# CURRICULUM VITAE

Dr. Michael D. Morse

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## I. Employment

Department of Chemistry, University of Utah, Salt Lake City, Utah 84112

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|---|---|
| Distinguished Professor of Chemistry | 2023 - present |
| Professor of Chemistry | 1993 - 2023 |
| Associate Professor | 1990 - 1993 |
| Assistant Professor | 1985 - 1990 |

Department of Chemistry, Rice University, Houston, Texas 77251

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|---|---|
| Visiting Assistant Professor | 1981 - 1983 |

## II. Education

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|---|---|
| Haverford College, Haverford, Pennsylvania | 1970 - 1974: B.S., Chemistry, with high honors |
| University of Chicago, Chicago, Illinois | 1974 - 1980: Ph.D., Physical Chemistry |
| University of Chicago, Chicago, Illinois | 1980 - 1981: Postdoctoral Research, Physical Chemistry |
| Rice University, Houston, Texas | 1983 - 1984: Postdoctoral Research, Physical Chemistry |

## III. Previous Research

Haverford College 1973 - 1974: X-ray crystallography
Advisor: Professor John P. Chesick

University of Chicago 1974 - 1980: Theory of Molecular Photodissociation
Advisor: Professor Karl F. Freed
Thesis Title: Molecular Photodissociation

University of Chicago 1980 - 1981: Intermolecular Forces in Water
Advisor: Professor Stuart A. Rice

Rice University 1982 - 1984: Spectroscopy and Reactivity of Small Metal Clusters
Advisor: Professor Richard E. Smalley

## IV. Membership in Professional and Honorary Societies

American Association for the Advancement of Science, Fellow
Elected 1993, "for definitive and imaginative experimental and theoretical work detailing the electronic states of metal clusters, particularly dimers and trimers."

American Chemical Society, Member

American Physical Society, Fellow
Elected 2004, for pioneering experimental studies of the electronic structure and spectroscopy of small metal molecules in the gas phase, particularly the diatomic transition metal molecules.

Optical Society of America
William F. Meggers Award Committee, Member, September 1993 - August 1994

Phi Beta Kappa, elected 1973

## V. Awards and Honors

| | |
|---|---|
| 1974 - 1977 | National Science Foundation Fellow |
| 1977 - 1980 | Fannie and John Hertz Foundation Fellow |
| 1980 | Galler Award for best Ph.D. thesis in the Division of Physical Sciences, University of Chicago. |
| 1987 | Outstanding Graduate Teaching Award, awarded by the Chemistry Student Advisory Committee. |
| 1987-1988 | Faculty Fellow Award, awarded by the University of Utah Research Committee |
| 1990 | Outstanding Graduate Teaching Award, awarded by the Chemistry Student Advisory Committee. |
| 1991 | Robert W. Parry Teaching Award |
| 1993 | Election as a Fellow of the AAAS |
| 1997-99 | Editorial Board Member, **Journal of Chemical Physics**, 1997-1999 |
| 1997 | University of Utah Distinguished Research Award |
| 1998 | ASUU Student's Choice Award for Excellence in Teaching |
| 1999 | University of Utah Distinguished Teaching Award |
| 2001 | William W. Epstein Outstanding Educator Award, sponsored by the Chemistry Student Advisory Committee |
| 2004 | Elected a Fellow of the American Physical Society |
| 2011 | Named among the Top 20 reviewers for the Journal of Chemical Physics for 2011 |
| 2014 | William W. Epstein Outstanding Educator Award, sponsored by the Chemistry Student Advisory Committee |
| 2014 | Certificate of Reviewing Excellence for 2013, awarded by the Journal of Molecular Spectroscopy |
| 2019 | William F. Meggers Award for outstanding work in spectroscopy, Optical Society of America |
| 2021 | College of Science Award for Fostering Undergraduate Research Excellence |
| 2023 | Promotion to the rank of Distinguished Professor, University of Utah |

## VI. General Research Interests

Spectroscopy and structure of transient species, particularly metal atom-ligand complexes, metal and semiconductor clusters, and their ions. Methods employed include laser vaporization/ photolysis, supersonic expansion using inert carrier gases, and laser spectroscopy using laser-induced fluorescence, resonant two-photon ionization, resonant two-photon dissociation, and cryo-cooled ion photodissociation techniques.

## VII. Scientific Publications (undergraduate authors are underlined)

1. Michael D. Morse and John P. Chesick, "1,2-trans-diaminocyclohexane hydrobromide," Acta Crystallographica **B32**, 954-6 (l976).

2. Michael D. Morse, Karl F. Freed, and Yehuda B. Band, "Rotational distributions in photodissociation: Application to ICN," Chem. Phys. Lett. **44**, l25-30 (l976).

3. Michael D. Morse, Karl F. Freed, and Yehuda B. Band, "Photodissociation: Isotope effects and comparisons between theory and experiment," Chem. Phys. Lett. **49**, 399-404 (l977).

4. Yehuda B. Band, Michael D. Morse, and Karl F. Freed, "Comparison of semiclassical treatments for evaluating Franck-Condon transition amplitudes for molecular dissociation," J. Chem. Phys. **68**, 2702-09 (l978).

5. Michael D. Morse, Karl F. Freed, and Yehuda B. Band, "Rotational distributions from photodissociations I. Linear triatomic molecules," J. Chem. Phys. **70**, 3604-19 (l979).

6. Michael D. Morse, Karl F. Freed, and Yehuda B. Band, "Rotational distributions from photodissociations II. Results from $ICN + h\nu \rightarrow I + CN(X^2\Sigma^+)$," J. Chem. Phys. **70**, 3620-29 (l979).

7. Karl F. Freed, Michael D. Morse, and Yehuda B. Band, "State-to-state photochemical reaction dynamics in polyatomic molecules," Disc. Faraday Soc. **67**, 297-305 (l979).

8. Yehuda B. Band, Michael D. Morse, and Karl F. Freed, "Fragment angular distributions from photodissociation of polyatomic molecules," Chem. Phys. Lett. **67**, 294-8 (l979).

9. Frank A. Novak, Stuart A. Rice, Michael D. Morse, and Karl F. Freed, "On rotational effects in radiationless processes in polyatomic molecules," in *Radiationless Transitions*, S.H. Lin, ed. (Academic, New York, l980), pp. l35-83.

10. Michael D. Morse and Karl F. Freed, "Rotational distributions in photodissociation: The bent triatomic molecule," Chem. Phys. Lett. **74**, 49-55 (l980).

11. Michael D. Morse and Karl F. Freed, "Rotational and angular distributions from photodissociation III. Effects of dynamic axis switching in polyatomic molecules," J. Chem. Phys. **74**, 4395-4417 (l98l).

12. Michael D. Morse and Stuart A. Rice, "A test of the accuracy of an effective pair potential for liquid water," J. Chem. Phys. **74**, 65l4-16 (l98l).

13. A. D. J. Haymet, Michael D. Morse, and Stuart A. Rice, "Structural test for intermolecular force models of crystalline HCl," Mol. Phys. **43**, l45l-57 (l98l).

14. Michael D. Morse and Stuart A. Rice, "Tests of effective pair potentials for water: Predicted ice structures," J. Chem. Phys. **76**, 650-660 (l982).

15. J. B. Hopkins, P. R. R. Langridge-Smith, M. D. Morse, and R. E. Smalley, "Supersonic metal cluster beams of refractory metals: Spectral investigations of ultracold $Mo_2$," J. Chem. Phys. **78**, l627-37 (l983).

16. M. D. Morse, A. C. Puiu, and R. E. Smalley, "Intramolecular vibrational relaxation: Effects on electronic nonradiative relaxation rates," J. Chem. Phys. **78**, 3435-44 (l983).

17. M. D. Morse and K. F. Freed, "Rotational distributions from photodissociations IV. The bent triatomic molecule," J. Chem. Phys. **78**, 6045-65 (l983).

18. M. D. Morse, Y. B. Band, and K. F. Freed, "Angular distributions from photodissociations V. The bent triatomic molecule," J. Chem. Phys. **78**, 6066-78 (l983).

19. M. Townsend, S. A. Rice, and M. D. Morse, "A test of an effective pair potential for liquid water," J. Chem. Phys. **79**, 2496-98 (l983).

20. M. D. Morse, J. B. Hopkins, P. R. R. Langridge-Smith, and R. E. Smalley, "Spectroscopic studies of the jet-cooled copper trimer," J. Chem. Phys. **79**, 53l6-28 (l983).

21. P. R. R. Langridge-Smith, M. D. Morse, G. P. Hansen, R. E. Smalley, and A. J. Merer, "The bond length and electronic structure of $V_2$," J. Chem. Phys. **80**, 593-600 (l984).

22. M. D. Morse, G. P. Hansen, P. R. R. Langridge-Smith, Lan-Sun Zheng, M. E. Geusic, D. L. Michalopoulos, and R. E. Smalley, "Spectroscopic studies of the jet-cooled nickel dimer," J. Chem. Phys. **80**, 5400-5405 (l984).

23. Michael D. Morse and R. E. Smalley, "Supersonic metal clusters," Ber. Bunsenges. Phys. Chem. **88**, 228-33 (l984).

24. M. E. Geusic, M. D. Morse, and R. E. Smalley, "Hydrogen chemisorption on transition metal clusters," J. Chem. Phys. **82**, 590-91 (l985).

25. M. E. Geusic, M. D. Morse, S. C. O'Brien, and R. E. Smalley, "Surface reactions of metal clusters I: The fast flow cluster reactor," Rev. Sci. Instr. **56**, 2123-30 (1985).

26. M. D. Morse, M. E. Geusic, J. R. Heath, and R. E. Smalley, "Surface reactions of metal clusters II: Reactivity surveys with $D_2$, $N_2$, and CO," J. Chem. Phys. **83**, 2293-2304 (1985).

27. M. D. Morse, M. E. Geusic, S. C. O'Brien, and R. E. Smalley, "Photofragmentation processes in metal-ligand complexes: Benzene-tungsten and bis-benzene tungsten," Chem Phys. Lett. **122**, 289-93 (1985).

28. Jianguo Li, John Daschbach, Jerry J. Smith, Michael D. Morse, and Stanley Pons, "The infrared spectra of surface metal atom vibrations. SNIFTIRS studies in the far infrared region using time resolved FTIR techniques," J. Electroanal. Chem. **209**, 387-90 (1986).

29. Michael D. Morse, "Clusters of transition metal atoms," Chem. Rev. **86**, 1049-1109 (1986).

30. Michael D. Morse, "Copper trimer: a revised assignment of the upper state of the 5397 Å system," Chem. Phys. Lett. **133**, 8-13 (1987).

