

Laurence A. Angel

Chemistry Department

Texas A&M University-Commerce
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Qualifications

Doctor of Philosophy, Chemistry, 2000.

Bachelor of Science (Honors), Environmental Science with North American Studies (minor), 1996.

Professional Experience

September 2019 – Present, Professor, Texas A&M University-Commerce.

June 2013 – August 2019, Associate Professor, Texas A&M University-Commerce.

Aug 2007 – May 2013, Assistant Professor, Texas A&M University-Commerce.

July 2003 – Aug 2007, Assistant Research Professor, University of Nevada, Reno.

Sept.1999 – July 2003, Postdoctoral Research, Professor K.M. Ervin, University of Nevada, Reno.

Education

Sept.1996 – Sept.1999, Doctor of Philosophy, Professor A.J. Stace, University of Sussex, U.K.

Oct.1992 – June 1996, BSc (Hons), Environmental Science with North American Studies, University of Sussex.

Professional Awards

1. Texas A&M University – Commerce, 2021-2022, Faculty Senate Award for Professional Excellence: “Ceaseless Industry”.
2. Texas A&M University – Commerce, 2016-2017, Faculty Senate Recognition Award for Professional Excellence: “Fearless Investigation”.
3. Texas A&M University – Commerce, 2011, Provost Award: Research and Creative Activity.
4. University of Nevada, Reno, 2006, Outstanding Professor and Researcher EB-1 visa award.
5. D.Phil. Research Scholarship, 1996-1999, Engineering and Physical Sciences Research Council, UK.

Professional Memberships

2005 – Present: American Society of Mass Spectrometry, Member.

2005 – Present: American Chemical Society, Member.

External Research Funding Acquired

1. PI, National Science Foundation: Chemical Structure, Dynamic & Mechanism B. CHE-2247511, RUI: Thermochemistry, Reaction Dynamics and Conformational Changes that Accompany the Collisional Activation of Peptide Ternary Complexes and Recombinant Tagged Proteins, \$343,638, 2023-2026.
2. PI, National Science Foundation: Chemical Structure, Dynamic & Mechanism B. CHE-1764436, RUI: Developing Ion Mobility Mass Spectrometry Techniques for Determining the Structure and Mechanisms of Metal Ion Recognition & Redox Activity of Metal Ion Binding Oligopeptides, \$216,267, 2018-2022.
3. Welch Departmental Grant: Tom West (PI) Laurence Angel (other personnel) Selective copper ion recognition and redox activity of a series of alternative metal binding oligopeptides, \$165,000, June 2024- May 2027.
4. Welch Departmental Grant: Tom West (PI) Laurence Angel (other personnel) Selective metal ion recognition and redox activity of methanobactin analog peptides, \$120,000, May 2021-2024.

5. Welch Departmental Grant: Tom West (PI) Laurence Angel (other personnel) Selective metal ion recognition and redox activity of methanobactin analog peptides, \$120,000, May 2018-2021.
6. PI, National Science Foundation – Major Research Instrumentation Grant. CBET-0821247, Acquisition of a IM-Q-TOF Mass Spectrometer, Laurence Angel, Ph.D., (PI), Nenad Kostic, Ph.D., (Co-PI), Frank Miskevich, Ph.D., (Co-PI), Stephen Starnes, Ph.D., (Co-PI), William Whaley, Ph.D., (Co-PI), Serge P. von Duvillard, Ph.D., (Co-PI), Lani Lyman-Henley, Ph.D., (Co-PI). \$310,000, 2008-2011.
7. Co-PI, U.S. Department of Energy Grant.TX-W-20090427-0004-50. Advanced Artificial Science. The development of an artificial science and engineering research infrastructure to facilitate innovative computational modeling, analysis, and application to interdisciplinary areas of scientific investigation. S. Saffer, Ph.D., (PI), Derek Harter, Ph.D., (Co-PI), Sang Suh, Ph.D., (Co-PI), Laurence Angel, Ph.D., (Co-PI). \$291,600, 2010.

Internal Research Funding Acquired

PI, Presidential GAR Initiative, Texas A&M University-Commerce, 2019-2020
 PI, Research Enhancement Grant, Texas A&M University-Commerce, \$17,506, 2010-2011
 PI, Research Enhancement Grant, Texas A&M University-Commerce, \$14,916, 2009-2010
 PI, Integrated Research Proposal, Texas A&M University-Commerce, \$30,000, 2008-2009
 PI, Research Enhancement Grant, Texas A&M University-Commerce, \$12,614, 2008-2009

Teaching

General Chemistry Tutorial (I-II), General and Quantitative Chemistry (I-II), General and Quantitative Chemistry Labs (I-II), Quantitative and Instrumental Analysis, Quantitative and Instrumental Analysis Lab, Instrumental Chemistry, Instrumental Chemistry Lab, Physical Chemistry II, Physical Chemistry II Lab, Advanced Analytical Chemistry, Advanced Instrumental Analysis (I-II), Advanced Research Techniques and Design (I-II), Advanced Mass Spectrometry Techniques (I-V), Chemical Science and Profession, Graduate Seminar, Undergraduate Research, Graduate Thesis.

