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## *Professional Preparation*

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*Baylor University, Waco, TX*

**Chemistry, B.S. (ACS Certified), May 1992**

Summa Cum Laude, Phi Beta Kappa, Highest Ranking Student in College of Arts and Sciences (GPA: 4.0/4.0)

*Baylor University, Waco, TX*

**Organic Chemistry, M.S., May 1994**

Advisor: Charles Garner, Ph.D.

Thesis: "Toward Terpene-Derived C<sub>2</sub>-Chiral Cyclic Boranes and Auxiliaries and Metalation Studies of Endocyclic and Exocyclic Alkenes."

*The Scripps Research Institute, La Jolla, CA*

**Organic Chemistry, Ph.D., May 2000**

Advisor: K. Barry Sharpless, Ph.D., 2001 Nobel Laureate in Chemistry and 2019 ACS Priestley Medal Awardee

Dissertation: "I. Aminohydroxylation of Unsaturated Phosphonates: A Template for Molecular Diversity. II. Rapid Discoveries in Osmium (VIII) Catalysis Using Automation and Mass Spectrometry."

## *Appointments and Professional Positions*

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**2014-** *University of Nebraska at Kearney (UNK).* Professor (Aug 2023-present), Associate Professor (Aug 2018-Aug 2023), Assistant Professor (Aug 2014-Aug 2018), Department of Chemistry

**2013-2014** *Community College of Denver.* Chemistry Instructor

**2000-2013** *Array BioPharma (acquired by Pfizer in 2019), Medicinal Chemistry, Boulder and Longmont, CO.* Senior Research Investigator (2012-2013); Research Investigator (2006-2012); Senior Research Scientist (2003-2006); Research Scientist (2000-2003)

**1997-1998** *Access Pharmaceuticals (now Abeona Therapeutics), Drug Delivery, Dallas, TX.* Scientist

## *Publications/Patents (abbreviated list)*

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1. "Synthesis of ribavirin 1,2,3- and 1,2,4-triazolyl analogs with changes at the amide and cytotoxicity in breast cancer cell lines," Way, H.; Roh, J.; Venteicher, B.; Chandra, S.; Thomas, A. A., *Nucleosides, Nucleotides & Nucleic Acids* **2023**, *42*, 38-64.
2. "Describing inhibitor specificity for the amino acid transporter LAT1 from metainference simulations," Hutchingson, K.; Silva, D.B.; Bohlke, J.; Clausen, C.; Thomas, A.A.; Bonomi, M.; Schlessinger, A., *Biophysical Journal* **2022**, *121*, 4476-4491.
3. "The effects of prodrug size and a carbonyl linker on L-type amino acid transporter 1-targeted cellular and brain uptake," Venteicher, B.; Merklin, K.; Ngo, H.X.; Chien, H.-C.; Hutchinson, K.; Campbell, J.; Way, H.; Griffith, J.; Alvarado, C.; Chandra, S.; Hill, E.; Schlessinger, A.; Thomas, A.A., *ChemMedChem* **2021**, *16*, 869-880.

4. "L-type amino acid transporter 1 activity of 1,2,3-triazolyl analogs of L-histidine and L-tryptophan," Hall, C.; Wolfe, H.; Wells, A.; Chien, H.-C.; Colas, C.; Schlessinger, A.; Giacomini, K. M.; Thomas, A. A., *Bioorg. Med. Chem. Lett.* **2019**, *29*, 2254.
5. "Bicyclic urea, thiourea, guanidine and cyanoguanidine compounds useful for the treatment of pain," Allen, S.; Andrews, S.W.; Blake, J.F.; Brandhuber, B.J.; Haas, J.; Jiang, Y.; Kercher, T.; Kolakowski, G.R.; Thomas, A.A.; Winski, S.L., U.S. Patent 10,351,575, **issued 2019**.
6. "Reevaluating the substrate specificity of the L-type amino acid transporter (LAT1)," Chien, H.-C.; Colas, C.; Finke, K.; Springer, S.; Stoner, L.; Zur, A. A.; Flint, A.; Augustyn, E.; Venteicher, B.; Campbell, J.; Hall, C.; Hernandez, C.; Heeren, N.; Hansen, L.; Anthony, A.; Bauer, J.; Fotiadis, D.; Schlessinger, A.; Giacomini, K. M.; Thomas, A. A., *J. Med. Chem.* **2018**, *61*, 7358.
7. "Serine/threonine kinase inhibitors," Blake, J.F.; Cook, A.; Gunawardana, I.W.; Hunt, K.W.; Lyon, M.; Metcalf, A.T.; Mohr, P.J.; Moreno, D.A.; Newhouse, B.; Ren, L.; Tang, T.P.; Thomas, A.A.; Schwarz, J.; Schmidt, J.; Gazzard, L.; Chen, H., U.S. Patent 10,154,995, **issued 2018**.
8. "N-(Arylalkyl)-N'-pyrazolyl-urea, thiourea, guanidine and cyanoguanidine compounds as TrkA kinase inhibitors," Blake, J.F.; Brandhuber, B.J.; Haas, J.; Newhouse, B.; Thomas, A.A.; Winski, S.L., U.S. Patent 9,969,694, **issued 2018**.
9. "LAT1 activity of carboxylic acid bioisosteres: Evaluation of hydroxamic acids as substrates," Zur, A.A.; Chien, H.-C.; Augustyn, E.; Flint, A.; Heeren, N.; Finke, K.; Hernandez, C.; Hansen, L.; Miller, S.; Lin, L.; Giacomini, K.M.; Colas, C.; Schlessinger, A.; Thomas, A.A., *Bioorg. Med. Chem. Lett.* **2016**, *26*, 5000.
10. "LAT-1 activity of meta-substituted phenylalanine and tyrosine analogs," Augustyn, E.; Finke, K.; Zur, A.A.; Hansen, L.; Heeren, N.; Lin, L.; Chien, H.-C.; Giacomini, K.M.; Colas, C.; Schlessinger, A.; Thomas, A.A., *Bioorg. Med. Chem. Lett.* **2016**, *26*, 2616.

