Brendan Dwyer

bdwyer@stanford.edu

EDUCATION

The Scripps Research Institute, Jupiter, FL — August 1, 2017 – May 20, 2022
Ph.D. in Chemical and Biological Sciences
Skaggs Graduate School of Chemical and Biological Sciences
NSF Graduate Research Fellowship Program Fellow

Willamette University, Salem, OR — August 2011 –May 2015
Bachelor of Arts, Major: Chemistry, emphasis in Biochemistry, Minor: Philosophy
Cumulative GPA: 3.89; Chemistry GPA: 3.91
Magna Cum Laude, Chemistry Department Honors, American Chemical Society Certified Degree, Phi Beta Kappa Honor Society

RESEARCH EXPERIENCE

Stanford University, School of Medicine, Stanford, CA — January 2023 – Present
Postdoctoral Scholar, Prof. Nathanael Gray
Stanford Cancer Institute; Chemical & Systems Biology

Postdoctoral Research Associate, Prof. Alexander Adibekian — May 20, 2022 – December 20, 2022
Ph.D. Candidate, Prof. Alexander Adibekian — October 2018 – May 20, 2022
The Scripps Research Institute, Jupiter, FL

- *Dissertation Title:* Chemoproteomic Tools for Profiling Bioactive Small Molecules: From *De Novo* Photopharmacology to Cysteine-Reactive Covalent Drugs to Natural Product Target Identification
- Created a new chemoproteomic platform for the *de novo* discovery of photopharmaceuticals, which yielded the first optical control of drug metabolism via inhibiting carboxylesterases 1 and 2.
- Developed new ethynylbenziodoxolone (EBX)-based probes for cysteine-reactive proteomic profiling including (i) TMS-EBX enabling direct ethynylation of cysteines for bioorthogonal click chemistries and (ii) a kinetically attenuated EBX-based probe for evaluating target engagement and selectivity of covalent reversible or slow-binding drugs.
- Identified cellular targets of cysteine-reactive natural products gambogic acid and curcusone D using competitive chemoproteomics revealing new strategies for chemotherapeutics and for targeted protein degradation.

Rotating Graduate Research Assistant, Prof. Matthew Disney — August 2017 – October 2018
The Scripps Research Institute, Jupiter, FL

- Evaluated a lead compound that selectively targets the hairpin form of the expanded G_4C_2 RNA repeat that causes genetic amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD).

Research Assistant, Prof. David Griffith — August 2016 – May 2017
Willamette University Chemistry Department, Salem, OR

- Identified novel products of the photo-degradation of halogenated estrogens, specifically dibromo-E2, using a TripleTOF mass spectrometer.

Undergraduate Thesis, Prof. Karen Holman and Prof. Sarah Kirk — August 2014 – July 2015
Willamette University Chemistry Department, Salem, OR

- *Thesis title:* An Examination of the Binding Interactions between Ruthenium-Based Anticancer Agents NAMI-A and KP1019 with Ribonucleic Acid.
- Evaluated how the axial ligands of NAMI-A and KP1019 affect their binding to tRNA using fluorescence and absorbance spectroscopy.

Research Assistant, Prof. Gary Tallman — May 2013 – December 2013
Scientific Collaborative Research Program (SCRP), Willamette University, Salem, OR

- Modified the *NtRac1* gene construct through site-directed mutagenesis.

PUBLICATIONS (# indicates authors contributed equally)