31. Zhenwen Fu, George W. Lemire, Yoon Mi Hamrick, Scott Taylor, Jin-Cheng Shui, and Michael D. Morse, "Spectroscopic studies of the jet-cooled aluminum trimer," J. Chem. Phys. **88**, 3524-31 (1988).

32. Y. Hamrick, S. Taylor, G. W. Lemire, Z.-W. Fu, J.-C. Shui, and M. D. Morse, "Evidence of structural isomerism in small niobium clusters," J. Chem. Phys. **88**, 4095-98 (1988).

33. Scott Taylor, George W. Lemire, Yoon Mi Hamrick, Zhenwen Fu, and Michael D. Morse, "Resonant two-photon ionization spectroscopy of jet-cooled $Pt_2$," J. Chem. Phys. **89**, 5517-23 (1988).

34. George W. Lemire, Zhenwen Fu, Yoon Mi Hamrick, Scott Taylor, and Michael D. Morse, "New electronic band systems of jet-cooled $C_3$: 266-302 nm," J. Phys. Chem. **93**, 2313-19 (1989).

35. Zhenwen Fu and Michael D. Morse, "Spectroscopy and electronic structure of jet-cooled NiCu," J. Chem. Phys. **90**, 3417-26 (1989).

36. John G. McCaffrey, Robert R. Bennett, Michael D. Morse, and W. H. Breckenridge, "Laser excitation spectroscopy of the A and B states of jet-cooled copper dimer: Evidence for large electronic isotope shifts," J. Chem. Phys. **91**, 92-103 (1989).

37. Yoon Mi Hamrick and Michael D. Morse, "Comparative cluster reaction studies of the V, Nb, Ta series," J. Phys. Chem. **93**, 6494-6501 (1989).

38. George W. Lemire, Gregory A. Bishea, Scott A. Heidecke, and Michael D. Morse, "Spectroscopy and electronic structure of jet-cooled GaAs," J. Chem. Phys. **92**, 121-32 (1990).

39. Scott Taylor, Eileen M. Spain, and Michael D. Morse, "Resonant two-photon ionization spectroscopy of jet-cooled NiPt," J. Chem. Phys. **92**, 2698-2709 (1990).

40. Scott Taylor, Eileen M. Spain, and Michael D. Morse, "Spectroscopy and electronic structure of jet-cooled NiPd and PdPt," J. Chem. Phys. **92**, 2710-20 (1990).

41. Gregory A. Bishea and Michael D. Morse, "The $a\ ^3\Sigma^+_{(u)} \leftarrow X\ ^1\Sigma^+_{(g)}$ band systems of CuAu and $Au_2$," Chem. Phys. Lett. **171**, 430-32 (1990).

42. Eileen M. Spain and Michael D. Morse, "Bond strengths of transition metal diatomics: VNi and $V_2$," Intl. J. Mass Spectrom. Ion Processes **102**, 183-97 (1990).

43. Zhenwen Fu, George W. Lemire, Gregory A. Bishea, and Michael D. Morse, "Spectroscopy and electronic structure of jet-cooled $Al_2$," J. Chem. Phys. **93**, 8420-41 (1990).

44. Yoon Mi Hamrick, Scott Taylor, and Michael D. Morse, "Optical spectroscopy of jet-cooled MoO," J. Mol. Spectrosc. **146**, 274-313 (1991).

45. Eileen M. Spain, Jane M. Behm, and Michael D. Morse, "The $A\ ^1\Sigma^+ \leftarrow X\ ^1\Sigma^+$ band system of CrMo," Chem. Phys. Lett. **179**, 411-16 (1991).

46. Michael D. Morse, "Clusters: Strange bits of matter," *Encyclopaedia Britannica 1992 Yearbook of Science and the Future*, 132-43 (1991).

47. Gregory A. Bishea, Ninette Marak, and Michael D. Morse, "Spectroscopic studies of jet-cooled CuAg," J. Chem. Phys. **95**, 5618-29 (1991).

48. Gregory A. Bishea, Jacqueline C. Pinegar, and Michael D. Morse, "The ground state and excited *d*-hole states of CuAu," J. Chem. Phys. **95**, 5630-45 (1991).

49. Gregory A. Bishea and Michael D. Morse, "Spectroscopic studies of jet-cooled AgAu and $Au_2$," J. Chem. Phys. **95**, 5646-59 (1991).

50. Gregory A. Bishea, Caleb A. Arrington, Jane M. Behm, and Michael D. Morse, "Resonant two-photon ionization spectroscopy of coinage metal trimers: $Cu_2Ag$, $Cu_2Au$, and CuAgAu," J. Chem. Phys. **95**, 8765-78 (1991).

51. Gregory A. Bishea and Michael D. Morse, "Resonant two-photon ionization spectroscopy of jet-cooled $Au_3$," J. Chem. Phys. **95**, 8779-92 (1991).

52. Scott A. Heidecke, Zhenwen Fu, John R. Colt, and Michael D. Morse, "Spectroscopy of AlAr and AlKr from 31,000 $cm^{-1}$ to the ionization limit," J. Chem. Phys. **97**, 1692-1710 (1992).

53. Eileen M. Spain and Michael D. Morse, "Bond strengths of transition metal dimers: TiV, $V_2$, TiCo, and VNi," J. Phys. Chem. **96**, 2479-86 (1992).

54. Eileen M. Spain, Jane M. Behm, and Michael D. Morse, "The 846 nm A $^3\Sigma_u^-$ ← X $^3\Sigma_g^-$ band system of jet-cooled $V_2$," J. Chem. Phys. **96**, 2511-16 (1992).

55. Eileen M. Spain and Michael D. Morse, "Spectroscopic studies of jet-cooled NiAu and PtCu," J. Chem. Phys. **97**, 4605-15 (1992).

56. Eileen M. Spain and Michael D. Morse, "The $d_{Ni}^8 d_{Cu}^{10}\sigma^2\sigma^{*1}$ manifold of excited electronic states of NiCu," J. Chem. Phys. **97**, 4633-40 (1992).

57. Eileen M. Spain and Michael D. Morse, "Ligand-field theory applied to diatomic transition metals: Results for the $d_A^9 d_B^9\sigma^2$ states of $Ni_2$, the $d_{Ni}^9 d_{Cu}^{10}\sigma^2$ states of NiCu, and the $d_{Ni}^8(\,^3F)d_{Cu}^{10}\sigma^2\sigma^{*1}$ excited states of NiCu," J. Chem. Phys. **97**, 4641-60 (1992).

58. Mats Doverstål, Bo Lindgren, Ulf Sassenberg, Caleb A. Arrington, and Michael D. Morse, "The $^3\Pi_{0u}$ ← X $^3\Delta_{1g}$ band system of jet-cooled $Ti_2$," J. Chem. Phys. **97**, 7087-92 (1992).

59. Solomon Bililign, Michael D. Morse, and W. H. Breckenridge, "Predissociation lifetimes of vibrational levels of the excited $^1B_1$ ($K_a' = 0$) electronic states of Cd•$H_2$ and Cd•$D_2$ complexes," J. Chem. Phys. **98**, 2115-22 (1993).

60. Michael D. Morse, "Chemical bonding in the late transition metals: The nickel and copper group dimers," Advances in Metal and Semiconductor Clusters, Vol. I. Spectroscopy and Dynamics, edited by M. A. Duncan, (JAI Press, Greenwich, Conn., 1993), 83-121.

61. Lon B. Knight, Jr., Robert M. Babb, Gina M. King, Allan J. McKinley, Michael D. Morse, and Caleb A. Arrington, "Laser vaporization generation of $Y^{10}B^+$, $Y^{11}B^+$, and $YAl^+$ for electron spin resonance studies in neon matrices at 4K: Comparison with theoretical calculations," J. Chem. Phys. **98**, 4404-12 (1993).

62. Larry M. Russon, Scott A. Heidecke, Michelle K. Birke, J. Conceicao, Peter B. Armentrout, and Michael D. Morse, "The bond strength of $Co_2^+$," Chem. Phys. Lett. **204**, 235-40 (1993).

63. Lon B. Knight, Jr., Allan J. McKinley, Robert M. Babb, Michael D. Morse, and Caleb Arrington, "Laser vaporization generation of the SiB and SiAl radicals for matrix isolation electron spin resonance studies: Comparison with theoretical calculations and assignment of their electronic ground states as X $^4\Sigma$," J. Chem. Phys. **98**, 6749-57 (1993).

64. Jacqueline C. Pinegar, Jon D. Langenberg, and Michael D. Morse, "Resonant two-photon ionization spectroscopy of jet-cooled $Ag_2Au$," Chem. Phys. Lett. **212**, 458-62 (1993).

65. Jane M. Behm, Caleb A. Arrington, Jon D. Langenberg, and Michael D. Morse, "Spectroscopic analysis of jet-cooled AlCu," J. Chem. Phys. **99**, 6394-6408 (1993).

66. Jane M. Behm, Caleb A. Arrington, and Michael D. Morse, "Spectroscopic studies of jet-cooled AlNi," J. Chem. Phys. **99**, 6409-15 (1993).

67. Lon B. Knight, Jr., Allan McKinley, and Michael D. Morse, "ESR investigation of $Sc_2^+$ in neon matrices and assignment of its ground electronic state as X $^4\Sigma^-$," J. Chem. Phys. **99**, 7376-83 (1993).

68. W. H. Breckenridge, Ingvar Wallace, David J. Funk, John G. Kaup, M. D. Morse, and Solomon Bililign, "Half-collision studies of singlet-to-triplet energy transfer: action spectroscopy and predissociation dynamics of electronically excited Cd·$H_2$ and Cd·$D_2$ Complexes," Proc. SPIE - Int. Soc. Opt. Eng. **1858**, 247-55 (1993).

69. Caleb A. Arrington, Thorsten Blume, Michael D. Morse, Mats Doverstål, and Ulf Sassenberg, "Bond strengths of transition metal diatomics: $Zr_2$, YCo, YNi, ZrCo, ZrNi, NbCo, and NbNi," J. Phys. Chem. **98**, 1398-1406 (1994).

70. Larry M. Russon, Scott A. Heidecke, Michelle K. Birke, J. Conceicao, Michael D. Morse, and P. B. Armentrout, "Photodissociation measurements of bond dissociation energies: $Ti_2^+$, $V_2^+$, $Co_2^+$, and $Co_3^+$," J. Chem. Phys. **100**, 4747-55 (1994).

71. Jane M. Behm and Michael D. Morse, "Electronic spectroscopy and electronic structure of the smallest metal clusters: The diatomic *3d* transition metal aluminides," Proc. SPIE - Int. Soc. Opt. Eng. **2124**, 388-99 (1994).

