



Laurence A. Angel

Chemistry Department

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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, East Texas A&M University.

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. East Texas A&M University, 2025, Faculty Senate Recognition of Scholarship: “Unfettered Thought Award”.
2. Texas A&M University – Commerce, 2021-2022, Faculty Senate Award for Professional Excellence: “Ceaseless Industry”.
3. Texas A&M University – Commerce, 2016-2017, Faculty Senate Recognition Award for Professional Excellence: “Fearless Investigation”.
4. Texas A&M University – Commerce, 2011, Provost Award: Research and Creative Activity.
5. University of Nevada, Reno, 2006, Outstanding Professor and Researcher EB-1 visa award.
6. 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.

National Science Foundation 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. 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.

Departmental or College Funding Acquired as CoPI or Other Personnel

1. 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.
2. Welch Departmental Grant: Tom West (PI) Laurence Angel (other personnel) Equipment Grant: Synapt G2 Acquisition, \$75,000, June 2024-May 2025.
3. 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.
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 2018-2021.
5. 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), Advanced Methods in Chemical Research and Experimental Design, Chemical Science and Profession, Graduate Seminar, Undergraduate Research, Graduate Thesis.

1. **Evaluating the Binding Efficiency of Alternative Histidine Affinity Tags to Zn and Ni Chelating Resins** Mohammad Arar, Richmond A. Adomako, Michael B. Owusu, Md Abu Taleb, Airam Cordova, Juliana V. Trejo, Liliana Miller, and Laurence A. Angel *European Journal of Inorganic Chemistry* DOI: 10.1002/ejic.202500539
2. **Alternative zinc binding peptides as potential tags for recombinant protein purification** Richmond A. Adomako, Michael B. Owusu, Airam Cordova, and Laurence A. Angel *Journal of Inorganic Biochemistry* **2025**, 271, 112981. <https://doi.org/10.1016/j.jinorgbio.2025.112981>
3. **Effect of the Tyr₅ and His₆ substituent groups on the zinc affinities and conformational structures of the acetyl-His₁-Cys₂-Gly₃-Pro₄-X₅-X₆-Cys₇ heptapeptides** Richmond A. Adomako, Michael B. Owusu, Rebekah K. Oberdick, Kwabena Senyah, Perfect Asare, Laurence A. Angel *International Journal of Mass Spectrometry* **2025**, 513, 117458. <https://doi.org/10.1016/j.ijms.2025.117458>
4. **Zn(II) Affinity and Structural Conformations of 2His-2Cys Zinc Finger-like Motif Peptide Determined by Ion Mobility – Mass Spectrometry and PM6 Molecular Modeling** Richmond A. Adomako, Michael B. Owusu, Rebekah K. Oberdick, Kwabena Senyah, Perfect Asare, Riccardo Spezia, Laurence A. Angel *Journal of Mass Spectrometry* **2025**, 60, e5113. <http://dx.doi.org/10.1002/jms.5113>
5. **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://doi.org/10.1016/j.ijms.2023.117188>
6. **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>
7. **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>
8. **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>
9. **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>
10. **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>
11. **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>
- 12. Collisional dynamics simulations revealing fragmentation properties of Zn(II)-bound polypeptide**
 Abdul Malik, Laurence A. Angel, Riccardo Spezia, and William L. Hase *Physical Chemistry Chemical Physics*, **2020**, *22*, 14551. <https://doi.org/10.1039/D0CP02463E>
 - 13. 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>
 - 14. 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 *Journal of Mass Spectrometry* **2020**, *55*, e4489.
<https://onlinelibrary.wiley.com/doi/10.1002/jms.4489>
 - 15. 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>
 - 16. 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 *Journal of Physical Chemistry. A* **2019**, *123*, 6868-6885. <https://doi.org/10.1021/acs.jpca.9b05218>
 - 17. 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 *Journal of Visualized Experiment* (151), e60102, doi: [10.3791/60102](https://doi.org/10.3791/60102) (2019). Video URL: <https://www.jove.com/video/60102>
 - 18. 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)
 - 19. 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>
 - 20. 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., *Journal of Mass Spectrometry* **2016**, *51*, 1120. <https://doi.org/10.1002/jms.3846>
 - 21. 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>
 - 22. 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., *Journal of Mass Spectrometry* **2015**, *50*, 316. <https://doi.org/10.1002/jms.3530>
 - 23. 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>

24. 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>
25. 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>
26. 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>
27. 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>
28. 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>
29. 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/nl1012447>
30. 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.