Publications in Peer-Reviewed Scientific Journals since joining TAMU-Commerce

1. **Gas-phase Ni(II) affinities of alternative metal binding peptides from competitive threshold collision-induced dissociation** Perfect Asare, Kwabena Senyah, Jonathan Wilcox, Jovany Morales, Laurence A. Angel *International Journal of Mass Spectrometry* **2024**, 497, 117188. [https://authors.elsevier.com/sd/article/S1387-3806\(23\)00179-3](https://authors.elsevier.com/sd/article/S1387-3806(23)00179-3)
2. **Ion Mobility – Tandem Mass Spectrometry of Bulky *tert*-Butyl Thiol Ligated Gold Nanoparticles** Kalpani Hirunika Wijesinghe, Christopher Hood, Daniell Mattern, Laurence A. Angel, Amala Dass *Journal of Mass Spectrometry* **2024**, 59, e4998. <https://analyticalsciencejournals.onlinelibrary.wiley.com/doi/10.1002/jms.4998>
3. **Extending the competitive threshold collision-induced dissociation of Zn(II) ternary complexes using traveling-wave ion mobility-mass spectrometry** Kwabena Senyah, Perfect Asare, Jonathan Wilcox, Federica Angiolari, Riccardo Spezia, Laurence A. Angel *International Journal of Mass Spectrometry* **2023**, 488, 117041. <https://doi.org/10.1016/j.ijms.2023.117041>
4. **Thermochemical Studies of Ni(II) and Zn(II) Ternary Complexes Using Ion mobility – Mass Spectrometry** Anna J. Corrales, Anna V. Arredondo, Amber A. Flores, Chloe L. Duvak, Charles L. Mitchell, Riccardo Spezia, Laurence A. Angel. *Journal of Visualized Experiments* (184), e63722, doi:10.3791/63722 (2022). Video URL: <https://www.jove.com/v/63722/thermochemical-studies-ni-ii-zn-ii-ternary-complexes-using-ion>
5. **Thermochemical and Conformational Studies of Ni(II) and Zn(II) Ternary Complexes of Alternative Metal Binding Peptides with Nitrilotriacetic Acid** Amber A. Flores, Anna V. Arredondo, Anna J. Corrales, Chloe L. Duvak, Charles L. Mitchell, Oladapo Falokun, Cynthia L. Aguilar, Aram