1. **Dwyer, B.G.** Adibekian, A. Using hypervalent iodine probes to improve cysteine reactivity-based profiling for chemoproteomics-enabled drug discovery. *Review article in preparation (invited contribution to Current Research in Chemical Biology)*. **2022**.
2. **Dwyer, B.G.** Cui, C. Pechalrieu, D. Abegg, D. Hoch, D.G. Dai, M. Adibekian, A. Using the Curcusone Natural Product for Targeted Protein Degradation by Recruiting the E3 Ubiquitin Ligase MUL1. *Manuscript in preparation*. **2022**.
3. **Dwyer, B.G.** Tessier, R. Abegg, D. Zhao, Z. Hoch, D.G. Shuster, A. Waser, J. Adibekian, A. A Kinetically Attenuated Ethynylbenziodoxolone Chemoproteomic Probe for Profiling Covalent Reversible and Slow-Binding Drugs. *Manuscript in preparation*. **2022**.
4. **Dwyer, B.G.** Hoch, D.G. Tessier, R. Abegg, D. Zhao, Z. Waser, J. Adibekian, A. An Ethynylbenziodoxolone Probe for Treating Melanoma by Dysregulating Glycolysis. *Manuscript in preparation*. **2022**.
5. Pechalrieu, D.# **Dwyer, B.G.#** Abegg, D. Adibekian, A. Isotopically Labelled Phenylalanine O-Nitrobenzyl Photocleavable Linkers for Quantitative Chemoproteomics. *Manuscript in preparation (invited contribution to RSC Chemical Biology)*. **2022**.
6. Shuster, A.# Simonet-Davin, R.# Abegg, D. **Dwyer, B.G.** Pechalrieu, D. Lairson, L.L Waser, J. Adibekian, A. Probing structural dynamics and ligand-binding sites by protein surface azidation. *Manuscript in preparation*. **2022**.
7. Cui, C.# **Dwyer, B.G.#** Liu, C. Abegg, D. Zhong-Jian, C. Hoch, D.G. Yin, X. Qiu, N. Jie-Qing, L. Adibekian, A.* Dai, M.* Total Synthesis and Target Identification of the Curcusone Diterpenes. *Journal of the American Chemical Society*. **2021**, 143, 11, 4379-4386.
8. **Dwyer, B.G.#** Wang, C.W.# Abegg, D. Racioppo, B. Qui, N. Zhao, Z. Pechalrieu, D. Shuster, A., Hoch, D. Adibekian, A. Chemoproteomics-Enabled De Novo Discovery of Photoswitchable Carboxylesterase Inhibitors for Optically Controlled Drug Metabolism. *Angewandte Chemie International Edition*. **2020**, 60 (6), 3071-3079.
9. Tessier, R. Nandi, R.K.# **Dwyer, B.G.#** Abegg, D.# Sornay, C.# Ceballos, J. Erb, S. Cianférani, S. Wagner, A. Chaubet, G. Adibekian, A. Waser, J. Ethynylation of Cysteine Residues: From Peptides to Proteins in Vitro and in Living Cells. *Angewandte Chemie International Edition*. **2020**, 59 (27), 10961-10970.
   - Selected for Frontispiece
10. Hoch, Dominic G.# Abegg, D.# Hannich, J.T. Pechalrieu, D. Shuster, A. **Dwyer, B.G.** Wang, C. Zhang, X. You, Q. Riezman, H. Adibekian, A. Combined Omics Approach Identifies Gambogic Acid and Related Xanthones as Covalent Inhibitors of the Serine Palmitoyltransferase Complex. *Cell Chem. Bio.* **2020**, 27 (5), 586-597.
11. Wang, C. Abegg, D. **Dwyer, B.G.#** Adibekian, A.# Discovery and Evaluation of New Activity-Based Probes for Serine Hydrolases. *ChemBioChem (Invited Manuscript: ChemBio Talents)*. **2019**, 20 (17), 2212-2216.
    - Selected as Cover Feature
    - In the top 10% of most download articles in *ChemBioChem* between January 2018 and December 2019
12. Wang, Z.F. Ursu, A. Childs-Disney, J.L. Guertler, R. Wang-Yong, Y. Bernat, V. Rzuczek, S.G. Fuerst, R. Yong-Jie, Z. Gendron, T.F. Yildirim, I. **Dwyer, B.G.** Rice, J.E. Petrucelli, L. Disney, M.D. The Hairpin Form of r(G4C2)exp in c9ALS/FTD is Repeat-associated non-ATG Translated and a Target for Bioactive Small Molecules. *Cell Chem. Bio.* **2019**, 26 (2), 179-190.
13. Disney, M.D. **Dwyer, B.G.** Childs-Disney, J.L. Drugging the RNA World. *Cold Spring Harb. Perspect. Biol., RNA Worlds*. **2018.** doi: 10.1101/cshperspect.a034769
14. **Dwyer, B.G.** Johnson, E. Cazares, E. Holman, K.L.M. Kirk, S.R. Ruthenium anticancer agent KP1019 binds more tightly than NAMI-A to $tRNA^{Phe}$. *J. of Inorganic Biochemistry*. **2018**, 182, 177-183.

