Drake C. Jensen

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EDUCATION

Washington University School of Medicine (WUSM) **St. Louis, MO**
PhD in Computational & Molecular Biophysics *April 2023*
Thesis Title: Fluorescent-based approaches for quantifying bacterial transcription initiation kinetics
Thesis Advisor: Eric Galburt, Ph.D.

Southern Illinois University Edwardsville (SIUE) **Edwardsville, IL**
Master of Science in Chemistry (Biochemistry focus) *May 2015*
Thesis Title: Functional Analysis of Calmodulin's Calcium Dependent Inactivation of Orai1
Thesis Advisor: Chin-Chuan Wei, Ph.D

Southern Illinois University Edwardsville **Edwardsville, IL**
Bachelor of Arts in Chemistry *May 2013*
Bachelor of Science in Biology (Genetics and Cellular Biology focus) *May 2013*

Rock Valley College (RVC) **Rockford, IL**
Associates of Science *May 2010*

ACADEMIC APPOINTMENTS

Washington University School of Medicine, Andrea Soranno, Ph.D. **St. Louis, MO**
NIAID F32 Postdoctoral Researcher *May 2023–present*
- Studying the conformations and dynamics of intrinsically disordered protein regions involved in the regulation of bacterial transcription.
- *Techniques employed*: single molecule FRET and FCS, mass photometry, bioinformatics

Washington University School of Medicine, Eric Galburt, Ph.D. **St. Louis, MO**
Graduate Research Assistant *August 2015–April 2023*
- Developed real-time fluorescent methods for steady-state rate analyses of promoter-specific gene regulation in *Mycobacterium tuberculosis.*
- *Techniques employed*: stopped-flow kinetics, equilibrium anisotropy titrations, steady-state kinetics, Analytical Ultracentrifugation (AUC)

Southern Illinois University Edwardsville, Chin-Chuan Wei, Ph.D. **Edwardsville, IL**
Undergraduate/Graduate Research Assistant / Lab Manager *March 2012–August 2015*
- Assessed the kinetics and thermodynamics of calcium and target peptide binding to Calmodulin.
- *Techniques employed*: Circular Dichroism (CD), Differential Scanning Calorimetry (DSC), Isothermal Titration Calorimetry (ITC), steady-state and lifetime fluorescence, and stopped-flow kinetics.

TEACHING

Washington University School of Medicine **St. Louis, MO**
Lecturer – InPrint Editing *Fall 2025 and 2026*
- Taught two sessions and led small group discussions on NSF proposal writing.
- Instructed post-bacc students on the key elements of an oral scientific presentation.

Guest Lecturer *Spring 2022 and 2023*
- Gave lectures on single-molecule force spectroscopy applications to study molecular motors for Molecular Biology at the Cutting Edge course.

Graduate Teaching Assistant *Fall 2016*
- Taught Laboratory on DNA Manipulation where students cloned, expressed and purified proteins involved in the Cytochrome C biogenesis pathway for western blotting and heme staining analyses

Southern Illinois University Edwardsville **Edwardsville, IL**
Graduate Teaching Assistant / Instructor *January 2013-May 2015*
- Taught General Chemistry (Semester I), Physical Chemistry (Semester I), and Biochemistry labs.
- Instructed advanced laboratory techniques such as Isothermal Titration Calorimetry, Differential Scanning Calorimetry, enzyme kinetics, PCR/restriction enzyme digests, protein expression, and protein purification via FPLC.

- Assisted in conceiving and writing two novel Isothermal Titration Calorimetry experiments (see publications) to be used successively in the physical and biochemistry labs.

Rock Valley College **Rockford, IL**
Undergraduate Teaching Assistant / Student Tutor *August 2009-August 2010, Summer 2011*

- Taught General Physics (Semester I). Led recitation sessions and sample problem discussions.
- College Reading & Learning Association (CRLA) Level II advanced certified tutor. Aided students in general chemistry, general biology, physics, and calculus courses.

COURSES TAUGHT

BIOL 4993	Molecular Biology at the Cutting Edge	*WUSM*	Guest Lecturer	*Fall 2022, Fall 2023*
BIOL 437	Laboratory on DNA Manipulation	*WUSM*	TA	*Fall 2016*
CHEM 455	Experimental Methods in Biochemistry	*SIUE*	TA	*Spring 2014, Spring 2015*
CHEM 365A	Physical Chemistry Lab I	*SIUE*	Instructor, TA	*Fall 2014, Fall 2013*
CHEM 125A	General Chemistry Lab I	*SIUE*	TA	*Spring 2013*
PHY 201	General Physics (Mechanics and Heat)	*RVC*	TA	*Fall 2009*