72. Andrew M. James, Pawel Kowalczyk, Benoit Simard, Jacqueline C. Pinegar, and Michael D. Morse, "The A $1_u \leftarrow$ X $0_g^+$ system of gold dimer," J. Mol. Spectrosc. **168**, 248-57 (1994).

73. Jane M. Behm, Michael D. Morse, Alexander I. Boldyrev, and Jack Simons, "Interaction of an Al atom with an alkaline earth atom: Spectroscopic and *ab initio* investigations of jet-cooled AlCa," J. Chem. Phys. **101**, 5441-53 (1994).

74. Jane M. Behm, Thorsten Blume, and Michael D. Morse, "Interaction of an Al atom with a closed subshell metal atom: spectroscopic analysis of jet-cooled AlZn," J. Chem. Phys. **101**, 5454-63 (1994).

75. Jane M. Behm, Dale J. Brugh, and Michael D. Morse, "Spectroscopic analysis of the open 3*d* subshell transition metal aluminides: AlV, AlCr, and AlCo," J. Chem. Phys. **101**, 6487-99 (1994).

76. Jane M. Behm and Michael D. Morse, "Resonant two-photon ionization spectroscopy of AlMn and an analysis of the chemical bonding in the 3*d* series of transition metal aluminides," J. Chem. Phys. **101**, 6500-11 (1994).

77. Jacqueline C. Pinegar, Jon D. Langenberg, C. A. Arrington, E. M. Spain, and M. D. Morse, "$Ni_2$ revisited: Reassignment of the ground electronic state," J. Chem. Phys. **102**, 666-74 (1995).

78. Caleb A. Arrington, Michael D. Morse, and Mats Doverstål, "Spectroscopy of mixed early-late transition metal diatomics: ScNi, YPd, and ZrCo," J. Chem. Phys. **102**, 1895-1904 (1995).

79. Caleb A. Arrington, Jon D. Langenberg, Jacqueline C. Pinegar, Michael D. Morse, Mats Doverstål, and Ulf Sassenberg, "Spectroscopy of jet-cooled AlY," J. Phys. Chem. **99**, 2589-93 (1995). (Stuart Rice Festschrift)

80. Caleb A. Arrington, Dale J. Brugh, Michael D. Morse, and Mats Doverstål, "Spectroscopy of jet-cooled YCu," J. Chem. Phys. **102**, 8704-13 (1995).

81. Jon D. Langenberg and Michael D. Morse, "Bond energies of transition metal dimers: TiZr, TiNb, and ZrV," Chem. Phys. Lett. **239**, 25-30 (1995).

82. Ingvar Wallace, Solomon Bililign, David J. Funk, John G. Kaup, M. D. Morse, and W. H. Breckenridge, "Half-collision studies of singlet-to-triplet energy transfer within electronically excited $Cd{\cdot}H_2$ and $Cd{\cdot}D_2$ complexes," in *The Chemical Dynamics and Kinetics of Small Radicals*, Kopin Liu and Albert Wagner, editors, Part II (World Scientific, 1996), pp 536-72.

83. Robert F. Gunion, St. John Dixon-Warren, W. C. Lineberger, and Michael D. Morse, "Ultraviolet Photoelectron Spectroscopy of Molybdenum and Molybdenum Monoxide Anions," J. Chem. Phys. **104**, 1765-73 (1996).

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85. Lon B. Knight, Jr., Keith A. Keller, Robert M. Babb, and Michael D. Morse, "Electron-spin resonance studies of the titanium cation ($Ti^+$, $3d^3$, $^4F$) in rare gas matrices at 4 K: A crystal field interpretation," J. Chem. Phys. **105**, 5331-40 (1996).

86. Dale J. Brugh and Michael D. Morse, "Resonant two-photon ionization spectroscopy of the 13-electron triatomic $Si_2N$," Chem. Phys. Lett. **267**, 370-76 (1997).

87. Larry M. Russon, Gretchen K. Rothschopf, and Michael D. Morse, "Resonant two-photon ionization spectroscopy of LiCu," J. Chem. Phys **107**, 1079-85 (1997).

88. Dale J. Brugh and Michael D. Morse, "Optical spectroscopy of jet-cooled FeC between 12,000 $cm^{-1}$ and 18,100 $cm^{-1}$," J. Chem. Phys. **107**, 9772-82 (1997).

89. Jon D. Langenberg and Michael D. Morse, "The bond energy of $Rh_2$," J. Chem. Phys. **108**, 2331-5 (1998).

90. W. H. Breckenridge, M. D. Morse, and John G. McCaffrey, "A pair potentials study of matrix-isolated atomic zinc. II. Intersystem crossing in rare gas clusters and matrices," J. Chem. Phys., **109**, 3137-44 (1998).

91. L. M. Russon, G. K. Rothschopf, M. D. Morse, A. I. Boldyrev, and Jack Simons "Two-photon ionization spectroscopy and all-electron *ab initio* study of LiCa," J. Chem. Phys. **109**, 6655-65 (1998).

92. Dale J. Brugh, Theodore J. Ronningen, and Michael D. Morse, "First spectroscopic investigation of the 4*d* transition metal monocarbide MoC," J. Chem. Phys. **109**, 7851-62 (1998).

93. Jon D. Langenberg, Ryan S. DaBell, Lian Shao, Dawn Dreessen, and Michael D. Morse, "Resonant two-photon ionization spectroscopy of jet-cooled RuC," J. Chem. Phys. **109**, 7863-75 (1998).

94. Jon D. Langenberg, Lian Shao, and Michael D. Morse, "Resonant two-photon ionization spectroscopy of jet-cooled PdC," J. Chem. Phys. **111**, 4077-86 (1999).

95. Colan Linton, Benoit Simard, Hans Peter Loock, Sara Wallin, Gretchen K. Rothschopf, Robert F. Gunion, Michael D. Morse, and Peter B. Armentrout, "Rydberg and PFI-ZEKE spectra of YO," J. Chem. Phys. **111**, 5017-5026 (1999).

96. D. L. Patrick, V. J. Cee, M. D. Morse, and T. P. Beebe, Jr., "Nanometer-Scale Aspects of Molecular Ordering in Nanocrystalline Domains at a Solid Interface: The Role of Liquid Crystal - Surface Interactions Studied by STM and Molecular Corrals," J. Phys. Chem. B **103(39)**, 8328-8336 (1999).

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98. Jacqueline C. Fabbi, Jon D. Langenberg, and Michael D. Morse, "The $[17.0]^2\Pi_{1/2}$ 7 X $^2\Pi_{1/2}$ System of AlCa," Chem. Phys. Lett. **320**, 303-6 (2000).

99. Shane M. Sickafoose, Jon D. Langenberg, and Michael D. Morse, "Rotationally Resolved Spectra of Isovalent NbCr and VCr," J. Phys. Chem A **104**, 3521-7 (2000).

100. Ryan S. DaBell, Raymond G. Meyer, and Michael D. Morse, "Electronic structure of the 4d transition metal carbides: Dispersed fluorescence spectroscopy of MoC, RuC, and PdC," J. Chem. Phys. **114**, 2938-54 (2001).

101. Zhenwen Fu, Larry M. Russon, Michael D. Morse, and P. B. Armentrout, "Photodissociation measurements of bond dissociation energies: $D_0(Al_2\text{-}Al)$, $D_0(TiO^+\text{-}Mn)$, and $D_0(V_2^+\text{-}V)$," Int. J. Mass Spectrom. **204**(1/3) 143-57 (2001).

102. Shane M. Sickafoose, David A. Hales, and Michael D. Morse, "The near infrared $^2\Pi(a_{\beta J}) \leftarrow X\ ^2\Sigma^+(b_{\beta S})$ band systems of TiCo and ZrCo," Can. J. Phys. **79**, 229-245 (2001).

103. Jacqueline C. Fabbi, Jon D. Langenberg, Quinton D. Costello, Michael D. Morse, and Lars Karlsson, "Dispersed fluorescence spectroscopy of jet-cooled AgAu and $Pt_2$," J. Chem. Phys. **115**, 7543-49 (2001).

104. Shane M. Sickafoose, Adam W. Smith, and Michael D. Morse, "Optical spectroscopy of tungsten carbide (WC)," J. Chem. Phys. **116**, 993-1002 (2002).

105. Marc B. Airola and Michael D. Morse, "Rotationally resolved spectroscopy of $Pt_2$," J. Chem. Phys., **116**, 1313-17 (2002).

106. Dale J. Brugh and Michael D. Morse, "Resonant two-photon ionization spectroscopy of NiC," J. Chem. Phys. **117**, 10703-14 (2002).

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167. Kimberly H. Tomchak, Jason J. Sorensen, Erick Tieu, and Michael D. Morse, "Predissociation-based measurements of bond dissociation energies of the uranium-chalcogenide bond: $US_2$, OUS, and USe," to be submitted.

168. Thomas Kawagoe and Michael D. Morse, "Bond dissociation energies of diatomic thorium and uranium chloride, bromide, and iodide," to be submitted.

169. Dakota M. Merriles, Kimberly H. Tomchak, Christopher Nielson, and Michael D. Morse, "Bond dissociation energies and electronic structure of the lanthanide diborides: $LaB_2$, $CeB_2$, $PrB_2$, $GdB_2$, and $LuB_2$," to be submitted.

170. Dakota M. Merriles, Yexalen Barrera-Casas, and Michael D. Morse, "The World's Smallest Molecules," invited Perspective article to be submitted to the Journal of Physical Chemistry Letters.

## VIII. Invited Presentations

1. University of Chicago, Chemical Physics Seminar, Chicago, Illinois, April 8, 1981.
"Some Perspective on Water"

2. Rice University, Houston, Texas, July 27, 1981
"Franck-Condon Theories of Molecular Photodissociation"

3. Brookhaven National Laboratory, Upton, New York, December 10, 1982
"Spectroscopic Studies of Small Metal Clusters"

4. Iowa State University, Ames, Iowa, January 24, 1983
"Spectroscopic Studies of Small Metal Clusters"

5. Arizona State University, Tempe, Arizona, December 12, 1983.
"Spectroscopic Studies of Transition Metal Dimers and Trimers"

6. Colorado State University, Fort Collins, Colorado, December 15, 1983
"Spectroscopic Studies of Transition Metal Dimers and Trimers"

7. The University of North Carolina, Chapel Hill, North Carolina, December 19, 1983.
"Spectroscopic Studies of Small Transition Metal Clusters"

8. The University of Utah, Salt Lake City, Utah, Jan. 16, 1984.
"Spectroscopic Studies of Transition Metal Dimers and Trimers"

9. The University of Pittsburgh, Pittsburgh, Pennsylvania, Jan. 23, 1984.
"Spectroscopic Studies of Transition Metal Dimers and Trimers"

10. The Aerospace Corporation, Los Angeles, California, Jan. 30, 1984.
"Spectroscopic Studies of Transition Metal Dimers and Trimers"

11. The University of Southern California, Los Angeles, California, February 1, 1984.
"Spectroscopic Studies of Transition Metal Dimers and Trimers."

