

DAVID KASTNER

Personal Website www.davidwkastner.com
Company Website www.kahyton.com
Email davidwkastner@gmail.com
Phone (707) 492 4220

Education

B.S. Biophysics Brigham Young University, Provo, Utah 2019
 GPA 4.0 | Honors | *Valedictorian*

Prestigious Awards

| | |
|--|--------------|
| National Science Foundation Graduate Research Fellowship (NSF GRFP) | 2019 |
| MIT Sloan Scholarship | 2019 |
| National Barry Goldwater Scholarship | 2017 |
| National American Chemical Society Scholars Award (ACS) | 2017 |
| National Hispanic Fund Scholarship (HSF) | 2018 |
| National President's Volunteer Service Award | 2018 |
| Tolero Pharmaceuticals Fellowship | 2018 |
| National Merck Pharmaceuticals Scholarship | 2017 |
| Simmons Center for Cancer Research Fellowship (SCCR) | 2017 |
| Lieutenant Governor's Community Service Award | 2018 |
| Inspired Learning University Fellowship | 2018 |
| Phi Kappa Phi National Honors Society 2018 Outstanding Student Award | 2018 |
| Karl G. Maeser Scholarship | 2018 |
| Elva Pederson Jorgenson Award | 2018 |
| University Research Grant (ORCA) | 2017 |
| University Undergraduate Research Award (URA) | 2018 |
| Full-Ride Merit-Based Scholarship | 2014-Current |
| Eagle Scout Award (Boy Scouts of America) | 2008 |

Research/Professional Experience

Huntsman Cancer Institute (HCI) – Salt Lake City, UT Current

Mentor: Dr. Trudy Oliver

Project Title: *The Role of the Tumor Microenvironment in Small Cell Lung Cancer*

Description: Currently using genetically engineered mouse models to study development and treatment options for squamous and small cell lung cancer. The focus of our research is to better understand the molecular underpinnings of lung cancer and develop novel treatment options.

National Institutes of Health (NIH) – Bethesda, MD July – Sept 2018

Mentor: Dr. Nico Tjandra

Project Title: *Identification and Characterization of Humanin-Bax Fibril Formation*

Description: Investigated peptide fibril formation implicated in apoptosis. The project made extensive use of electron microscopy, fluorescence, and light scattering techniques to characterize the dynamic properties of Bax and its ability to catalyze the fibrillation of an endogenous peptide.

Dana-Farber/Harvard Cancer Center (DFCI/HCC) – Boston, MA

April – July 2018

Mentor: Dr. Haribabu Arthanari**Project Title:** *The Complete Profile of Isotopically Labeled Proteins from Pyruvate Precursors***Description:** Investigated novel methods of isotopically labeling proteins using techniques that leverage pyruvate metabolism. The internship used techniques such as cell culture, protein extraction and preparation, NMR procedures and theory, and data processing.**Kahyton Biostructures, LLC. – Provo, UT**

Aug 2016 – Current

Position: Founder**Website:** www.kahyton.com**Description:** The company specializes in engineering elegant yet functional devices that leverage structural motifs found in nature. The 2018 annual report showcases the newest medical device www.kahyton.com/2018.html as well as its applications and market.**Simmons Center for Cancer Research (SCCR) – Salt Lake City, UT**

May 2016 – Apr 2018

Mentor: Dr. Steven Castle**Project Title:** *Bulky Dehydroamino Acids Enhance Proteolytic Stability and Folding in β -Hairpins***Description:** Over the course of a two-year prestigious fellowship with the SCCR, I researched complex bioactive products and peptides through synthesis and computational modeling. I engineered several anticancer peptides that will be tested in a long-term collaboration with Bristol-Myer Squibb.**Beckman Institute for Advanced Science and Technology – Urbana, IL**