## Research Leadership (grants)

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1. NIH (NHLBI) R15 HL165700, PI, 9/01/2022-8/31/2025, \$394,781, "Serotonin N-Acetyl-Transferase Inhibitors for Circadian Rhythm Disorders".
2. Nebraska EPSCoR Undergraduate Research Experience in Small Colleges and Universities, PI, 5/16/2022-12/1/2022, \$5,000, "Pyrophosphate bioisosteres as serotonin N-acetyltransferase inhibitors for treating circadian rhythm disorders".
3. Nebraska EPSCoR Undergraduate Research Experience in Small Colleges and Universities, PI, 5/16/2022-12/1/2022, \$5,000, "Pyrophosphate bioisosteres as serotonin N-acetyltransferase inhibitors for treating circadian rhythm disorders".
4. University of Nebraska Kearney, Research Services Council Collaborative Seed Grant, co-PI, 8/19/2020-5/8/2022, \$9,144, "Ribavirin Analogs for Hyperuricemia and Evaluation of Antiviral Potential".
5. NIH (NINDS) R15 NS099981, PI, 9/18/2017-9/17/2020, \$399,082, "Identification of New LAT-1 Transporter Substrates for Drug Delivery".
6. Nebraska Research Initiative, Lab Equipment Grant, co-PI, 5/19/2017, \$188,515, "New High Performance Liquid Chromatograph – Mass Spectrometer to Enhance Research Capability at UNK".

## Leadership and Professionalism: Synergistic Activities

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### Research Project Leader and Collaborator

As a medicinal chemist in both industry and academia, I have been responsible for optimization of small molecule drug candidates in multiple therapeutic areas including cancer, Alzheimer's disease, pain, and inflammatory diseases. My research projects required collaboration within multidisciplinary teams to integrate data from *in vitro* and *in vivo* experiments to obtain a compound that progressed to Phase I clinical trials (Erk/cancer), and two compounds that progressed to pre-clinical toxicology studies (BACE/Alzheimer's and Met/cancer). For the latter two compounds, I was responsible for coordinating the synthesis of the lead molecules and designing related analogs to obtain data needed for clinical trial submission. While in academia, I have lead research projects across multiple institutions (UCSF, Icahn School of Medicine, and Northwestern)

studying an amino acid transporter (LAT1) for use in drug delivery as well as a nucleoside transporter (CNT2) for treating hyperuricemia. Our team obtained 6 publications together and presented at dozens of conferences, since 2014. Recently, I am leading a project in circadian rhythm disorders at UNK that involves collaboration between the Departments of Chemistry, Psychology and Biology.

### **Curriculum Development for Gen Chem and Organic Labs**

While an assistant professor at UNK, I was the lab coordinator for first semester general chemistry lab for 2 years. In this position, I was responsible for ensuring that labs were running smoothly each week and for making changes to the lab manual and experiments to improve them. I revised most of the labs to make them clearer for students to follow and to allow for better results. Also, in my first two years at UNK, I made key curriculum changes to the organic chemistry labs at UNK. Previously, spectroscopy was not emphasized in lab and lecture until second semester; however, this limited students to only doing melting points to characterize compounds they made during first semester labs. I created both an NMR and IR lab that were performed midway through first semester and involved relatively simple worksheets for students to learn how these techniques are applied in analyzing compounds. I also created additional spectroscopy assignments for labs that involved isolating compounds. Student scores on standardized ACS final exams for both first and second semester rose dramatically among all the organic faculty, going from the 50-60% range up to 70-92%, due at least in part to introducing the complimentary concepts of analyzing organic structures by spectroscopy along with learning to "see" structures earlier in the course.

### **Organized UNK Sigma Xi Celebrity Panel Discussions and Science Cafes**

While I served as President of the UNK Chapter for 2 years, I was responsible for organizing over a dozen Science Cafes and two different Panel Discussions including celebrity scientists Drs. Phil Plait (aka the Bad Astronomer and chief science writer for the Bill Nye show) speaking about the solar eclipse and Greg Forbes (The Weather Channel) speaking about climate change. Our chapter was recognized with both Program and Chapter of Excellence Awards by Sigma Xi in 2017 and 2018, respectively.

