Thomas Rivas

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SUMMARY

Self-motivated and driven biochemist with experience in NGS, bioinformatics analyses, and RNA biology. Enjoys mechanistic experimentation to understand consequences of biological interactions.

EDUCATION

University of Colorado Boulder 2015 – August 2021
Ph.D. in Biochemistry

University of Delaware 2011 – 2015
Honors B.S. in Biochemistry with Distinction

EXPERIENCE

University of Colorado Boulder 2015 – Present
Graduate Research Assistant – Advisors: James Goodrich and Jennifer Kugel

- Grew, harvested, and quantified wildtype and mutant Herpes Simplex Virus-1
- Optimized infection conditions for total Pol II ChIP-seq assays
- Analyzed total Pol II ChIP-seq data to quantify differential gene expression
- Validated ChIP-seq results with qRT-PCR, ChIP-qPCR, and western blots
- Developed and tested mechanisms predicted by the analysis of sequencing data
- Created and maintained stably transfected cell lines (U2OS, Vero, HEK 293)
- Developed and validated a heterologous expression system to study a novel post-transcriptional modification of a small ncRNA in cells by northern blots, primer extensions, and enzymatic assays
- Optimized and quantified transfection efficiency by lipofectamine and electroporation methods using flow cytometry
- Generated and purified *in vitro* transcribed RNAs for *in vitro* biochemical assays including EMSAs, RNase protection assays, and RNA-dependent RNA polymerase assays
- Conducted extensive optimization and troubleshooting of RNA FISH and retrotransposition assays on a ncRNA
- Designed proof-of-concept RNA-seq method to study heterogeneity of a small ncRNA in cells
- Created plasmid DNA using restriction digestion, QuikChange, Gibson Assembly, and ligation free cloning methods
- Mentored 4 graduate rotation students and 1 undergraduate student

University of Delaware 2013 – 2015
Undergraduate Research Assistant – Advisors: Mary Watson, Brian Bahnson, Catherine Grimes

- Created a bacterial expression system to study the human innate immune protein NOD1
- Assayed protein structure and activity through circular dichroism, malachite green assays, and a novel peptidoglycan pulldown assay
- Utilized organic synthesis to create small molecule substrates to test the scope of a novel enantioselective reaction
- Characterized compounds through GC-MS, chiral HPLC, IR spectroscopy, C-NMR, and H-NMR

PUBLICATIONS

Rivas, T., Goodrich, J.A., & Kugel, J.F. (2021). The herpes simplex virus 1 protein ICP4 acts as both an activator and repressor of host genome transcription during infection. *Mol Cell Bio* 41(10): e00171-21

Dasgupta, S., **Rivas, T.**, & Watson, M. P. (2015). Enantioselective Copper(I)-Catalyzed Alkynylation of Oxocarbenium Ions to Set Diaryl Tetrasubstituted Stereocenters. *Angewandte Chemie - International Edition*, 54(47), 14154–14158.

- Highlighted in *Synfacts*: 2016; 12(2): 0169

SKILLS

Cellular – mammalian cell culture; virus production; plaque assays; stable cell line generation; DNA/RNA transfection; RNA FISH; fluorescence microscopy; cell-based assays; flow cytometry; RNA and DNA isolation

Molecular and Biochemical – northern blotting; western blotting; Chromatin immunoprecipitation (ChIP) and IP; primer extension; *in vitro* transcription; RNA production and purification; EMSAs; qRT-PCR and qPCR; molecular cloning; radioactive labeling (^{32}P) and quantification
Bioinformatics – ChIP-seq analysis; automated image analysis; classical statistical tests; data visualization
Programming – R (advanced); MATLAB (intermediate); Python (familiar)

HONORS AND AWARDS

CU Green Labs Program Award, Partnership for Lab Sustainability	2021
RNA Society Travel Award	2020
International Institute for Sustainable Laboratories (I2SL) Scholarship	2019
Carl Storm Underrepresented Minority Fellowship to attend GRC and GRS	2019
Ruth L. Kirschstein NRSA Fellow (NIH F31-D)	2018 – Present
ASBMB Graduate Student Travel Award	2018
Signaling and Cellular Regulation Training Grant (NIH T32)	2016 – 2018
Frank Collins Undergraduate Award in Biochemistry	2015
American Institute of Chemists Award in Chemistry	2015
Delaware INBRE Scholar (Summer Research Fellowship)	2014
University of Delaware General Honors Award	2013
Dave Plastino Alumni Scholar (Summer Research Fellowship)	2013
Community Service Scholar Award	2011 – 2015
Eagle Scout	2011

CONFERENCES

RNA Society (2020) **&** Gordon Research Conference: Nucleic Acids (2019)
Understanding RNA Polymerase II transcriptional regulation upon HSV-1 infection (poster)
Experimental Biology / ASBMB (2018)
How Cell Stress and 3' End Alterations Control the Metabolism of a Cellular Non-Coding RNA (poster)
Experimental Biology / ASBMB (2015) **&** UD Undergraduate Research Symposium (2015)
Biochemical Characterization of NOD1, an Innate Immune Receptor (poster & oral)

LOCAL PRESENTATIONS

SCR Supergroup (CU Boulder)	
Understanding RNA Polymerase II transcriptional regulation upon HSV-1 infection (oral)	2019
Investigating the Lifecycle and Metabolism of B2 RNA (oral)	2018
Senior Thesis Symposium (UD)	
Biochemical Characterization of NOD1, an Innate Immune Receptor (oral)	2015
Summer Scholars Symposium (UD)	
Biochemical Characterization of NOD1, an Innate Immune Receptor (poster)	2014
Undergraduate Research Symposium (UD)	
Fully Substituted Stereocenters via Enantioselective Alkynylation (poster)	2013
Buffs Talk Science podcast: Episode 36	2019

SERVICE AND PROFESSIONAL EXPERIENCE

RNA Club Undergraduate Day Panelist; Founder, Dept. of Biochemistry Faculty Liaison Council; CU Green Labs Ecoleader; Organizer, Colorado RNA Salon; Organizer SCR mini symposium; Organizer, Chemical Biology Supergroup; President, UD ASBMB Undergraduate Affiliate Network

TEACHING

Teaching Assistant
University of Colorado Boulder – Biochemistry 1; General Chemistry Lab and Recitation
University of Delaware – Organic Chemistry 2; General Chemistry Lab; Introduction to Biochemistry; Integrated General Chemistry