- Kim, Bency C. Daniel, H. Derya Karabulut, Riccardo Spezia, Laurence A. Angel. *International Journal of Mass Spectrometry* **2022**, 473, 116792. <https://doi.org/10.1016/j.ijms.2021.116792>
6. **ESI-IM-MS reveals the specific metal binding of three analog methanobactin peptides with different numbers of free Cys at physiological pH** Rajpal Vangala and Laurence A. Angel. *International Journal of Mass Spectrometry* **2021**, 468, 116640. <https://doi.org/10.1016/j.ijms.2021.116640>
 7. **Formation of Co(II), Ni(II), Zn(II) Complexes of Alternative Metal Binding Heptapeptides and Nitrilotriacetic Acid: Discovering New Potential Affinity Tags** Amber Flores, Oladapo Falokun, Ayobami Ilesanmi, Anna Arredondo, Linh Truong, Nayeli Fuentes, Riccardo Spezia, Laurence A. Angel *International Journal of Mass Spectrometry* **2021**, 463, 116554. <https://doi.org/10.1016/j.ijms.2021.116554>
 8. **Collisional dynamics simulations revealing fragmentation properties of Zn(II)-bound poly-peptide** Abdul Malik, Laurence A. Angel, Riccardo Spezia, and William L. Hase *Physical Chemistry Chemical Physics*, **2020**, 22, 14551. <https://doi.org/10.1039/D0CP02463E>
 9. **pH dependent chelation study of Zn(II) and Ni(II) by a series of hexapeptides using electrospray ionization – ion mobility – mass spectrometry** Ayobami B. Ilesanmi, Tessa C. Moore, Laurence A. Angel *International Journal of Mass Spectrometry* **2020**, 455, 116369. <https://doi.org/10.1016/j.ijms.2020.116369>
 10. **Comparison of the pH-dependent formation of His and Cys heptapeptide complexes of nickel(II), copper(II), and zinc(II) as determined by ion mobility – mass spectrometry** Enas N. Yousef and Laurence A. Angel *J. Mass Spectrom.* **2020**, 55, e4489. <https://onlinelibrary.wiley.com/doi/10.1002/jms.4489>
 11. **Weak Acid-Base Interactions of Histidine and Cysteine Affect the Charge States, Tertiary Structure, and Zn(II)-binding of Heptapeptides** Yu-Fu, Lin, Enas N. Yousef, Efren Torres, Linh Truong, James M. Zahnow, Cole B. Donald, Ying Qin, and Laurence A. Angel *J. Am. Soc. Mass Spectrom.* **2019**, 30, 2068-2081. <https://doi.org/10.1021/jasms.8b06222>
 12. **Direct Dynamics Simulations of Fragmentation of a Zn(II)-2Cys-2His Oligopeptide. Comparison with Mass Spectrometry Collision-Induced Dissociation** Malik A. Rao, Yu-Fu Lin, Subha Pratihari, Laurence A. Angel, and William L. Hase *J. Phys. Chem. A* **2019**, 123, 6868-6885. <https://doi.org/10.1021/acs.jpca.9b05218>
 13. **Ion Mobility – Mass Spectrometry Techniques for Determining the Structure and Mechanisms of Metal Ion Recognition and Redox Activity of Metal Binding Oligopeptides** Enas N. Yousef, Ramakrishna Sesham, Jacob W. McCabe, Rajpal Vangala and Laurence A. Angel *J. Vis. Exp.* (151), e60102, doi: [10.3791/60102](https://doi.org/10.3791/60102) (2019). Video URL: <https://www.jove.com/video/60102>
 14. **Binding Selectivity of Methanobactin from *Methylosinus Trichosporium* OB3b for Copper(I), Silver(I), Zinc(II), Nickel(II), Cobalt(II), Manganese(II), Lead(II), and Iron(II)** McCabe, J. W.; Vangala, R. and Angel, L. A. *J. Am. Soc. Mass Spectrom.* **2017**, 28, 2588-2601. DOI: [10.1007/s13361-017-1778-9](https://doi.org/10.1007/s13361-017-1778-9)
 15. **Applying Ion Mobility – Mass Spectrometry Techniques for Explicitly Identifying the Products of Cu(II) Reactions of 2His-2Cys Motif Peptides** Vytla, Y. and Angel, L.A. *Analytical Chemistry*, **2016**, 88, 10925. <https://doi.org/10.1021/acs.analchem.6b02313>
 16. **The Multiple Conformational Charge States of Zinc(II) Coordination by 2His-2Cys Oligopeptide Investigated by Ion Mobility - Mass Spectrometry, Density Functional Theory and Theoretical Collision Cross Sections** Wagoner, S. M.; Deeconda, M.; Cumpian, K. L.; Ortiz, R.; Chinthala, S. and Angel, L. A., *J. Mass Spectrom.* **2016**, 51, 1120. <https://doi.org/10.1002/jms.3846>
 17. **Probing the Stability of Insulin Oligomers Using Electrospray Ionization - Ion Mobility - Mass Spectrometry** Boga Raja, U. K.; Injeti, S.; Culver, T.; McCabe, J. W.; Angel, L. A., *Eur. J. Mass Spectrom.* **2015**, 21, 759. <https://doi.org/10.1255/2Fejms.1396>
 18. **Redox Activity and Multiple Copper(I) Coordination of 2His-2Cys Oligopeptides** Choi, D.; Alshahrani, A.; Vytla, Y.; Deeconda, M.; Serna, V. J.; Saenz, R. F. and Angel, L. A., *J. Mass Spectrom.* **2015**, 50, 316. <https://doi.org/10.1002/jms.3530>
 19. **The pH Dependent Cu(II) and Zn(II) Binding Behavior of an Analog Methanobactin Peptide** Sesham, R.; Choi, D.; Balaji, A.; Cheruku, S.; Ravichetti, C.; Alshahrani, A.; Nasani, M.; Angel, L. A., *Eur. J. Mass Spectrom.* **2013**, 19, 463. <https://doi.org/10.1255/2Fejms.1249>