Mar 2018 – Apr 2018

Mentor: Dr. Marcelo Melo**Project Title:** *Advantages of Quantum Mechanics/ Molecular Mechanics Hybrid Simulations***Description:** Made extensive use of the CHARMM and NAMD forcefields to run Quantum Mechanics/ Molecular Mechanics (QM/MM) hybrid simulations on a supercomputing cluster. I also became very comfortable with cutting edge techniques for rendering publication grade images of biological macromolecules. Gallery: www.davidwkastner.com/gallery.html**Computational and Synthetic Chemistry Researcher – Provo, UT**

Aug 2014 – Aug 2017

Mentor: Dr. Steven Castle**Project Title:** *Progress Toward Synthetically Simplified Natural Anticancer Peptides***Description:** Synthesized non-standard amino acids and small peptides and predicted their structures using NMR and quantum mechanics DFT calculations. My research focused on using reaction coordinates and energies of formation to predict chemical properties and reaction pathways.**Cellular Biology Teaching Assistant – Provo, UT**

Jan 2017 – May 2017

Position: Teaching Assistant**Website:** <http://lifesciences.byu.edu/>**Description:** While working as a teaching assistant in an advanced Cell Biology course, I gained a strong understanding of cellular structures and processes. In addition to serving as a valuable opportunity to master the material, it also served as a valuable teaching experience.**Humanitarian Missionary – Osorno, Southern Chile**

Apr 2012 – Apr 2014

Position: Full-time Humanitarian Volunteer**Supervisor:** John Rappleye**Description:** As a fluent bilingual American of Latino heritage, the Spanish language and history have been defining factors in the development of my identity. Consequently, I chose to serve as a full-time non-paid humanitarian volunteer in Southern Chile where I volunteered in more than 20 cities in the Osorno region over a two-year period. I volunteered over 40 hours a week.

Publications

Peer-reviewed Publications

1. Jalan, A.; Kastner, D. W.; Webber, K. G. I.; Smith, M. S.; Price, J. L.; Castle, S. L. Bulky dehydroamino acids enhance proteolytic stability and folding in β -hairpin peptides. *Organic Letters* **2017**, 19 (19), 5190-5193. DOI: [10.1021/acs.orglett.7b02455](https://doi.org/10.1021/acs.orglett.7b02455)
2. Ashraf, N. M., Krishnagopal, A., Hussain, A., Kastner, D., Sayed, A. M., Mol Y. K., Swaminathan. K., Zeeshan, N. Improving thermostability and catalytic efficiency of serine endoprotease (mSP) by engineering non-catalytic residues. *International Journal of Biological Macromolecules* **2018**, Submitted
3. Ashraf, N. M.; Imran, K.; Kastner, D. W.; Ikram, K.; Mushtaq, A.; Hussain, A.; Zeeshan, N. Potential involvement of mi-RNA 574-3p in progression of prostate cancer: A bioinformatic study. *Molecular and Cellular Probes* **2017**, 36, 21-28. DOI: [10.1016/j.mcp.2017.07.002](https://doi.org/10.1016/j.mcp.2017.07.002)
4. Kastner, D. W.; Castle, S. L. *ONIOM(DFT:MM) study of yaku'amide A and analogues*; ORCA Report. *Journal of Undergraduate Research (JUR)*: Provo, **2018**. URL: jur.byu.edu

Manuscripts in Progress

1. Olsen, R.; Ireland, A.; Kastner, D.; Oliver, T. Loss of ASCL1 induces latent osteogenic program (manuscript in preparation at the Huntsman Cancer Institute).
2. Lo, C.; Joaquin, D.; Moyá, D.; Ramos, A.; Kastner, D.; White, S.; Christensen, B.; Castle, S. Synthesis and evaluation of potent yaku'amide A analogs (manuscript in preparation at Brigham Young University).
3. Moore, D.; Kastner, D.; Tjandra, N. Identification and Characterization of Humanin-Bax Fibrils. Project was carried out and the manuscript prepared at the National Institutes (manuscript in preparation at National Institutes of Health).
4. Dubey, A.; Kastner, D.; Arthanari, H. The Complete Profiling of Isotopically Labeled Proteins from Pyruvate Precursors. Project was carried out and the manuscript prepared at the Dana-Farber Cancer Institute (manuscript in preparation at Dana-Farber).