12. IBM Research Laboratory, San Jose, California, Feb. 3, 1984.
"Spectroscopic Studies of Transition Metal Dimers and Trimers."

13. The Allied Corporation, Mount Bethel, New Jersey, March 13, 1984.
"Spectroscopic Studies of Small Transition Metal Clusters".

14. Exxon Research and Engineering, Clinton, New Jersey, March 14, 1984.
"Spectroscopic Studies of Small Transition Metal Clusters".

15. Bell Laboratories, Murray Hill, New Jersey, March 15, 1984.
"Spectroscopic Studies of Small Transition Metal Clusters".

16. Utah Workshop, Snowbird, Utah, September 26, 1985.
"Surface Reactions of Metal Clusters".

17. Brigham Young University, Provo, Utah, January 14, 1986.
"Studies of Gas-Phase Transition Metal Clusters."

18. Dow Chemical Company, M.E. Pruitt Research Center, Midland, Michigan, January 22, 1987.
"Spectroscopy, Structure, and Chemical Reactivity of Metal Clusters in the Gas Phase."

19. Utah State University, Logan, Utah, November 11, 1987.
"Reactivity and Spectroscopy of Ligand-Free Metal Clusters."

20. Furman University, Greenville, South Carolina, February 1, 1988.
"Reactivity and Spectroscopy of Ligand-Free Metal Clusters."
"Supersonic Jets: How and Why They Work."

21. ACS Symposium, **Chemistry of Isolated Atoms and Clusters: Metals and Semiconductors**, ACS National Meeting, Los Angeles, California, September 26, 1988.
"Spectroscopy and Reactivity of Ligand-Free Metal Clusters."

22. University of California, San Diego, California, October 18, 1988.
"Spectroscopy and Reactivity of Small Metal Clusters."

23. University of Denver, Denver, Colorado, November 2, 1988.
"Spectroscopy and Reactivity of Gas-Phase Metal Clusters."

24. University of Colorado, Boulder, Colorado, November 4, 1988.
"Spectroscopy and Electronic Structure of Small Metal Clusters."

25. NSF/SERC Young Scientists Workshop: Frontiers in Molecular Spectroscopy and Dynamics, Princeton University, New Jersey, June 17, 1989.
"Spectroscopic Studies of Small Metal Clusters."

26. 1989 Conference on the Dynamics of Molecular Collisions, Pacific Grove, California, July 21, 1989. "Small Metal Clusters: Reactions, Spectroscopy, and Predissociations."

27. Sandia National Laboratories, Livermore, California, July 24, 1989.
"Spectroscopic Studies of Small Metal and Semiconductor Molecules."

28. Gordon Conference on Metal and Semiconductor Clusters, August 1, 1989.
"Reactivity and Spectroscopy of Small Metal and Semiconductor Clusters."

29. University of Texas, Austin, Texas, September 7, 1989.
"Spectroscopy and Electronic Structure of Small Metal Clusters."

30. Rice University, Houston, Texas, September 8, 1989.
"Spectroscopy and Electronic Structure of Small Metal Clusters."

31. ACS Symposium, **Structures, Properties, and Dynamics of Clusters: Theory and Experiment**, ACS National Meeting, Miami, Florida, September 14, 1989.
"Spectroscopy, Electronic Structure, and Chemical Bonding of Selected Small Metal and Semiconductor Clusters."

32. Optical Society of America, National Meeting, Orlando, Florida, October 16, 1989.
"Spectroscopic Studies of Diatomic Metals and Semiconductors."

33. Haverford College, Haverford, Pennsylvania, February 28, 1990.
"Spectroscopic Studies of Gas-Phase Metal Clusters."

34. Franklin and Marshall College, Lancaster, Pennsylvania, March 1, 1990.
"Spectroscopic Studies of Gas-Phase Metal Clusters."

35. Swarthmore College, Swarthmore, Pennsylvania, March 2, 1990.
"Spectroscopic Studies of Gas-Phase Metal Clusters."

36. University of Puerto Rico, Rio Piedras, Puerto Rico, April 2, 1990.
"Reactivity and Spectroscopy of Gas Phase Metal Clusters."

37. Regional ACS Symposium on the Kinetics of Inhomogeneous Systems, Salt Lake City, June 14, 1990. "Metal Cluster Reactivity, Spectroscopy, and Thermochemistry."

38. 38th Annual Western Spectroscopy Association Meeting, Asilomar, California, January 31, 1991.
"Spectroscopic Probes of the Metal-Metal Chemical Bond."

39. West Coast Theoretical Chemistry Conference, Ames, California, March 27-29, 1991.
"Spectroscopic Probes of the Metal-Metal Chemical Bond."

40. University of Colorado, Colorado Springs, Colorado, April 11, 1991.
"Ligand-Free Metal Clusters in the Gas Phase: Reactivity, Spectroscopy, and Electronic Structure."

41. Arizona State University, Tempe, Arizona, September 26, 1991.
"Chemical Bonding and Electronic Structure of Small Metal Clusters"

42. University of California, Davis, California, January 28, 1992.
"Chemical Bonding and Electronic Structure of Small Metal Clusters"

43. Furman University, Greenville, South Carolina, February 20, 1992.
"Small Metal Clusters"

44. University of Virginia, Charlottesville, Virginia, February 21, 1992.
"Chemical Bonding and Electronic Structure of Small Metal Clusters"

45. Ohio State University, Columbus, Ohio, February 24, 1992.
"Chemical Bonding and Electronic Structure of Small Metal Clusters"

46. APS Symposium, entitled "**Elementary to Complex Systems**," Seattle, Washington, March 22, 1993. "Electronic Spectra of Small Metal Clusters"

47. ACS Symposium: **Electron Spin Effects**, March 28, 1993
ACS National Meeting, Denver, Colorado
"Electronic Structure of Diatomic Metals"

48. The Institute for Atomic and Molecular Science, Taipei, Taiwan, June 14, 1993.
"Resonant Two-Photon Ionization Spectroscopy of Metal Dimers and Trimers"
"Reactivity Studies of Metal Clusters"

49. Sun-Yat Sen University, Kaohsiung, Taiwan, June 16, 1993
"Electronic Structure and Chemical Bonding in Transition Metal Diatomics"

50. Symposium honoring Prof. Karl F. Freed on his 50$^{th}$ Birthday,
University of Chicago, Chicago, October 1, 1993
"Electronic Spectra and Electronic Structure of Transition Metal Diatomics"

51. Optical Society of America Symposium, Toronto, Ontario, Canada, October 4, 1993.
"Chemical Bonding and Electronic Structure of Small Metal Molecules"

52. National Research Council of Canada, Ottawa, Ontario, Canada, October 7, 1993.
"Electronic Spectra and Electronic Structure of Transition Metal Diatomics"

53. SPIE Conference, Los Angeles, California, January 29, 1994
"Electronic Spectroscopy and Electronic Structure of the Smallest Metal Clusters"

54. Massachusetts Institute of Technology, Cambridge, Massachusetts, March 29, 1994
"Electronic Structure and Chemical Bonding in Transition Metal Diatomics"

55. Furman University, Greenville, South Carolina, February 13, 1995.
"Spectroscopic Studies of Transition Metal Molecules"

56. University of Georgia, Athens, Georgia, February 14, 1995
"Electronic Structure and Chemical Bonding in Transition Metal Diatomics"

57. Emory University, Atlanta, Georgia, February 15, 1995
"Spectroscopic Studies of the Metal-Metal Chemical Bond"

58. University of Florida, Gainesville, Florida, February 17, 1995
"Spectroscopic Studies of the Metal-Metal Chemical Bond"

59. ACS Symposium: **Metal-Metal Bonding From Clusters to Surfaces**, April 2-7, 1995
ACS National Meeting, Anaheim, California
"Chemical Bonding and Electronic Structure of Diatomic Metals"

60. Princeton University, Princeton, NJ, February 7, 1996.
"Electronic Spectra and Electronic Structure of Diatomic Transition Metals"

61. Pacific Northwest National Laboratory, Richland, WA, February 28, 1996.
"Electronic Spectra and Electronic Structure of Diatomic Transition Metals"

62. Brigham Young University, Provo, UT, February 29, 1996.
"Electronic Spectra and Electronic Structure of Transition Metal Diatomics"

63. University of Victoria, Victoria, B.C., Canada, March 7, 1996
"Spectroscopic Studies of Transition Metal Molecules"

64. University of British Columbia, Vancouver, B.C., Canada, March 8, 1996
"Spectroscopic Studies of Transition Metal Molecules"

65. University of California, Irvine, CA, April 9, 1996.
"Electronic Spectra and Electronic Structure of Transition Metal Diatomics"

66. University of Utah, Salt Lake City, UT, April 15, 1996.
"Electronic Spectra and Structure of the Late Transition Metal Dimers"

67. 51$^{st}$ Ohio State University International Symposium on Molecular Spectroscopy, June 10-14, 1996. Plenary Lecture, "Spectroscopy of Diatomic Transition Metal Molecules"

68. University of Nevada, Reno, NV, March 7, 1997,
"Electronic Spectroscopy of Transition Metal Molecules".

69. Haverford College, Haverford, PA, April 19, 1997, **Symposium in honor of Colin F. MacKay**,
"Electronic Spectroscopy of Reactive Transition Metal Molecules"

70. 24$^{th}$ International Symposium on Free Radicals, Tällberg, Sweden, August 17-22, 1997.
"Electronic Spectroscopy of Transition Metal Carbides and Organometallic Radicals"

71. 5$^{th}$ Chemical Congress of North America, Cancun, Mexico, **Symposium on Transition Metal Clusters and Metal-Ligand Interactions**, November 11-15, 1997,
"Electronic Structure of Transition Metal Diatomics and Metal-Ligand Complexes".

72. Occidental College, Los Angeles, CA, November 19, 1997,
"Spectroscopic Studies of Metal Clusters and Organometallic Radicals".

73. California State University at Fullerton, Fullerton, CA, November 20, 1997,
"Spectroscopic Studies of Metal Clusters and Organometallic Radicals".

