 1998
- Established and lead productive research group consisting of professional scientists, postdoctoral research fellows, graduate and undergraduate students.
 - Conceived, designed and built unique experimental instrumentation.
 - Prepared, defended and was awarded numerous peer-reviewed research proposals
 - Co-invented PNNL's Integrated Operations System, "IOPS"

PROFESSIONAL and COMMUNITY SERVICE

I believe strongly in the importance and value of serving ones professional and local communities.

I currently serve:

- on the Editorial Advisory Board for the American Chemical Society journal "Energy & Fuels",
- on the Scientific Advisory Committee of DOE's Combustion Research Facility and
- as an Executive-in-Residence at Washington State University – Tri Cities.

I formerly served on:

- the Chemical Sciences Roundtable of the National Academy of Sciences,
- the Joint Genome Institute Scientific Advisory Committee,
- the U.S.-Japan Joint Committee for Cooperation in High Energy Physics,
- the Carbon Capture Simulation Initiative Board of Directors,
- the Joint BioEnergy Institute Board of Directors,
- the International Advisory Committee for the Dalian (China) National Laboratory for Clean Energy,
- the International Energy Agency's Experts Group on Science for Energy,
- the Columbia Basin College Foundation Board and
- the Washington State STEM Education Foundation.

SELECTED RECENT INVITED PRESENTATIONS

1. "Pathways to Net Zero Carbon Emissions", presented at the University of Michigan School of Natural Resources and Environment Sustainable Systems Forum, March 18, 2016.
2. "Pathways to Net Zero Carbon Emissions", presented at the World Conference on Climate Change, Valencia, Spain, October 25, 2016.
3. "Climate Change: Where We Are and What To Do", with Joanna D. Haigh, presented at the National Geographic Festival delle Scienze, Rome, Italy, May 11, 2017.