RESEARCH MENTORSHIP & SUPERVISION ***mentees: 7***

Ankita Chadda	*WUSM*	PostDoc at Salk Institute for Biological Sciences
Vincent Nicholson	*WUSM*	PhD Candidate at WUSM
Liam O'Brien	*SIUE*	Field Service Engineer at MilliporeSigma
Eun Sil Rollins	*WUSM*	PhD Candidate at WUSM
Kyle Schafer	*SIUE*	DO of Medicine at Des Moines University
Victor Tyne	*WUSM*	Research Assistant at Argonne National Laboratory
Dallas Wright	*SIUE*	DO of Medicine at Ross University School of Medicine

PUBLICATIONS

Research Articles *corresponding author(s), +co-first authors

1. Ruiz Manzano, A.+; **Jensen, D**.+; Galburt, E. A.***** "Regulation of Steady State Ribosomal Transcription in *Mycobacterium tuberculosis*: Intersection of Sigma Subunits, Superhelicity, and Transcription Factors." ***J. Biol. Chem.*** 301(8), **2025**. Link to Article
2. **Jensen, D**.+; Ruiz Manzano, A.+; Rector, M.; Tomko, E. J.; Record, M. T.; Galburt, E. A.* "High-throughput, fluorescent-aptamer-based measurements of steady-state transcription rates for the *Mycobacterium tuberculosis* RNA polymerase." ***Nucleic Acids Res.*** 51(19), e99; **2023**. Link to Article
3. Chadda, A.; **Jensen, D**.; Tomko, E. J.; Ruiz Manzano, A.; Nguyen, B.; Lohman, Galburt, E. A.* "*Mycobacterium tuberculosis* DNA repair helicase UvrD1 is activated by redox-dependent dimerization via a 2B domain cysteine." ***PNAS***. 119(8), e2114501119; **2022**. Link to Article
4. Prusa, J.; Zhu, D. X.; Flynn, A. J.; **Jensen, D**.; Ruiz Manzano, A.; Galburt, E. A.; Stallings, C. L.* "Molecular dissection of RbpA-mediated regulation of fidaxomicin sensitivity in mycobacteria." ***J. Biol. Chem.*** 298(4), **2022**. Link to Article
5. **Jensen, D**.; Ruiz Manzano, A.; Rammohan, J.; Stallings, C. L.; Galburt, E. A.* "CarD and RbpA modify the kinetics of initial transcription and slow promoter escape of the *Mycobacterium tuberculosis* RNA polymerase." ***Nucleic Acids Res.*** 47(13), 6685-6698; **2019**. Link to Article
6. Prusa, J.; **Jensen, D**.; Santiago-Collazo, G.; Pope, S. S.; Garner, A. L.; Miller, J. J.; Ruiz Manzano, A.; Galburt, E. A.; Stallings, C. L.* "Domains within RbpA Serve Specific Functional Roles that Regulate the Expression of Distinct Mycobacterial Gene Subsets." ***J. Bacteriol.*** 200(13), e00690-17; **2018**. Link to Article
7. Garner, A. L.; Rammohan, J.; Huynh, J. P.; Onder, L. M.; Chen, J.; Bae, B.; **Jensen, D**.; Weiss, L. A.; Ruiz Manzano, A.; Darst, S. A.; Campbell, E. A.; Nickels, B. E.; Galburt, E. A.; Stallings, C. L.* "Effects of Increasing the Affinity of CarD for RNA Polymerase on *Mycobacterium tuberculosis* Growth, rRNA Transcription, and Virulence." ***J. Bacteriol.*** 199(4), e00698-16; **2017**. Link to Article
8. **Jensen, D**.; Reynolds, N.; Yang, Y.-P.; Shakya, S.; Wang, Z.-Q.; Stuehr, D. J.; Wei, C.-C.* "The Exchanged EF-hands in Calmodulin and Troponin C Chimeras Alter the Induced Hydrophobicity and Impair the Interaction with Orai1: A Spectroscopic, Thermodynamic and Kinetic Study." ***BMC Biochemistry***. 16(6); **2015**. Link to Article

Teaching Protocols

9. O'Brien, L. C.*; Hannah, R. B.; Wei, C.-C.; **Jensen, D**.; Shabestary, N.; DeMeo, C.; Eder, D. J. "EDTA:Mn^{2+}·Binding Affinities: A Modern Experiment in Thermodynamics for the Physical Chemistry Laboratory." ***J. Chem. Educ.*** 92(9), 1547-51; **2015**. Link to Article
10. Wei, C.-C.*; **Jensen, D**.; Boyle, T.; O'Brien, L. C.; DeMeo, C.; Shabestary, N.; Eder, D. J. "Isothermal Titration Calorimetry and Macromolecular Visualization for the Interaction of Lysozyme and its Inhibitors." ***J. Chem. Educ.*** 92(9), 1552-1556; **2015**. Link to Article