FELLOWSHIPS & AWARDS

1. GRFP Fellow. National Science Foundation. August 2019 – May 2022.
2. Poster Prize Winner. *Pacifichem 2015: The International Chemical Congress of Pacific Basin Societies (INORG-1260)*. December 2015.

3. Senior Award in Biochemistry. *Willamette University*. May 2015. *For outstanding leadership, ability, character, and scholastic achievement.*
4. Dean of Campus Life Special Recognition Award. *Willamette University*. May 2015. *For exceptional achievement, service, and leadership.*
5. Senior Key. *Willamette University*. May 2015. *For the most outstanding seniors with meritorious service, diverse activities, and impact.*
6. American Chemical Society Award in Analytical Chemistry. *Willamette University*. May 2014. *For excellence in analytical chemistry.*
7. Peterson Family Scholarship. *Willamette University*. May 2014. *For being an outstanding chemistry student with strong leadership skills.*
8. Third Place Poster Prize Winner. *Sigma Xi Columbia-Willamette Student Research Symposium*: *Undergraduate Biological Science Division*. April 2014.

PATENTS

1. Patent application U.S. 63/084,594. Targeting BRAT1 with Curcusone Diterpenoids and Analogs for Cancer Treatment.

PRESENTATIONS *(presenter underlined)*

1. **Dwyer, B.G.** Chengsen, C. Pechalrieu, D. Abegg, D. Hoch, D.G. Dai, M. Adibekian, A. Chemoproteomic-enabled target identification of the curcusone natural products reveals new chemotherapeutic and targeted protein degradation strategies. *ICBS2020 Trainee Symposium*. November 2020. Oral presentation.
2. **Dwyer, B.G.** Chemoproteomic Drug Discovery. *Scripps Research Community Symposium*. The Scripps Research Institute, CA. May 2021. Oral presentation for the general public.
3. **Dwyer, B.G.** Wang, C.W. Abegg, D. Racioppo, B. Qui, N. Zhao, Z. Pechalrieu, D. Shuster, A., Hoch, D. Adibekian, A. Development of New Tools and Methods for Chemoproteomic-Enabled Drug Discovery: Optical Control of Drug Metabolism via De Novo Discovery of Photoswitchable Inhibitor. *National Graduate Student Symposium*. St. Jude Children's Research Hospital.
4. **Dwyer, B.G.** Wang, C.W. Abegg, D. Racioppo, B. Qui, N. Zhao, Z. Pechalrieu, D. Shuster, A., Hoch, D. Adibekian, A. Optical control of drug metabolism via de novo discovery of photoswitchable inhibitors. *2020 Graduate Student Research Symposium*. The Scripps Research Institute, CA. Jan 2021.
5. **Dwyer, B.G.** Hoch, D. Tessier, R. Zhao, Z. Abegg, D. Waser, J. Adibekian, A. *Poster*. Discovery of Ethynyl Benziodoxolone (EBX) Inhibitors that Selectively Kill Melanoma by Inhibiting Glycolysis. *2019 Graduate Student Research Symposium*. The Scripps Research Institute, CA. Nov. 2019.
6. Milstead, R.P., Nance, K.T., Tarnas, K.S., Egelhofer, K.E., **Dwyer**, **B.G.,** Griffith, D.R. *Poster*. Halogenated estrogen photolysis under natural solar irradiance. *Gordon Research Conference: Environmental Science – Water*. Holderness, NH. June 2018.
7. **Dwyer, B.G.,** Josephson, R., Johnson, E., Kirk, S.R., Holman, K.M. *Poster*. Binding interactions of ruthenium-based prodrugs with tRNA. *Pacifichem 2015: The International Chemical Congress of Pacific Basin Societies (INORG-1260)*. Honolulu, HI. December 2015.
8. **Dwyer, B.G.**, Sobocinski, J., Fredendall, A. How can Process Oriented Guided Inquiry Learning Enhance Your Training? *National Orientation Directors Association Region I Conference*. Portland, OR. February 2015.
9. **Dwyer, B.G.,** Wilson, C. Tallman, G. Modifying an NtRac1-containing construct to determine whether heat interferes with auxin-regulated NtRac1 localization. *Sigma Xi Columbia-Willamette Student Research Symposium*. Portland, OR. April 2014.
10. **Dwyer, B.G.** Wilson, C. Tallman, G. Modifying an NtRac1-containing construct to determine whether heat interferes with auxin-regulated NtRac1 localization. *Murdock College Science Research Conference*. Vancouver, WA, USA. November 2013.