74. 81st Canadian Society for Chemistry Conference and Exhibition, Whistler, BC, Canada, May 31-June 4, 1998. ″Electronic Spectroscopy of Transition Metal Carbides and Organometallic Radicals″

75. Solid State Physics Seminar, University of Utah Department of Physics, February 26, 1999. ″Electronic Spectra and Electronic Structure of Diatomic Transition Metals in the Gas Phase″

76. Gordon Conference on the Chemistry and Physics of Matrix Isolated Species, Plymouth, NH, July 11-15, 1999 ″Matrix Isolation without the Matrix: Spectroscopy of Transition Metal Molecules in Supersonic Jets″

77. University of Kentucky, Lexington, KY, October 8, 1999,
″Electronic Spectra and Electronic Structure of Transition Metal Molecules in the Gas Phase″

78. **Symposium in Memory of Gerhard Herzberg**, Cornwall, Canada, Oct. 30- Nov. 3, 1999
″Electronic Spectra and Electronic Structure of Diatomic Transition Metal Molecules″

79. Western Washington University, Bellingham, WA, January 20, 2000.
″Laser Spectroscopic Probes of Diatomic Transition Metals″

80. Central Washington University, Ellensburg, WA, January 21, 2000.
″Laser Spectroscopic Probes of Diatomic Transition Metals″

81. California Institute of Technology, Pasadena, CA, May 16, 2000.
″Spectroscopic studies of transition metal molecules in the gas phase″

82. University of Arizona, Tucson, AZ, December 4, 2000.
″Electronic Spectroscopy and Electronic Structure of Diatomic Transition Metal Carbides.″

83. PACIFICHEM 2000, Symposium on Metal-Metal and Metal-Ligand Interactions, Honolulu, Hawaii, December 14-19, 2000. ″Spectroscopic Probes of the Metal-Metal Bond″

84. ACS Symposium: **Contemporary Aspects of Chemical Bonding**, Sept. 7-11, 2003
226th ACS National Meeting, New York, New York
"Varieties of the chemical bond: Spectroscopic studies of diatomic metals"

85. City University of New York, New York, NY, Sept. 10, 2003
″Spectroscopic Probes of the Metal-Metal Bond″

86. University of Delaware, Newark, DE, Dec. 1, 2003
″Spectroscopy of Transition Metal Carbides and Organometallic Radicals″

87. Rocky Mountain Regional ACS Meeting, Symposium: New Frontiers in Chemical Bonding, June 6-9, 2004 ″Spectroscopic studies of diatomic metals,″ June 8, 2004.
Utah State University, Logan, UT

88. Université Marne-la-Vallée, Paris, FRANCE, October 17, 2005
″Electronic Spectra and Structure of Diatomic Transition Metals″

89. Université Pierre et Marie Curie, Paris, FRANCE, October 19, 2005
″Electronic Spectra and Structure of Diatomic Transition Metals″

90. Universität Basel, Basel, SWITZERLAND, November 2, 2005
″Electronic Spectra and Structure of Diatomic Transition Metals″

91. Technische Universität Braunschweig, Braunschweig, GERMANY
″Electronic Spectra and Structure of Diatomic Transition Metals″
November 8, 2005

92. Freie Universität Berlin, Berlin, GERMANY, November 9, 2005
″Electronic Spectra and Structure of Diatomic Transition Metals″

93. Sonoma State University, Rohnert Park, CA, March 2, 2006
″Laser Spectroscopy of Transition Metal Molecules in the Gas Phase″

94. 2006 Meeting on Condensed Phase and Interfacial Molecular Science, sponsored by the DOE, October 22-25, 2006
″Spectroscopy of Organometallic Radicals″
Airlie Conference Center, Warrenton, VA

95. Emory University, Atlanta, GA, November 6, 2006
″Laser Spectroscopy of Transition Metal Molecules″

96. Montana State University, Billings, MT, February 26, 2007
″Laser Spectroscopy of Transition Metal Molecules in the Gas Phase″

97. University of California, Davis, California, October 14, 2008.
″Laser Spectroscopy of Transition Metal Molecules in the Gas Phase″

98. University of Missouri, Saint Louis, MO, November 3, 2008.
″Laser Spectroscopy of Transition Metal Carbides and Organometallic Radicals″

99. University of Arizona, Tucson, AZ, November 17, 2008
″Laser Spectroscopy of Transition Metal Molecules in the Gas Phase″

100. Willamette University, Salem, OR, February 16, 2009
″Laser Spectroscopy of Transition Metal Molecules in the Gas Phase″

101. 30$^{th}$ International Symposium on Free Radicals, Savonlinna, Finland, July 25-30, 2009.
"Laser Spectroscopy of Metal-Containing Free Radicals"

102. 2009 Meeting on Condensed Phase and Interfacial Molecular Science, sponsored by the DOE, October 18-21, 2009
"Spectroscopy of Organometallic Radicals"
Airlie Conference Center, Warrenton, VA

103. Brown University, Providence, RI, October 20, 2011.
"Transition Metal Molecules in the Gas Phase"

104. Universität Basel, Basel, SWITZERLAND, June 26, 2012
″Electronic Spectroscopy and Electronic Structure of Organometallic Radicals″

105. University of Minnesota, Minneapolis, MN, Dec. 5, 2013
"Electronic Spectra and Electronic Structure of Transition Metal Molecules"

106. ACS Symposium, **Thermodynamics, Reactivity, and Spectroscopy of the Heavy Elements**, ACS National Meeting, Dallas, Texas, March 16-20, 2014.
"Spectroscopic studies of difficult diatomics: UN, TiFe, and ZrFe."

107. International Conference on Chemical Bonding, Kauai, Hawaii, July 24-28, 2014
"Chemical Bonding in Diatomic Transition Metals"

108. University of North Texas, Denton, Texas, October 17, 2014
"Electronic Spectra and Electronic Structure of Transition Metal Molecules"

109. Modern Optics and Spectroscopy Series, MIT, October 20, 2015
"Transition metal spectroscopy: From diatomic metals to the metal-carbon bond"

110. Symposium in Honor of John P. Maier, Switzerland, September 3-4, 2016.

111. International Conference on Chemical Bonding, Kauai, Hawaii, July 13-17, 2018
"Predissociation Measurements of Bond Dissociation Energies"
Andrew Sevy, Jason J. Sorensen, Eric L. Johnson, Daniel J. Matthew, and Michael D. Morse

112. Duquesne University, Pittsburgh, Pennsylvania, October 11, 2019.
"Spectroscopic and thermochemical studies of small metal molecules"

113. Indiana University, Bloomington, Indiana, March 26, 2020. (cancelled)

114. International Conference on Chemical Bonding, Kauai, Hawaii, August 9-13, 2020. (cancelled)

115. Angela Wilson group meeting, Michigan State University (via Zoom), "Predissociation Measurements of Bond Dissociation Energies", July 13, 2021.

116. Saint Louis Section, American Chemical Society, Celebration in honor of Leah C. O'Brien, winner of the Saint Louis Award. "Predissociation Measurements of Bond Dissociation Energies," October 1, 2021

117. Science Day at Alpine School District, "Laser Spectroscopy of Transition Metal Molecules in the Gas Phase," October 18, 2021.

118. Boston College, Boston, Massachusetts, March 31, 2022.
"Predissociation Measurements of Bond Dissociation Energies: d-Block and f-Block Molecules"

119. 7th International Conference on Chemical Bonding 2022, Kauai, HI, August 11-16, 2022.
"Bond Dissociation Energies and Electronic Structure of *d*- and *f*-Block Molecules"

120. Heavy Element Chemistry PI Meeting, Gaithersburg Marriott Washington, April 24-26, 2023.
"Electronic Structure, Spectroscopy, and Bond Dissociation Energies of Small Actinide Molecules"

121. Gas Phase Chemical Physics PI Meeting, May 31-June 2, 2023.
"Electronic Structure, Spectroscopy, and Bond Dissociation Energies of Small Actinide Molecules"

122. Distinguished Professor Seminar, University of Utah, April 8, 2024
"Precise Measurements of Bond Dissociation Energies of *d*- and *f*-block Molecules"

123. University of West Florida, April 12, 2024.
"Precise Measurements of Bond Dissociation Energies: *d*- and *f*-block Molecules"

124. International Symposium on Molecular Spectroscopy, June 17-21, 2024
"Precise Measurements of Bond Dissociation Energies: Heavy Metal Molecules"

**IX. Contributed Papers:**

1. Gordon Conference on Metal and Semiconductor Clusters, August 2-7, 1987.
"Spectroscopic Studies of the Jet-Cooled Aluminum Trimer" (poster).

2. ACS Symposium on Chemistry of Isolated Atoms and Clusters: Metals and Semiconductors,
ACS National Meeting, Los Angeles, California, September 28, 1988.
"Resonant Two-Photon Ionization Spectroscopy of Jet-Cooled $Pt_2$" (poster).

3. ACS Symposium on Chemistry of Isolated Atoms and Clusters: Metals and Semiconductors,
ACS National Meeting, Los Angeles, California, September 29, 1988.
"Comparative Reaction Studies of the Group VB Transition Metal Clusters" (poster).

4. ACS Symposium on Chemistry of Isolated Atoms and Clusters: Metals and Semiconductors,
ACS National Meeting, Los Angeles, California, September 29, 1988.
"Spectroscopic Studies of the Jet-Cooled Carbon Trimer" (poster).

5. ACS Symposium on Chemistry of Isolated Atoms and Clusters: Metals and Semiconductors,
ACS National Meeting, Los Angeles, California, September 29, 1988.
"Spectroscopic Studies of the Jet-Cooled Aluminum Trimer" (poster).

6. ACS Symposium on Chemistry of Isolated Atoms and Clusters: Metals and Semiconductors,
ACS National Meeting, Los Angeles, California, September 29, 1988.
"Spectroscopy and Electronic Structure of Jet-Cooled NiCu" (poster).

7. 38th Annual Western Spectroscopy Association Meeting, Asilomar, California, January 30, 1991.
"Spectroscopy of the Late Transition Metal Dimers and Trimers" (poster)
G. A. Bishea, E. M. Spain and M. D. Morse.

8. 38th Annual Western Spectroscopy Association Meeting, Asilomar, California, January 30, 1991.
"Spectroscopic Studies of Diatomic Aluminum Molecules: AlNi, AlCu, AlAr, and AlKr,"
J. M. Behm, C. A. Arrington, S. A. Heidecke, Z.-W. Fu, and M. D. Morse (poster).