Reviews & Book Chapters

11. **Jensen, D**.; Cubuk, J.; Samanta, N.; Stuchell-Brereton, M. D.; Soranno, A.***** "Advancements in single-molecule fluorescence spectroscopy for probing conformations, dynamics, and interactions in disordered protein regions." ***Curr. Opin. Struct. Biol****.* 98(103277); **2026**. Link to Article
12. **Jensen, D**.; Galburt, E. A.***** "The Context-Dependent Influence of Promoter Sequence Motifs on Transcription Initiation Kinetics and Regulation." ***J. Bacteriol.***; 203(8), e00512-20; **2021**. Selected as "New and Notable**."** Link to Article
13. Wang, Z.-Q.; Stuehr, D. J.*; Wei, C.-C.*; **Jensen, D**. "Calcium Signaling: NO Synthase." ***Encyclopedia Biol. Chem****. 3rd Ed.* 6, 602-608; **2021**. Link to Article

PRESENTATIONS

Talks

- "A conserved dynamic intrinsically disordered region facilitates transcription in *Mycobacterium tuberculosis*."
  Gibbs Conference on Biothermodynamics. Carbondale IL, 2026.
  Midwest Single Molecule Workshop. University of Illinois Urbana-Champaign, 2026.
  Zurich Single Molecule Biophysics Conference. Zurich Switzerland, 2026.
  WUSM BMB Department Research Roundup. St. Louis MO, 2026.
- "The conformationally dynamic *Mycobacterium tuberculosis* σ^A IDR facilitates ribosomal RNA transcription."
  Gordon Research Conference: Mechanisms of Microbial Transcription. Manchester NH, 2025.
- "Mechanisms of sigma-factor-dependent transcriptional control in *Mycobacterium tuberculosis*."
  WUSM BMB Department Seed Grant Award Symposium. St. Louis MO, 2023.
  WUSM BMB Department Rising Star Symposium. St. Louis MO, 2022.
- "Fluorescent-based approaches for measuring transcription kinetics."
  SIUE Chemistry Department Seminar Series. Edwardsville IL, 2022.
- "Quasi-high-throughput *in vitro* measurements of steady-state transcript flux."
  WUSM BMB Department Science Fridays. St. Louis MO, 2022.
- "Steady-state kinetic analysis of transcription."
  WUSM BMB Department Science Fridays. St. Louis MO, 2021.
- "The A's and B's of mycobacterial transcription initiation."
  WUSM BMB Department Science Fridays. St. Louis MO, 2020.
- "Mechanisms of transcription represivation in *Mycobacterium tuberculosis*."
  WUSM BMB Department Elliot Elson Fellowship Seminar. St. Louis MO, 2019.
- "*Mycobacterium tuberculosis* CarD and RbpA: transcriptional repressivators."
  WUSM Biochemistry, Biophysics & Structural Biology Program Retreat. Potosi MO, 2018.
- "Kinetic regulation of mycobacterial transcription."
  WUSM BMB Department Science Fridays. St. Louis MO, 2018.

Posters only external conferences and presenting author are included

"A conserved dynamic intrinsically disordered region facilitates transcription in *Mycobacterium tuberculosis*."
Midwest Mycobacterial Meeting. St. Louis MO, 2026.
Biophysical Society Meeting. San Franscico CA, 2026.

- "The conformationally dynamic *Mycobacterium tuberculosis* σ^A IDR facilitates ribosomal RNA transcription."
  Gordon Research Conference: Intrinsically Disordered Proteins. Les Diablerets Switzerland, 2026.
  Gibbs Conference on Biothermodynamics. Carbondale IL, 2025.
  Gordon Research Conference: Mechanisms of Microbial Transcription. Manchester NH, 2025.

Biophysical Society Meeting. Los Angeles CA, 2025.

- "High-throughput, florescent-aptamer-based measurements of steady-state transcription initiation kinetics."
  Gordon Research Conference: Mechanisms of Microbial Transcription. Manchester NH, 2023.
- "A real-time fluorescence-based readout for quantitative *in vitro* measurements of steady-state transcript flux."
  Biophysical Society Meeting. San Francisco CA, 2022.
- "CarD and RbpA slow the kinetics of *Mycobacterium tuberculosis* RNA polymerase promoter escape."
  Gibbs Conference on Biothermodynamics. Carbondale IL, 2019.
  Gordon Research Conference: Mechanisms of Microbial Transcription. Lewiston ME, 2019.
- "Regulation of mycobacterial RNA Polymerase promoter escape kinetics by transcription factors CarD and RbpA."
  Biophysical Society Meeting. Baltimore MD, 2019.
- For additional poster abstracts published online, see here