### **Served as Chief Negotiator for UNKEA**

I have served as a negotiator in the University of Nebraska at Kearney Education Association ("faculty union") for the past five years. In 2020, I was the chief negotiator. In addition to leading verbal negotiations during biweekly meetings with administration and the University of Nebraska negotiators, I was responsible for creating the contract language for at least 7 different items related to conditions of employment, including a new Professor of Practice position, expanding contract language to cover external online coursework, better definitions of how summer salary is paid, tuition benefits for dependents, extended paternity leave, reimbursement for distance learning supplies, and creating a faculty advisory committee. Our team negotiated a modest pay raise for faculty during a year when many schools were freezing salaries. Another significant achievement was establishing terms for the Professor of Practice position. I continued my service on the negotiation team this past fall of 2022, in which I served as secretary and identified language in our contract to enable library faculty to take sabbaticals.

### **Service in Grant and Journal Article Reviewing and Poster Judging**

Since joining UNK in 2014, I have consistently accepted invitations to review journal articles, averaging about 3 per year. I have been a proposal reviewer for University of Nebraska system-wide grants, the Big Ideas Initiative, and for the Great Plains IDeA-CTR. In fall of 2021, I served on an NIH study section, which involved reviewing 9 grant proposals, including mostly R01 level applications. I have served as poster judge at four national Sigma Xi Student Research Conferences and as a presentation judge at two of the online Student Research Showcases.

## *Commitment to Diversity and Inclusiveness*

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I am strongly committed to increasing diversity in the sciences, partly because I value fairness, but also, I think it improves scientific progress to have different perspectives. I am fortunate to be in a department that encourages inclusiveness, as evidenced by 17 of 44 (39%) of our chemistry bachelor's graduates within the last 5 years being women. Moreover, our department participates in Delfin, a research-based program dedicated to bringing undergraduates from Latino countries to U.S. universities to participate in summer research. I have been quite active in recruiting female students into my lab since joining UNK, as over 50% of the 39 undergraduates that I have mentored were women. I currently have a ratio of 5:1 women to men in my research group. One of my female undergraduate students was instrumental in proposing a project that led to an NIH grant proposal that was funded in 2022. Two of my former female students pursued research careers (instead of medical school) due to their positive experiences in my group, which included opportunities to mentor other students, come up with their own ideas, and lead projects.

## *Mentoring*

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Since joining UNK in 2014, I have mentored 39 undergraduate students in my research lab. As we are a primarily undergraduate institution (PUI), training undergraduates how to do research is a large component of our job. My students have given over 50 presentations at scientific conferences, including 15 talks, and a presentation at the highly competitive Posters on the Hill event, sponsored by the Council on Undergraduate Research (CUR). Moreover, some of my students decided to pursue graduate degrees in science based on their experiences with me. For example, one of my former students is completing his fifth year in the MD/PhD program at the University of Nebraska Medical Center (UNMC). Another completed her second year in the PhD program in organic chemistry at the University of Illinois Champaign-Urbana, with the goal of being a medicinal chemist someday. This past year, one of my former students started a position as an associate scientist in medicinal chemistry at Pfizer. It is important to note that these three students all started in the pre-med program at UNK but fell in love with research as result of working in my lab. I have also stayed in close contact with other students who have gone on to medical, osteopathy or pharmacy school. I very much enjoy helping them with their graduate or professional school applications and interview preparation. For me, there is no greater pleasure than helping undergraduates develop a passion for research, no matter their career path.

## *Major Awards and Honors*

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1. Donald E. Fox Endowed Chair, UNK Chemistry, 2022
2. Pratt-Heins Foundation Faculty Award for Scholarship/Research, UNK Campus, 2021
3. Faculty Mentoring of Undergraduate Student Research Award, UNK College of Arts and Sciences, 2020
4. UNK New Frontiers Award and magazine article for cancer research, 2019
5. UNK Sigma Xi "Chapter of Excellence" awarded by the national Sigma Xi Scientific Research Honor Society, 2018
6. UNK Sigma Xi "Program of Excellence" awarded by the national Sigma Xi Scientific Research Honor Society for "The Great American Solar Eclipse Panel Discussion", 2017

## *Major Career Contributions and Legacy*

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- My research at UNK revealed that the amino acid transporter LAT1, important in cancer metabolism and drug delivery, is tolerant of many changes to the molecules it transports, though larger molecules are more likely to be inhibitors than substrates.
- While working on an Alzheimer's disease target BACE1 at Array BioPharma, I discovered a highly selective class of molecules (1300X vs. an anti-target) that lowered brain A $\beta$  protein in rats.
- While at Array BioPharma, my group demonstrated that highly potent and selective inhibitors of the enzyme transketolase were ineffective at preventing colon cancer cell growth, which challenged the existing dogma that blocking transketolase would be a viable way to treat cancer.
- In graduate school, I helped my PI to develop a powerful method for elucidating reaction mechanisms by measuring kinetic isotope effects (KIE) using NMR.