9. Gordon Conference on Molecular Electronic Spectroscopy, August 12-16, 1991.
"Ligand Field Theory Applied to Transition Metal Diatomics," (poster).
Eileen M. Spain and Michael D. Morse

10. 39th Annual Western Spectroscopy Association Meeting, Asilomar, California, January 30, 1992.
"Spectroscopic Studies of Diatomic Metals," (poster).
C. A. Arrington, J. M. Behm, and M. D. Morse

11. 39th Annual Western Spectroscopy Association Meeting, Asilomar, California, January 30, 1992.
"Bond Strengths of Transition Metal Dimers," (poster).
E. M. Spain and M. D. Morse

12. 16th NSF National Organometallic Workshop, Snowbird, Utah, May 8, 1992.
"Spectroscopic Studies of Diatomic Metals," (poster).
J. M. Behm, C. A. Arrington, and M. D. Morse

13. High Resolution Spectroscopy: First Topical Meeting of the Optical Society of America, Salt Lake City, Utah, January 18, 1993.
"Spectroscopy of Jet-Cooled $Ag_2Au$," (poster).
Jacqueline C. Pinegar, Jon D. Langenberg, and Michael D. Morse

14. High Resolution Spectroscopy: First Topical Meeting of the Optical Society of America, Salt Lake City, Utah, January 18, 1993.
"Bond Energies of Small Transition Metal Cation Clusters," (poster).
Larry M. Russon, Scott A. Heidecke, Michelle K. Birke, J. Conceicao, P. B. Armentrout and Michael D. Morse

15. High Resolution Spectroscopy: First Topical Meeting of the Optical Society of America, Salt Lake City, Utah, January 18, 1993.
"Spectroscopic Analysis of the Transition Metal Aluminides," (poster).
Jane M. Behm, Caleb A. Arrington, Thorsten Blume, Jon D. Langenberg, and Michael D. Morse

16. High Resolution Spectroscopy: First Topical Meeting of the Optical Society of America, Salt Lake City, Utah, January 18, 1993.
"High Resolution Spectroscopy of $Ti_2$ and AlY at Near-Infrared Frequencies,"
Caleb A. Arrington, Jon D. Langenberg, Jacqueline C. Pinegar, and Michael D. Morse (poster).

17. 1993 Conference on Ion Chemistry and Mass Spectrometry, Lake Arrowhead, CA, January 29-31, 1993.
"Bond Energies of Small Transition Metal Cation Clusters,"
Larry M. Russon, Scott A. Heidecke, Michelle K. Birke, J. Conceicao, P. B. Armentrout and Michael D. Morse (poster).

18. Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, June 16, 1993
"Interaction of an Aluminum Atom with a Closed Subshell Metal Atom: Spectroscopic Analysis of AlZn,"
Jane M. Behm, Thorsten Blume, and Michael D. Morse

19. Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio, June 18, 1993
"The $^3\Pi_{0u} \leftarrow X\ ^3\Delta_{1g}$ Band System of Jet-Cooled $Ti_2$,"
M. Doverstål, Bo Lindgren, Ulf Sassenberg, Caleb Arrington, and Michael D. Morse

20. ACS Symposium on Connecting Molecular-Level Calculational Tools with Experiment, ACS National Meeting, Chicago, Illinois, August 25, 1993.
"Spectroscopic Analysis of Jet-Cooled AlCu"
Jane M. Behm, Caleb A. Arrington, Jon D. Langenberg, and Michael D. Morse

21. 49th International Symposium on Molecular Spectroscopy, June 13-17, 1994
"$Ni_2$ Revisited: Reassignment of the Ground Electronic State in Agreement with Ligand Field and *ab initio* Results"
J. C. Pinegar, J. D. Langenberg, C. A. Arrington, E. M. Spain, and M. D. Morse

22. 49th International Symposium on Molecular Spectroscopy, June 13-17, 1994
"Photodissociation Measurements of Bond Dissociation Energies: $Ti_2^+$, $V_2^+$, $Co_2^+$, and $Co_3^+$," Larry M. Russon, Scott A. Heidecke, Michelle K. Birke, J. Conceicao, Michael D. Morse, and Peter B. Armentrout

23. 49th International Symposium on Molecular Spectroscopy, June 13-17, 1994
"Photodissociation Measurements of the Bond Dissociation Energies of TiZr, TiNb, and VZr" Jon D. Langenberg and Michael D. Morse

24. 49th International Symposium on Molecular Spectroscopy, June 13-17, 1994
"Jet-Cooled Spectroscopy of $Si_2N$"
Dale J. Brugh and Michael D. Morse

25. 42nd Annual Western Spectroscopy Association Meeting, Asilomar, California, February 2, 1995.
"Dispersed Fluorescence of AlNi: A Test of the Ligand Field Model" (poster).
Jacqueline C. Pinegar and Michael D. Morse

26. 23rd International Symposium on Free Radicals, Victoria, British Columbia, August 14, 1995.
"Spectra of Titanium and Zirconium Dimers"
M. Doverstäl, L. Karlsson, B. Lindgren, U. Sassenberg, C. A. Arrington, and M. D. Morse

27. 10th DOE/BES Heterogeneous Catalysis Conference, Lake Conroe, Texas, May 22, 1996.
"Spectroscopy of Unsaturated Metal-Ligand Complexes: Electronic Spectroscopy of FeC and RuC, and Electronic Spectroscopy of Organochromium Radicals"
Jon D. Langenberg, Dale J. Brugh, and Michael D. Morse

28. 51st International Symposium on Molecular Spectroscopy, June 10-14, 1996
"Electronic Spectroscopy of RuC from 12,000 to 19,000 $cm^{-1}$"
J. D. Langenberg, R. DaBell, D. Dreessen, and M. D. Morse

29. Fourth DOE/BES Research Conference on Homogeneous Catalysis and Organometallic Chemistry, Johns Hopkins University, June 3-7, 1998.
"Electronic spectroscopy of transition metal carbides and organometallic radicals"
J. D. Langenberg, D. J. Brugh, and M. D. Morse

30. 54th International Symposium on Molecular Spectroscopy, June 14-18, 1999
"Dispersed Fluorescence Spectroscopy of MoC: Observation of the $\delta^1\sigma^1$, $^3\Delta_2$ and $^1\Delta_2$ states," Ryan S. DaBell, Raymond G. Meyer, and Michael D. Morse

31. 54th International Symposium on Molecular Spectroscopy, June 14-18, 1999
"Dispersed Fluorescence Spectroscopy of RuC: An Examination of the Ground and Low-Lying Electronic States, Ryan S. DaBell and Michael D. Morse

32. 54th International Symposium on Molecular Spectroscopy, June 14-18, 1999
"Dispersed Fluorescence Spectroscopy of PdC: Assignment of the $^1\Sigma^+$ Ground State and Observation of Low-Lying States," Ryan S. DaBell and Michael D. Morse

33. Gordon Conference on the Chemistry and Physics of Matrix Isolated Species, Plymouth, NH, July 11-15, 1999, "PFI-ZEKE Spectroscopy of Transition Metal Oxide Molecules", (poster)
Gretchen Rothschopf, Bob Gunion, Peter B. Armentrout, and Michael D. Morse

34. 25th International Symposium on Free Radicals, Flagstaff, AZ, August 15-20, 1999
Rotationally Resolved Spectra of Isovalent NbCr and VCr (poster)
Shane M. Sickafoose, Jon D. Langenberg, and Michael D. Morse

35. 25th International Symposium on Free Radicals, Flagstaff, AZ, August 15-20, 1999
Spectroscopic Investigation of NiSi: Identification of the Ground and Low-Lying Excited Electronic States (poster), Ned F. Lindholm, Gretchen K. Rothschopf, Shane M. Sickafoose, Dale J. Brugh, and Michael D. Morse

36. 25th International Symposium on Free Radicals, Flagstaff, AZ, August 15-20, 1999
Dispersed Fluorescence Spectroscopy of MoC, RuC, and PdC: An Examination of Low-Lying Electronic States (poster)
Ryan S. DaBell, Raymond G. Meyer,and Michael D. Morse

37. 55th International Symposium on Molecular Spectroscopy, June 12-16, 2000
"The Rotationally Resolved Near Infrared Band Systems of TiCo and ZrCo"
Shane M. Sickafoose, Michael D. Morse, and David A. Hales

38. 56th International Symposium on Molecular Spectroscopy, June 12-16, 2001
Electronic Spectroscopy of WC from 17,500 to 24,000 $cm^{-1}$
Adam W. Smith, Shane M. Sickafoose, and Michael D. Morse

39. 60th International Symposium on Molecular Spectroscopy, June 20-24, 2005
Infrared diode laser spectroscopy of jet-cooled $Ni(CO)_3{}^{13}CO$ and NiCO
Alonzo Martinez and Michael D. Morse

40. 28th International Symposium on Free Radicals, Leysin Switzerland, September 4-9, 2005
IR diode laser spectroscopy of the $\nu_1$ band of NiCO (poster)
Alonzo Martinez and Michael D. Morse

41. 54th Annual Western Spectroscopy Association Conference, January 31 - February 2, 2007
IR diode laser spectroscopy of the $\nu_1$ band of NiCO (poster)
Alonzo Martinez and Michael D. Morse

42. 54th Annual Western Spectroscopy Association Conference, January 31 - February 2, 2007
Resonant Two-Photon Ionization Spectroscopy of NiSi and RuSi (poster)
Ned Lindholm and Michael D. Morse

43. 54th Annual Western Spectroscopy Association Conference, January 31 - February 2, 2007
Rotationally Resolved Spectra of VMo, NbMo, ScCo, and YCo (poster)
Ramya Nagarajan, Shane Sickafoose, and Michael D. Morse

44. 29th International Symposium on Free Radicals, Big Sky, Montana, August 12-17, 2007
Resonant two-photon ionization spectroscopy of jet-cooled OsC (poster)
Olha Krechkivska and Michael D. Morse

45. 29th International Symposium on Free Radicals, Big Sky, Montana, August 12-17, 2007
Resonant two-photon ionization spectroscopy of NiSi and RuSi (poster)
Ned Lindholm and Michael D. Morse

46. 29th International Symposium on Free Radicals, Big Sky, Montana, August 12-17, 2007
Rotationally resolved spectra of VMo, NbMo, ScCo, and YCo (poster)
Ramya Nagarajan, Shane M. Sickafoose, and Michael D. Morse

47. 63rd International Symposium on Molecular Spectroscopy, June 16-20, 2008
Resonant two-photon ionization spectroscopy of jet-cooled osmium nitride
Maria A. Garcia and Michael D. Morse

48. 63rd International Symposium on Molecular Spectroscopy, June 16-20, 2008
Resonant two-photon ionization spectroscopy of jet-cooled OsC
Olha Krechkivska and Michael D. Morse

49. SACNAS 2008 National Conference, Salt Lake City, UT, October 9-12, 2008.
Resonant two-photon ionization spectroscopy of jet-cooled osmium nitride (poster)
Maria A. Garcia and Michael D. Morse