Conference and Poster Presentations

1. Kastner, D. W.; Jalan, A.; Castle, S. L. Conformational ensemble calculations of proteolytically stable β -hairpins containing bulky α,β -dehydroamino acids. *American Chemical Society 254th National Meeting*, Washington D.C., **2017**.
2. Kastner, David W.; and Castle, Steven L., Progress toward synthetically simplified natural anticancer peptide (2018). *Library Undergraduate Poster Competition* **2018**, 5. ISSN: [2572-4479](https://doi.org/10.2572-4479)
3. Kastner, D. W.; Castle, S. L. Computational predictions β -hairpins containing bulky dehydroamino acids. *Scholars Archive* **2017**, 4. ISSN: [2572-4479](https://doi.org/10.2572-4479)
4. Kastner, D. W.; Lo, C. C. L.; Castle, S. L. Progress towards a synthetically simplified anticancer peptide. *Student Research Conference (SRC)*, Provo, **2018**.
5. Jalan, A.; Kastner, D. W.; Castle, S. L. QM/MM analysis of proteolytically stable β -hairpins. *Student Research Conference (SRC)*, Provo, **2017**.
6. Kastner, D.; Castle, S. L. ONIOM geometry optimization of bulky dehydroamino acids in β -hairpins. *IEEE Poster Session*, Provo, **2017**.

Skills and Specializations

- Computational Biology
- Data processing
- Supercomputing, Unix, Python, R, Git
- Molecular dynamics simulations
- Fluorescence microscopy
- Dynamic Light Scattering
- NMR imaging and processing
- Electrophysiology
- Confocal Microscopy
- Cell culture and protein sample prep
- Electron Microscopy (TEM)
- QM/MM hybrid calculations
- Computational Chemistry
- Organic synthesis
- Molecular cloning
- DNA manipulation

Languages

Spanish, Python, Unix, and R

Societal and Honors Affiliations

| | |
|---|------|
| National Scientific Research Honor Society Sigma Xi | 2019 |
| Association of Clinical Research Professionals (ACRP) | 2018 |
| Biophysical Society (BPS) | 2017 |
| American Chemical Society (ACS) | 2017 |
| National Spanish Speaker Honor Society (SDP) | 2017 |
| Biomedical Engineering Society (BMES) | 2016 |
| Phi Kappa Phi National Honor Society (PKP - Council Member) | 2016 |
| Golden Key International Honor Society (GKHS) | 2016 |

Relevant Coursework

| | |
|--|----------------|
| <i>Physiology</i> • Biophysics (PDBIO 568) | Grade: A (4.0) |
| <i>Physiology</i> • Advanced Physiology (PDBIO 362) | Grade: A (4.0) |
| <i>Biology</i> • Cell Biology (BIO 360) | Grade: A (4.0) |
| <i>Biology</i> • Computational Biology (BIO 362) | Grade: A (4.0) |
| <i>Chemistry</i> • Biophysical Chemistry (CHEM 468) | Grade: A (4.0) |
| <i>Chemistry</i> • Organic Chemistry (CHEM 351 & 352) | Grade: A (4.0) |
| <i>Chemistry</i> • Biochemistry (CHEM 481) | Grade: A (4.0) |
| <i>Physics</i> • Molecular Dynamics (PDBIO 550R) | Grade: A (4.0) |
| <i>Physics</i> • Electricity and Magnetism (PHSCS 220) | Grade: A (4.0) |
| <i>Physics</i> • Newtonian and Modern Physics (PHSCS 121 & 123) | Grade: A (4.0) |
| <i>Mathematics</i> • Differential and Integral Calculus (MATH 112 & 113) | Grade: A (4.0) |