PEER-REVIEWED PUBLICATIONS

1. D. J. Fox, D. Ray, P. C. Rubesin and H. F. Schaefer III, "The prototype aluminum-carbon single, double, and triple bonds: Al-CH_3 , Al=CH_2 , and Al=CH ," *J. Chem. Phys.* 73, 3246 (1980).
2. D. Ray, K G. Lubic and R. J. Saykally, "The laser magnetic resonance spectrum of HCl^+ ," *Molec. Phys.* 1:§, 217 (1982).
3. K G. Lubic, D. Ray and R. J. Saykally, "Rotational spectroscopy of molecular ions by laser magnetic resonance," in *Laser Spectroscopy VI*, H. P. Weber and W. Luthy, Eds. (Springer-Verlag, Berlin, 1983), p. 82.
4. K G. Lubic, D. Ray, D. C. Hovde, L. Veseth and R. J. Saykally, "Laser magnetic resonance rotational spectroscopy of the hydrogen halide molecular ions: H^{35}Cl^+ and H^{37}Cl^+ ," *J. Mol. Spec.* 134, 1 (1989).
5. K G. Lubic, D. Ray, D. C. Hovde, L. Veseth and R. J. Saykally, "Laser magnetic resonance rotational spectroscopy of the hydrogen halide molecular ions: H^{79}Br^+ and H^{81}Br^+ ," *J. Mol. Spec.* 134, 21 (1989).
6. D. C. Hovde, E. Schaefer, S. E. Strahan, C. A. Ferrari, D. Ray, K G. Lubic and R. J. Saykally, "Measurement of the rotational spectra of HF^+ by laser magnetic resonance," *Molec. Phys.* 52, 245 (1984).
7. D. Ray, R. L. Robinson, D.-H. Gwo and R. J. Saykally, "Intracavity far infrared laser spectroscopy of supersonic jets: Direct measurement of the vibrational motions in van der Waals bonds," in *Laser Spectroscopy VII*, T. W. Hansch and Y. R. Shen, Eds. (Springer-Verlag, Berlin, 1985), p. 126.
8. D. Ray, R. L. Robinson, D.-H. Gwo and R. J. Saykally, "Vibrational spectroscopy of van der Waals bonds: Measurement of the perpendicular bend of ArHCl by intracavity far infrared laser spectroscopy of a supersonic jet," *J. Chem. Phys.* ~ 1171 (1986).
9. R. L. Robinson, D.-H. Gwo, D. Ray and R. J. Saykally, "Evidence for a secondary minimum in the ArHCl potential surface from far infrared laser spectroscopy of the lowest ~ bending vibration," *J. Chem. Phys.* 86, 5211 (1987).
10. R. L. Robinson, D. Ray, D.-H. Gwo and R. J. Saykally, "Vibration-rotation spectroscopy of ArHCl by far-infrared laser and microwave/far-infrared laser double resonance spectroscopy," in *Structure and Dynamics of Weakly Bound Molecular Complexes NATO ASI series C; vol 212*, A. Weber, Ed. (D. Reidel Publishing Co., Dordrecht, 1987) p. 85.
11. R. L. Robinson, D. Ray, D.-H. Gwo and R. J. Saykally, "An extended study of the lowest II bending vibration-rotation spectrum of Ar-HCl by intracavity far infrared laser/microwave double resonance spectroscopy," *J. Chem. Phys.* 87, 5149 (1987).
12. M. L. Alexander, N. E. Levinger, M. A. Johnson, D. Ray and W. C. Lineberger, "Recombination of Br_2^+ photodissociated within mass selected ionic clusters," *J. Chem. Phys.* 88, 6200 (1988).
13. N. E. Levinger, D. Ray, K. K. Murray, A. S. Mullin, C. P. Schulz, and W. C. Lineberger, "The visible photoabsorption spectrum of Ar_3^+ ," *J. Chem. Phys.* ~71 (1988).
14. N. E. Levinger, D. Ray, M. L. Alexander and W. C. Lineberger, "Photoabsorption and photofragmentation studies of Ar_n^+ cluster ions," *J. Chem. Phys.* 89, 5654 (1988).
15. D. Ray, N. E. Levinger, and W. C. Lineberger, "Spectroscopy and Dynamics of van der Waals Cluster Ions," to appear in: *Proceedings of the International School of Physics Enrico Fermi* (North Holland, Amsterdam, 1989).
16. "Time-resolved measurements of the photodissociation and recombination dynamics of I_2^+ in mass selected clusters," *J. Chem. Phys.* 91, 6533 (1989); with N. E. Levinger, J. M. Papanikolas, and W. C. Lineberger.
17. "Photodissociation and geminate recombination dynamics of I_2^+ in mass-selected $\text{h-(C}_n\text{)}^+$ cluster ions," *J. Phys. Chem.* 95, 8028 (1991); with J. M. Papanikolas, J. R. Gord, N. E. Levinger, V. Vorsa, and W. C. Lineberger.