LEADERSHIP & OUTREACH

- ***InPrint Science Communication Editorial Team*** – *WUSM (2025-present)*
  - Editor for manuscript, grant, and job application submissions
  - Aiding post-bacc students in an NSF proposal review sessions
  - Taught lectures on approaches for scientific presentations to undergraduate and post-bacc students
- ***Session Moderator*** *for the following meetings*
  - Annual Gibbs Conference on Biothermodynamics (*2020, 2025*)
  - WUSM Department of Biochemistry & Molecular Biophysics Retreat (*2022*)
  - WUSM Biochemistry, Biophysics, & Structural Biology Program Retreat (*2019*)
- ***Poster/Talk Judge*** *for the following events*
  - WUSM Graduate Research Symposium (*2025*)
  - SIUE Thomas D. Bouman Memorial Research Symposium (*2024-2026*)
- ***Trainee Search Committee*** – *WUSM Department of Biochemistry & Molecular Biophysics (2024-present)*
  - Providing feedback on potential faculty candidates through attendance/interactions at research seminars, chalk talks, and lunches.
- ***Community Engagement & Outreach Committee*** – *WUSM Department of Biochemistry & Molecular Biophysics (2022-present)*
  - Gave talk at SIUE Chemistry grad student seminar series on reasons to explore further graduate studies and tips for the application process (*2022*).
  - Started post-doc peer mentorship program (*2026*).
- ***Summer Outreach Program*** – *WUSM Department of Biochemistry & Molecular Biophysics (2022-present)*
  - Mentored an undergraduate student in research and data analysis for the three-month program (*2022*).
  - Served on selection committee (*2024-2026*).
- ***Survey Committee*** – *WUSM Department of Biochemistry & Molecular Biophysics (2019-2021)*
  - Assisted in creating an annual survey to gather information on areas of satisfaction and need for improvement in the department.
  - Aided in analyzing and presenting survey results for department.
- ***Liaison Committee*** – *WUSM Department of Biochemistry & Molecular Biophysics (2016-2020)*
  - Served as committee chair for 1 year; oversaw semi-annual meetings with the committee and department chair.
  - Organized Biochemistry, Biophysics, & Structural Biology program welcome events for incoming students.
  - Assigned student mentors and individually mentored second year graduate students through qualification exam process. Additionally, scheduled qualifying exam practice talks and question and answer sessions.
  - Served on five mock qualifying exam panels (*2021, 2025, 2026*).

AWARDS

2026	Biophysical Society Annual Meeting Postdoc Travel Award
2022	WUSM Department of Biochemistry & Molecular Biophysics Rising Star Award
2019	WUSM Biochemistry, Biophysics, & Structural Biology Retreat Poster Presentation Award

2019	Biophysical Society Annual Meeting Graduate Travel Award
2017-2018	WUSM Department of Biochemistry & Molecular Biophysics Elliot L. Elson Education and Training Award
2015	SIUE Outstanding Graduate Thesis Award (one awarded university-wide)
2015	SIUE Thomas D. Bouman Memorial Graduate Research Scholar Award
2014-2015	SIUE Outstanding Graduate Student in the Department of Chemistry Award
2014	SIUE Graduate School Student Research Symposium Presentation Award
2013-2014	SIUE Department of Chemistry Graduate Research Award
2013	SIUE Thomas D. Bouman Memorial Undergraduate Research Scholar Award
2012-2013	SIUE Outstanding Senior Assignment in the Department of Chemistry Award
2012-2013	SIUE Outstanding Senior Student in the Department of Chemistry Award
2009-2010	Rock Valley Physical Science Outstanding Performance Student Award
2008, 2009	Rock Valley Department of Composition and Literature Writing Recognition Award

RESEARCH FUNDING

External	*2025-2028*	F32 Ruth L. Kirschstein Postdoctoral Fellowship (NIAID, NIH)	$233,784
Internal	*2025*	Seed Grant (WUSM BMB Department)	$20,000
	2023	Professional Development Grant (WU BMB Department)	$2,500
	2022	Seed Grant (WUSM BMB Department)	$5,000
	2019	Seed Grant (WUSM Institute of Clinical and Translational Sciences)	$5,000
	2016	Gary K. Ackers Fellowship (WUSM BMB Department)	$10,000
	2013	Research Grants for Graduate Students (SIUE)	$1,500

PROFESSIONAL AFFILIATIONS

- Biophysical Society (*2019-present*)
- American Society for Biochemistry and Molecular Biology (*2014-2015*)
- American Chemical Society (*2013-2015*)
- Phi Kappa Phi (*2012-2015*)
- Undergraduate Research and Creative Activities (URCA) Associate (*2012-2013)*
- Phi Theta Kappa (*2009-2011*)