20. Analysis of Methanobactin from *Methylosinus Trichosporium* OB3b via Ion Mobility Mass Spectrometry Choi, D-W.; Sesham, R.; Kim, Y.; and Angel, L.A. *Eur. J. Mass Spectrom.*, **2012**, *18*, 509. <https://doi.org/10.1255%2Fejms.1202>
21. Study of Metal Ion Labeling of the Conformational and Charge States of Lysozyme Angel, L.A. *Eur. J. Mass Spectrom.*, **2011**, *11*, 207. <https://doi.org/10.1255%2Fejms.1133>
22. Metal Complexes as Artificial Proteases in Proteomics: A Palladium(II) Complex Cleaves Various Proteins in Solutions Containing Detergents Miskevich, F.; Davis, A.; Leeprapaiwong, P.; Giganti, V.; Kostic, N.M.; Angel, L.A. *J. Inorg. Biochem.*, **2011**, *105*, 675. <https://doi.org/10.1016/j.jinorgbio.2011.01.010>
23. Ion Mobility-Mass Spectrometry Study of Folded Ubiquitin Conformers Induced by Treatment with *cis*-[Pden(H₂O)₂]²⁺ Giganti, V.; Best, W.A; Kundoor, S.; Angel, L.A. *J. Am. Soc. Mass Spectrom.*, **2011**, *22*, 300. <https://doi.org/10.1021/jasms.8b03973>
24. Effects of Transition Metal Ion Identity & π -Cation Interactions in Metal-Bis(Peptide) Complexes Containing Phenylalanine Utley, B.; Angel, L.A. *Eur. J. Mass Spectrom.*, **2010**, *16*, 631. <https://doi.org/10.1255/ejms.1102>
25. Ion Mobility Mass Spectrometry of Au₂₅(SCH₂CH₂Ph)₁₈ Nanoclusters Angel, L.A.; Majors, L.T.; Dharmaratne, A.C.; Dass, A. *ACS Nano*, **2010**, *4*, 4691. <https://doi.org/10.1021/nn1012447>
26. Threshold Collision Induced Dissociation of Hydrogen-Bonded Dimers of Carboxylic Acids Jia, B.; Angel, L.A.; Ervin, K.M. *J. Phys. Chem. A*, **2008**, *112*, 1773.

Publications in Peer-Reviewed Scientific Journals before joining TAMU-Commerce

27. Gas-Phase Acidity and the O-H Bond Dissociation Enthalpy of Phenol, 3-Methylphenol, 2,4,6-Trimethylphenol and Ethanoic Acid Angel, L.A.; Ervin, K.M. *J. Phys. Chem. A*, **2006**, *110*, 1039.
28. Gas-Phase Reactions of Iodide Ion with Chloromethane and Bromomethane; Competition Between Nucleophilic Displacement and Halogen Abstraction Angel, L.A.; Ervin, K.M. *J. Phys. Chem. A*, **2004**, *108*, 9827.
29. Competitive Threshold Collision-Induced Dissociation: Gas-Phase Acidity and O-H Bond Dissociation Enthalpy of Phenol Angel, L.A.; Ervin, K.M. *J. Phys. Chem. A*, **2004**, *108*, 8346.
30. Gas-Phase Hydrogen Atom Abstraction Reactions of S⁻ with H₂, CH₄ and C₂H₆ Angel, L.A.; Dogbevia, M.K.; Rempala, K.M.; Ervin, K.M. *J. Chem. Phys.* **2003**, *119*, 8996.
31. Gas-Phase S_N2 and Bromine Abstraction Reactions of Chloride Ion with Bromomethane: Reaction Cross Sections and Energy Disposal into Products Angel, L.A.; Ervin, K.M. *J. Am. Chem. Soc.* **2003**, *125*, 1014.
32. Dynamics of the Gas-Phase Reactions of Chloride Ion with Fluoromethane: High Excess Translational Activation Energy for an Endothermic S_N2 Reaction Angel, L.A.; Garcia, S.P.; Ervin, K.M. *J. Am. Chem. Soc.* **2002**, *124*, 336.
33. Dissociation Patterns of (H₂O)_n⁺ Cluster Ions, for n=2-6 Angel, L. Stace, A.J. *Chem. Phys. Lett.* **2001**, *345*, 277.
34. Dynamics of the Gas-Phase Reactions of Fluoride Ions with Chloromethane Angel, L.A.; Ervin, K.M. *J. Phys. Chem. A*, **2001**, *105*, 4042.
35. A Re-Appraisal of the Contribution from [O₂.(H₂O)_n]⁺ Cluster Ions to the Chemistry of the Ionosphere Angel, L.; Stace, A.J. *J. Phys. Chem. A* **1999**, *103*, 2999.
36. The Critical Hydration Reactions of NO⁺ and NO₂⁺ Angel, L. Stace, A.J. *J. Chem. Phys.* **1998**, *109*, 1713.
37. Reactions of NO⁺ in Heterogeneous Water Clusters Angel, L.; Stace, A.J. *J. Phys. Chem. A* **1998**, *102*, 3037.
38. The Reactions of NO₂⁺ in Association with Heterogeneous Water Clusters Angel, L.; Stace, A.J. *J. Chem. Soc. Faraday Trans.* **1997**, *93*, 2769.