18. "Proton transfer reaction rates as a probe of size-dependent properties of large water clusters", *Chern. Phys. Lett.* 215, 188 (1993); with R. Knochenmuss and G. R. Holtom.
19. "Electronic absorption spectra of large benzene-Ar_n clusters", *J. Chern. Phys.* 100, 44 (1994); with R. Knochenmuss and W. P. Hess.
20. "Uptake of gases by aqueous solutions probed by surface nonlinear optical spectroscopy", *Laser Techniques for Surface Science II*, eds. J. M. Hicks, W. Ho and H.-L. Dai, vol. 2547, pg.364 (1995); with R. Doolen.
21. "Ionization detected rotational coherence spectroscopy of mass selected clusters", *Laser Techniques for State-Selected and State-to-State Chemistry III*, ed. J. W. Hepburn, Vol. 2548,pg. 182 (1995); with A. H. Bahnmaier, A. G. Joly, and J. M. Price.
22. "Cation-ether complexes in the gas phase: bond dissociation energies and equilibrium structures of Li+(O(CH₃)₂)_x (x = 1-4)", *J. Phys. Chem.* 100, 1605 (1996); with M. B. More, E. D. Glendening, D. Feller and P. B. Armentrout.
23. "Cation-ether complexes in the gas phase: bond dissociation energies and equilibrium structures of Li+(dimethoxyethane)_x (x = 1-2) and Li+12-crown-4", *J. Phys. Chem.* 100,16116 (1996); with D. Feller, M. B. More, E. D. Glendening and P. B. Armentrout.
24. "Frequency-Sweep Ion Trap Mass Spectrometry", *Proceedings of the 44th ASMS Conference on Mass Spectrometry and Allied Topics*, pg. 122 (1996); with J. M. Price, M. V. Gorshkov and S. E. Barlow.
25. "Cation-ether complexes in the gas phase: bond dissociation energies of Na+(dimethyl ether)_x (x = 1-4), Na+(dimethoxyethane)_x (x = 1-2) and Na+12-crown-4", *J. Phys. Chem.* 101, 831 (1997); with M. B. More and P. B. Armentrout.
26. "Pulse compression with a high energy Nd:YAG regenerative amplifier system", *Applied Optics* 36, 5048 (1997), with V. A. Venturo and A. G. Joly.
27. "Cation-ether complexes in the gas phase: bond dissociation energies of K+(dimethyl ether)_x (x = 1-4), K+(dimethoxyethane)_x (x = 1-2) and K+12-crown-4", *J. Phys. Chem.* 101, 4254 (1997); with M. B. More and P. B. Armentrout.
28. "Understanding the mechanism for mass accommodation of ethanol by a water droplet", *J. Phys. Chem.* 101, 5473 (1997); with R. S. Taylor and B. C. Garrett.
29. "Cation-ether complexes in the gas phase: bond dissociation energies of M+(dimethyl ether)_x (x = 1-4), M+(dimethoxyethane)_x (x = 1-2) and M+12-crown-4 where M = Rb and Cs", *J. Phys. Chem.*, 101, 7007 (1997); with M. B. More and P. B. Armentrout.
30. "Adsorption of Dimethyl Sulfoxide to the Liquid/Vapor Interface of Water and the Thermochemistry of Transport Across the Interface", *J. Phys. Chem* 102, 650 (1998); with D. S. Karpovich.
31. "Intrinsic Affinities of Alkali Cations for 15-Crown-5 and 18-Crown-6: Bond Dissociation Energies of Gas-Phase M+-Crown Ether Complexes "; *J. Amer. Chem. Soc.* 121, 2 (1999); with M. B. More and P. B. Armentrout.
32. "The Structure of Fluorene-(H₂O)_{1,2} Determined by Rotational Coherence Spectroscopy", *J. Chem. Phys.* 119, 1970 (2003); with D. M. Laman and A. G. Joly.
33. "The Role of Water on Electron-Initiated Processes and Radical Chemistry: Issues and Scientific Advances", *Chem. Rev.* 105, 355 (2005); with B. C. Garrett, D. A. Dixon et al.

SELECTED WORKSHOP REPORTS and other NON-PEER-REVIEWED PUBLICATIONS

1. Report of the PNNL Workshop “Advanced Resources for Catalysis Science”, Workshop Organizers: C. H. F. Peden, D. Ray; Pacific Northwest National Laboratory, 2005.
2. “Learning to Live with Fossil Fuels”, D. Ray, J. M. Davis, Seattle Times, July 15, 2007.
3. Report of the National Academy of Sciences Workshop “Bio-Inspired Chemistry for Energy”, Workshop Organizers: L. J. Buckley, S. Haynie, D. Ray; National Academies Press, 2008.
4. Report for the U. S. Department of Energy’s Basic Energy Sciences Workshop “Basic Research Needs: Catalysis for Energy”, Workshop Co-Chairs: A. T. Bell, B. C. Gates, D. Ray; Pacific Northwest National Laboratory, 2008.
5. “Scientific breakthroughs needed to unlock nation’s energy potential”, D. Ray, A. T. Bell, B. C. Gates, Seattle Times, Sept 17, 2008.
6. Report of the National Academy of Sciences Workshop “Challenges in Characterizing Small Particles: Exploring Particles from the Nano- to Microscales”, Workshop Organizers: B. Finlayson-Pitts, D. Ray, L.T. Thompson; National Academies Press, 2012.