50. SACNAS 2008 National Conference, Salt Lake City, UT, October 9-12, 2008.
IR diode laser spectroscopy of the $v_1$ band of NiCO (poster)
Alonzo Martinez and Michael D. Morse

51. 40 Years of Ion Chemistry - Symposium Honoring W. Carl Lineberger, University of Colorado, Boulder, CO "Rotationally resolved spectra of VMo, NbMo, ScCo, and YCo," (poster)
Ramya Nagarajan, Shane Sickafoose, and Michael D. Morse

52. 30th International Symposium on Free Radicals, Savonlinna, Finland, July 25-30, 2009
Resonant two-photon ionization (R2PI) spectroscopy of jet-cooled osmium nitride (poster)
Maria A. Garcia and Michael D. Morse

53. 30th International Symposium on Free Radicals, Savonlinna, Finland, July 25-30, 2009
Resonant Two-Photon Ionization Spectroscopic Investigation of ZrF (poster)
Alonzo Martinez and Michael D. Morse

54. MGE@MSA/WAESO Student Research Conference, Tempe, AZ, January 28, 2010
Resonant two-photon ionization (R2PI) spectroscopy of jet-cooled osmium nitride (poster)
Maria A. Garcia and Michael D. Morse

55. 57th Annual Western Spectroscopy Association Conference, February 3-5, 2010
Resonant two-photon ionization (R2PI) spectroscopy of jet-cooled osmium nitride (poster)
Maria A. Garcia and Michael D. Morse

56. 57th Annual Western Spectroscopy Association Conference, February 3-5, 2010
Resonant two-photon ionization (R2PI) spectroscopy of jet-cooled TaC and OsC
Olha Krechkivska and Michael D. Morse

57. Research Experiences for Undergraduates Symposium, Council on Undergraduate Research, Arlington, VA, October 23-24, 2016.
Bond Dissociation Energies of Diatomic Molecules MSe and MSi (M=Ti, Zr, Hf, V, Nb, and Ta) Using Resonant Two-Photon Ionization Spectroscopy (poster)
Thomas D. Persinger, Jordan Franchina, Andrew Sevy, Jason J. Sorensen, Eric L. Johnson, and Michael D. Morse

58. Utah Conference on Undergraduate Research, Feb. 17, 2017
Bond Dissociation Energies of Diatomic Transition Metal Species MSe and MSi (M=Ti, Zr, Hf, V, Nb, and Ta) (poster)
Jordan Franchina, Thomas D. Persinger, Andrew Sevy, Jason J. Sorensen, Eric L. Johnson, and Michael D. Morse

59. Utah Conference on Undergraduate Research, Feb. 17, 2017
Determination of the Bond Dissociation Energies of FeX and NiX (X=C, S, Se) Using Resonant Two-Photon Ionization Spectroscopy (poster)
Erick Tieu, Daniel J. Matthew, and Michael D. Morse

60. University of Utah Undergraduate Research Symposium, August 1, 2019
Bond Dissociation Energies of Late Transition Metal Sulfides (poster)
Jason J. Sorensen, Christopher Nielson, Erick Tieu, and Michael D. Morse

61. University of Utah Undergraduate Research Symposium, April 20, 2020
Early Transition Metal Boride Bond Dissociation Energies
Dakota M. Merriles, Christopher Nielson, Erick Tieu, and Michael D. Morse

62. Rocky Mountain Regional ACS Meeting, Nov. 12-13, 2020
Bond dissociation energies of transition metal borides
Dakota M. Merriles, Cristopher Nielson, Erick Tieu, and Michael D. Morse

63. 2021 Spring University of Utah Graduate Student Conference, Feb. 8, 2021
Spectroscopy Studies of Transition Metal Borides (talk)
Dakota M. Merriles, Erick Tieu, Christopher Nielson, and Michael D. Morse

64. National Conference on Undergraduate Research, April 12-14, 2021
Early Transition-Metal Boride Bond Dissociation Energies (poster)
Dakota M. Merriles, Christopher Nielson, Erick Tieu, and Michael D. Morse

65. ACS Spring National Meeting, April 14, 2021
Bond dissociation energies of transition metal and lanthanide borides with resonant two-photon ionization spectroscopy
Dakota M. Merriles, Kimberly H. Tomchak, Erick Tieu, Christopher Nielson, and Michael D. Morse

66. International Symposium on Molecular Spectroscopy, 2021
"Spectroscopic studies of transition metal and lanthanide borides with resonant two-photon ionization spectroscopy,"
Dakota M. Merriles, Kimberly H. Tomchak, Erick Tieu, Christopher Nielson, and Michael D. Morse

67. International Symposium on Molecular Spectroscopy, 2021
"Bond dissociation energies of diatomic lanthanide sulfides and selenides"
Jason J. Sorensen, Erick Tieu, and Michael D. Morse

68. APS Division of Atomic, Molecular, and Optical Physics 2021, June 3, 2021
"Spectroscopic studies of transition metal and lanthanide borides with resonant two-photon ionization spectroscopy,"
Dakota M. Merriles, Kimberly H. Tomchak, Erick Tieu, Christopher Nielson, and Michael D. Morse

69. 2022 Spring University of Utah Graduate Student Conference, Feb. 22, 2022
"Spectroscopic Studies of π-Backdonating Early Transition Metal and Monovalent Lanthanide Diborides" (talk)
Dakota M. Merriles, Kim Tomchak, Christopher Nielson, and Michael D. Morse

70. 2022 Spring University of Utah Graduate Student Conference, Feb. 22, 2022
"Spectroscopic Studies of Cryogenically-Cooled Cationic Metal-Containing Species" (talk)
Joshua Ewigleben and Michael D. Morse

71. 2022 Spring University of Utah Graduate Student Conference, Feb. 22, 2022
"Bond Dissociation Energies of Rhenium Containing Molecules: ReC, $ReC_2$, ReN, ReO, and ReS " (talk)
Kim Tomchak and Michael D. Morse

72. ACS Spring Meeting, March 20-24, 2022
"Employing resonant three-photon ionization spectroscopy for the measurement of molecular predissociation thresholds"
Dakota M. Merriles, Andrew Sevy, Christopher Nielson, and Michael D. Morse

73. International Symposium on Molecular Spectroscopy, June 21, 2022
"Bond Dissociation Energies and Ionization Energies of Rhenium-Containing Small Molecules"
Kimberly H. Tomchak, Erick Tieu, Thomas T. Kawagoe, Jordan Derbidge, Keith T. Clark, and Michael D. Morse

74. International Symposium on Molecular Spectroscopy, June 21, 2022
"Spectroscopic Studies of π-Backdonating Early Transition Metal and Monovalent Lanthanide Diborides"
Dakota M. Merriles, Kimberly H. Tomchak, Christopher Nielson, and Michael D. Morse

75. Office of Undergraduate Research Summer Symposium, August 4, 2022
"Spectroscopic Studies of Transition Metal Nitrides and Carbides"
Annie Knapp, Dakota Merriles, Yexalen Barrera-Casas, and Michael D. Morse

75. Utah Conference on Undergraduate Research, February 17, 2023
"Fundamental Spectroscopic Studies of Transition Metal Nitrides and Carbides"
Yexalen Barrera-Casas, Dakota Merriles, Annie Knapp, and Michael D. Morse

## X. University and Departmental Service (since 2015)

**Current:** CSME Faculty Associate, Jan. 1, 2019 – present
Teaching Assignment Advisory Group, July 1, 2019 – present.
Junior Faculty Mentoring Committee, July 2016 – present.
Peer-Teaching Mentoring Committee, July 1, 2019 – present.
Public Engagement Committee, July 1, 2021 – present.
Retention, Promotion, and Tenure Subcommittee, July 1,2023 – Dec. 2023.
College of Science Committee for the Masters of Science for Secondary School Teachers Fall, 2023.

**Formerly:**
Undergraduate Education Committee, Chair 7/2016-7/2019.
Ragsdale Endowed Chair Search Committee, Chair, 2009-11; 2018-19.
University Promotion and Tenure Advisory Committee (UPTAC), 8/1/2013-6/15/2015.
College of Science Admissions Standards & Degree Programs Committee, 7/2014-18 Chair (2015-17)
Tenured Faculty Review Committee, 2018; Chair 2022-3
Faculty Workload Committee, July 1, 2019 – June, 2020.
College of Science Retention, Promotion, and Tenure Committee, 7/2019-21
Safety and Sustainability Committee – January 2021 – June, 2021.
Retention, Promotion, & Tenure Subcommittee – May 2020 – June 2021.

## XI. Graduate Students and Postdoctoral Associates

**Former members of the Morse group:**

Dr. Jin-Cheng Shui, postdoctoral associate, February 1986 -March 1987.
Dr. Scott Taylor, graduate student, February 1985 - September 5, 1989. (Ph.D.#1)
Currently employed by Phillips Petroleum Company, Bartlesville, OK.
Dr. George W. Lemire, graduate student, August 1985 - November 14, 1989. (Ph.D.#2)
Currently employed at the Dugway Proving Ground, Dugway, UT.
Dr. Yoon Mi Hamrick, graduate student, May 1985 - January 11, 1990. (Ph.D.#3)
HR Manager at Hill Air Force Base, Ogden, UT.
Dr. Zhenwen Fu, graduate student, May 1985 - July 18, 1990. (Ph.D.#4)
Principal Research Scientist, Dow Chemical Company, Spring House, PA.
Dr. Gregory A. Bishea, graduate student, January 1988 - July 31, 1991. (Ph.D.#5)
Director of Security, Sony Pictures Entertainment
Formerly chief, WMD countermeasures unit, Federal Bureau of Investigation.
Dr. Scott A. Heidecke, graduate student, March 1987 - September 18, 1991. (Ph.D.#6)
Instructor, Montana Technological University, Butte, MT
Dr. Eileen M. Spain, graduate student, March 1988 - March 20, 1992. (Ph.D.#7)
Program Director, Research Corporation for Science Advancement
Dr. Michelle B. Paustenbaugh, graduate student May 1992 - September 1993.
Professor, Department of Chemistry, Weber State University, Ogden, UT.
Dr. Jane M. (Behm) Arrington, graduate student, May 1990 - April 27, 1994. (Ph.D.#8)
Currently at Greenville Water, Greenville, SC
Dr. Caleb A. Arrington, graduate student, April 1990 - November 2, 1994. (Ph.D.#9)
Professor and Chair of Chemistry, Wofford College, Spartanburg, SC
Dr. Larry M. Russon, graduate student, June 1990 - June 15, 1995. (Ph.D.#10)
Senior Project Scientist for Team SURVICE, Dugway Proving Ground, Dugway, UT.
Dr. Jacqueline C. Pinegar (Fabbi), graduate student, March 1989 - July 26, 1995. (Ph.D.#11)
Project Lead at ProModel Corporation
Dr. Robert F. Gunion, postdoctoral research fellow, January 1996 - September, 1997.
Engineer at Lawrence Berkeley National Laboratory.
Dr. Dale J. Brugh, graduate student, January 1993 - November 5, 1997. (Ph.D.#12)
Associate Provost and Professor, Ohio Wesleyan University, Delaware, OH.
Ms. Lian Shao, graduate student, May 1996 - May 1998. (M.S.#1)
Presently employed at Sonus Networks, Westford, MA
Prof. David A. Hales, sabbatical visitor, August 1, 1998 - July 31, 1999
Professor, Department of Chemistry, Hendrix College
Dr. Jon D. Langenberg, graduate student, May 1992 - July 28, 1999. (Ph.D.#13)
Dr. Gretchen K. Rothschopf, graduate student, April 1994 - August 3, 1999. (Ph.D.#14)
Mr. Jason Christofferson, Henry Eyring Research Fellow, June-August, 1999
Dr. Ryan S. DaBell, graduate student, February 1996 - June 1, 2000. (Ph.D.#15)
Faculty member at Brigham Young University, Idaho, Rexburg, ID.
Dr. Shane M. Sickafoose, graduate student, May 1997 - Nov. 27, 2000. (Ph.D.#16)
Manager at Sandia National Laboratory, Albuquerque, NM
Marc B. Airola, graduate student, May 1998 - November 29, 2000 (M.S.#2)
Engineer at Johns Hopkins University Applied Physics Laboratory
Linnea Ober, graduate student May 2003-December 2003. (M.S.#3)
Jason Schaller, graduate student, January 2002 - November, 2004. (M.S.#4)