TEACHING EXPERIENCE

Adjunct Instructor August 2022 – December 2023
Red Rocks Community College, Lakewood, CO
- Instructor on Record for General Chemistry I (CHE-1111) and General Chemistry II (CHE-1112)

Teaching Assistant January 2020 – April 2020
The Scripps Research Institute, Jupiter, FL
- Served as TA under Dr. Timothy Spicer and Dr. Louis Scampavia for "Drug Discovery and Development" covering hit identification through clinical optimization.

Visiting Instructor of Chemistry August 2016 – May 2017
Willamette University, Salem, OR
- Instructor on Record for General Chemistry Lab (Chem 115Y), Organic Chemistry Lab (225Y), General Chemistry Lab II (Chem 116Y), and Organic Chemistry Lab II (226Y).
- Lead Instructor of Organic Chemistry Laboratories (Spring 2017).

Organic Chemistry Head Teaching Assistant August 2014 – May 2015
Willamette University Chemistry Department, Salem, OR
- Mentored and trained Teaching Assistants in laboratory pedagogy, skills, and techniques including FT-IR and ^{1}H-NMR.
- Worked with faculty to create instructions for Formal Lab Reports and other assignments.
- Drafted grading rubrics for Formal Lab Reports and other assignments, improving efficiency and effectiveness of current grading practices.
- Produced a video to demonstrate proper Flash Column Chromatography technique.

Organic Chemistry Teaching Assistant August 2013 – May 2014
Willamette University Chemistry Department, Salem, OR
- Taught fundamental organic synthesis and analytical laboratory techniques, while simultaneously mentoring students, processing 1H-NMR and FT-IR spectroscopy samples, and grading assignments.

Chemistry Tutor
Willamette University Chemistry Department, Salem, OR
- Physical Chemistry, Inorganic Chemistry, and Instrumental Analysis: August 2016 – May 2017.
- Organic Chemistry: January 2014 – May 2015.
- Introductory Chemistry: August 2011 – May 2012.

PROFESSIONAL EXPERIENCE

Assistant to the Associate Dean August 2016 – May 2017
Willamette University Campus Life, Salem, OR
- Project 1: Assessed the Reality Check program through analyzing student feedback.
- Project 2: Reviewed Student Leadership Programs using the Council for the Advancement of Standards in Higher Education guidelines.

Customer Service Representative August 2015 – August 2016
United States Welding, Denver, CO
- Trained new hires for the Customer Service role focusing on integrating their current strengths with big picture understanding of the software systems and position responsibilities.

Opening Days Coordinator September 2013 - September 2014
Willamette University Office of Student Activities, Salem, OR
- Paraprofessional staff member responsible for directing all vital elements of the Opening Days program, which is Willamette University's 5-day new student orientation.
- Overhauled Opening Days Leader training using process oriented guided inquiry learning techniques (POGIL).

- Responsibilities include planning and running programming, hiring and training leaders, communicating information to new students and their families, and working with professional staff and the College Colloquium coordinator and faculty. Employed student learning outcomes and assessment in planning programs.

Chemistry Faculty Search Committee Member August 2013 - December 2014

Willamette University Chemistry Department, Salem, OR

- One of two student representatives on the Faculty Search Committee to hire an analytical chemistry professor (tenure-track) in the Willamette University Chemistry Department.