Dr. Ned F. Lindholm, graduate student, May 1998 - June 15, 2007. (Ph.D. #17)
Dr. Ramya Nagarajan, graduate student, January 2001 - June 21, 2007. (Ph.D. #18)
Mr. Nathan A. Davis, graduate student, January 2007 - December 2007.
Process Design Lead at Compass Minerals
Dr. Olha M. Krechkivska, graduate student, January 2005 - May 16, 2012. (Ph.D. #19)
Program Manager, Archer Materials Limited, Sydney, NSW, Australia
Dr. Alonzo Martinez, graduate student, January 2002 – August 16, 2012 (Ph.D. #20)
Staff Scientist at Idaho National Laboratory, Idaho Falls, ID.
Dr. Maria A. Garcia, graduate student, January 2004 – May 9, 2013 (Ph.D. #21)
Research Associate and Lab Manager, Atmospheric Sciences, University of Utah.
Dr. Sergei Aksyonov, postdoctoral, January 2009 – September 11, 2015. (deceased)
Dr. Eric L. Johnson, graduate student, January 2011 – August 1, 2016. (Ph.D. #22).
Lecturer at Georgia Southern University, Statesboro GA.
Dr. Daniel J. Matthew, graduate student, January 2010 – December 9, 2016. (Ph.D. #23)
Assistant Teaching Professor at Northeastern University, Boston, MA
Dr. Andrew Sevy, graduate student, January 2016 – October 16, 2019. (Ph.D. #24)
Submarine officer in the U.S. Navy.
Dr. Jason J. Sorensen, graduate student January 2016-September 23, 2020 (Ph.D. #25)
Assistant Research Professor, Brigham Young University, Provo UT
Dr. Dakota M. Merriles, graduate student January 2018-July 19, 2023 (Ph.D. #26)
Now employed with Horiba Process Instruments, Salt Lake City.

**Present members of the Morse group:**
Joshua Ewigleben, graduate student, January 2020 – present.
Kimberly H. Tomchak, graduate student, January 2020 – present.
Thomas Kawagoe, graduate student, January 2023 – present
Yexalen Barrera-Casas, undergraduate student, June 2022 – August 2023.
Graduate student August 2023 – present
Jonah Bennett, Utah UG 2023-present

## XII. Undergraduates in the Morse Group

John Colt, Utah UG 1989-1990 – one published paper from my group
Darryl Spencer, Utah UG 1990-91 – no papers from my group.
Obtained his Ph.D. from MIT
Ninette Marak, REU 1991 – one published paper from my group
Dawn Dreessen, REU 1995 – one published paper from my group
Theodore Ronningen, REU 1997 – one published paper from my group
Now a Ph.D. chemist from Ohio State, working at Battelle
Raymond G. Meyer, REU 1998 – one published paper from my group
Adam Smith, Utah UG 2000-2002 – one published paper from my group
Now a Ph.D. chemist from MIT, currently an Assoc. Professor at Texas Tech University
Min-A Cho, Utah UG 2008-9 – no papers from my group
Now a Ph.D. physicist from U. Maryland (General Relativity), a coauthor on the paper detecting the first gravitational waves from colliding black holes.
Carolin Vietz, Braunschweig visitor 2013 – one published paper from my group
Now a Ph.D. chemist.

Trevor Erickson, Utah UG 2013 – no papers from my group
Received a chemistry Ph.D. from MIT
Jory Lusk, Utah UG 2014 – no papers from my group
Tyler Baldwin, Utah UG 2014 – no papers from my group
Sang Hoon Oh, Utah UG and REU 2016 – one published paper from my group
Now a pharmacy student at the University of Utah
Quincy C. Davis, Utah UG 2016 – one published paper from my group
Thomas D. Persinger, REU 2016 – two published papers from my group
Completed a Ph.D. from Emory; now employed at Argonne National Laboratory
Jordan Franchina, Utah UG 2016-2017 – two published papers from my group
Now an M.D. student at the University of Utah
Erick Tieu, Utah UG 2016-2021 – nine published papers from my group.
Entered graduate school in Chemical Engineering at the University of Washington in Fall 2021.
Chris Nielson, Utah UG 2018-2021 – five published papers from my group.
Entered graduate school in Chemistry at Emory in Fall 2021. Now employed in information technology.
Anthony London, Utah UG 2018-2021 – one paper from my group
Matthew Baldwin, Utah UG 2020-2021 – no papers from my group
Entered graduate school in Chemistry in Fall 2021 at Northwestern University.
Keith Clark, REU 2021 – Worked on the design and construction of the cryo-cooled ion photodissociation spectrometer, now a Ph.D. student in Materials Science at Johns Hopkins University.
Tommy Kawagoe, REU 2021 – Contributed to the measurements of the bond dissociation energies of ReC, ReN, ReO, and Re-$C_2$. Now a B.S. graduate from Grand Canyon University, and a graduate student in my research group at the University of Utah.
Jordan Derbidge, Utah UG 2021-2022 – no papers from my group. Now a B.S. graduate from the University of Utah, now in medical school.
Saoirse Kerr, Utah UG 2022 – no papers from my group
Yexalen Berrera-Casas, Utah UG 2022 – Two papers from my group; Completed her B.S. with Honors; now a graduate student in my group.
Isabelle Smith, Utah UG 2022 – no papers from my group.
Annie Knapp, REU 2022 –One paper from my group; will co-author 2 more papers. In graduate school at Yale.

**XIII. Professional Service**

**External Reviewer:**

Review of the Steacie Institute for Molecular Sciences, National Research Council of Canada, Fall 1994.
DOE review panel member for chemical physics at the Pacific Northwest National Laboratory, February 1996.
Advisory Committee Member for the Nevada NSF-EPSCoR Chemical Physics Cluster, April 1996 - 1999.
DOE review panel member for the metal cluster program at Argonne National Laboratory, November 2000.
Board of Assessment of NIST Programs, Subpanel for JILA, February, 2002.
NSF Review Panel for Spectroscopy proposals, 2015, 2016, 2019, 2021.
DOE Review Panel, Gas Phase Chemical Physics, Argonne National Laboratory, 2022.

**Conferences and Symposia Organized:**

"Structural Aspects of Small Metal Clusters," for the March, 1990 meeting of the APS, Anaheim, California.
39th Annual Western Spectroscopy Association Conference, January 29-31, 1992, Asilomar, California.
Metal Clusters Symposium, SPIE Meeting, Los Angeles Airport Hilton, Los Angeles, CA, Jan. 27-29, 1994.

## XIV. Courses Taught

Chemistry 222 - Honors Freshman Chemistry, Winter, 1985
Chemistry 223 - Honors Freshman Chemistry, Spring, 1985
Chemistry 307 - Physical Chemistry, Spring, 1989
Chemistry 570 - Instrumental Analysis, Winter, 1990
Chemistry 572 - Physical Chemistry Laboratory, Spring, 1991
Chemistry 600 - Applied Quantum Chemistry, Fall, 1985-92, 1996-97
Chemistry 601 - Quantum Mechanics, Fall, 1986-87
Chemistry 602 - Introduction to Spectroscopy, Spring, 1994-97
Chemistry 603 - Advanced Quantum Mechanics & Spectroscopy, Spring 1989-90; Fall, 1991-92; 1994-96; Summer 1993; Winter 1998
Chemistry 784 - Physical-Analytical Seminar, Fall, 1986
Chemistry 785 - Physical Chemistry Seminar, Spring, 1986, Fall, 1986
Chemistry 1210 - General Chemistry I, Fall, 1999, 2000, 2007, 2009, 2011
Chemistry 3060 - Physical Chemistry, semester I; F1998; S2001, F2012-16, S2018-19, F2019-20, S2022, F2022, F2023
Chemistry 7000 - Introduction to Quantum Chemistry, Fall A, 2000, 2002-2004, 2008-10
Chemistry 7030 - Spectroscopy II, 1999, 2000, 2002-10, 2012-14, 2016-2020
Chemistry 7020 - Spectroscopy I, 2002, 2004-2006, 2011, 2015, 2021, 2022, 2023, 2024
Chemistry 7500 - Angular Momentum, Spring A, 1999, 2000; Fall A 2001, 2003, 2006, Summer 2009, Fall 2013, Fall A 2017, Fall B 2019
Winter, 1988 Faculty Fellow Award, one quarter off from teaching
Fall, 2005 Sabbatical Leave, one half-semester off from teaching

**Teaching Awards:**

April, 1987 Outstanding Graduate Teaching Award
April, 1990 Award for Excellence in Graduate Teaching
April, 1991 Robert W. Parry Teaching Award
April, 1998 ASUU Student's Choice Award for Teaching
May, 1999 University of Utah Distinguished Teaching Award
April, 2001 William W. Epstein Outstanding Educator Award
April, 2014 William W. Epstein Outstanding Educator Award
2021 College of Science Award for Fostering Undergraduate Research Excellence