# Michael Hogan Ronzetti

GPP Graduate Student, National Center for Advancing Translational Sciences/University of Maryland

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## Research Experience

**National Center for Advancing Translational Sciences, NIH 03/2020 – Current**

IRTA GPP Graduate Student Fellow

Thesis Advisor: Dr. Anton Simeonov

Thesis Topic: *Screening and Profiling of Borreliacidal Compounds with Novel Mechanisms of Action*

* Participating in a 5-year fellowship at NCATS/NIH through the Graduate Partnership Program, focusing on developing and validating cell-based and biochemical assays for drug discovery aimed at finding small molecules with cytotoxic effects and novel modes of action in Borrelia bacteria.
* Acquiring techniques in quantitative high-throughput screening, biophysical target engagement screening, and high-throughput proteomics, including the use of various advanced methods such as high content imaging, FACS, and thermal proteome profiling.
* Gaining expertise in biophysical assays for target engagement and in protein production and purification methods, complemented by training in high-performance liquid chromatography. Contributing to the NCATS Fellows Committee as a member, leading a team through the NIH-AIM I-CORPS Program as Team Leader, initiating customer discovery for a new technology, filing for intellectual property, and securing significant funding for prototype development.

**Veterinary Medical Sciences, University of Maryland 2019 – Current**

Graduate Student

Thesis Advisor: Dr. Utpal Pal

Thesis Topic: *Screening and Profiling of Borreliacidal Compounds with Novel Mechanisms of Action*

* Formed multiple collaborations with other graduate students and staff scientists at UMD/VMSC to perform protein-small molecule interaction studies using an array of biophysical and biochemical approaches.

**National Center for Advancing Translational Sciences, NIH 03/2017 – 07/2019**

Postbaccalaureate Intramural Research Training Award (IRTA) Fellow

PI: Dr. Anton Simeonov, Dr. Bolormaa Baljinnyam

Highlighted Project: *Investigation of RP-182 binding to CD206 in M2-like tumor-associated macrophages*

* Developed techniques to study the interaction of synthetic host defense peptides with the CD206 membrane protein, using methods like microscale thermophoresis, cellular thermal shift assays, and western blot, and investigated the peptide's mechanism of action and signaling pathways via mass spectrometry proteomics and knockdown models.
* Characterized molecular interactions between lead compounds and targets employing a suite of biophysical tools, pioneered an innovative cellular thermal shift assay model with a luminescent readout, and mastered a range of techniques including thermophoresis, surface plasmon resonance, and various chromatography methods.
* Established and conducted a range of assays for high-throughput screening with fluorescent and luminescent readouts, leveraging automated liquid handling and microplate readers to validate and execute primary, orthogonal, and counter-screen assays.
* Analyzed, interpreted, and communicated large datasets qualitatively and quantitatively through presentations and scientific publications, collaborating with biology, chemistry, and informatics teams to advance project objectives and adhere to strict timelines.

**Institute for Social Research, University of Michigan 08/2015 – 06/2016**

Research Assistant

PI: Dr. Beverly Strassmann

* Investigated the relationship between testosterone and cortisol levels and growth stunting in a 30-year cohort study of African villages in Mali.
* Created statistical models relating free testosterone levels and growth rates to various social and stress benchmarks.

**MStem Cell Laboratories, University of Michigan 05/2013 – 05/2016**

Research Assistant

PI: Dr. Gary Smith

* Created a novel method of human embryonic stem cell (hESC) ablation and passage using Hamilton Thorne Stiletto laser system.
* Developed an algorithm in ImageJ to automate morphology data-gathering on hESCs.
* Performed immunofluorescence and qRT-PCR studies on pluripotent and differentiated stem cells.

**University of Michigan Health System, University of Michigan 03/2011 – 03/2013**

Research Assistant

PI: Dr. Gabriela Gorelik

* Handled patient blood and other tissues with active and inactive lupus erythematosus.
* Characterized the role of O-linked N-acetylglucosamine transferase over-expression in T cell signaling abnormalities in systemic lupus erythematosus.

## Publications and Posters

### Publications

* **[Dome1–JAK–STAT signaling between parasite and host integrates vector immunity and development](https://www.science.org/doi/abs/10.1126/science.abl3837)**

Vipin S Rana, Chrysoula Kitsou, Shraboni Dutta, **Michael H Ronzetti**, Min Zhang, Quentin Bernard, Alexis A Smith, Julen Tomás-Cortázar, Xiuli Yang, Ming-Jie Wu, Oleksandra Kepple, Weizhong Li, Jennifer E Dwyer, Jaqueline Matias, Bolormaa Baljinnyam, Jonathan D Oliver, Nallakkandi Rajeevan, Joao HF Pedra, Sukanya Narasimhan, Yan Wang, Ulrike Munderloh, Erol Fikrig, Anton Simeonov, Juan Anguita, Utpal Pal

*Science, Published 2023*

* [The ferroptosis inducing compounds RSL3 and ML162 are not direct inhibitors of GPX4 but of TXNRD1](https://www.sciencedirect.com/science/article/pii/S2213231723001040)

Dorian M Cheff, Chuying Huang, Karoline C Scholzen, Radosveta Gencheva, **Michael H Ronzetti**, Qing Cheng, Matthew D Hall, Elias SJ Arnér

*Redox Biology, Published 2023*

* [A unique borrelial protein facilitates microbial immune evasion](https://journals.asm.org/doi/full/10.1128/mbio.02135-23)

Shelby D. Foor, Kalvis Brangulis, Anil K. Shakya, Vipin S. Rana, Sandhya Bista, Chrysoula Kitsou, **Michael Ronzetti**, Adit B. Alreja, Sara B. Linden, Amanda S. Altieri, Bolormaa Baljinnyam, Inara Akopjana, Daniel C. Nelson Anton Simeonov, Osnat Herzberg, Melissa J. Caimano, Utpal Pal

*mBio, Published 2023*

* [Advances in luminescence-based technologies for drug discovery](https://www.tandfonline.com/doi/abs/10.1080/17460441.2023.2160441)

Bolormaa Baljinnyam, **Michael Ronzetti**, Anton Simeonov

Expert Opinion on Drug Discovery*, Published 2023*

* **[A real-time cellular thermal shift assay (RT-CETSA) to monitor target engagement](https://www.biorxiv.org/content/10.1101/2022.01.24.477382v1.article-metrics)**

Tino W Sanchez\*, **Michael H Ronzetti**\*, Ashley E Owens, Maria Antony, Ty Voss, Eric Wallgren, Daniel Talley, Krishna Balakrishnan, Ganesha Rai, Juan J Marugan, Sam Michael, Bolormaa Baljinnyam, Noel Southall, Anton Simeonov, Mark J Henderson

\*These authors contributed equally to this work

*ACS Chemical Biology, Published 2022*

* **[Application of Temperature-Responsive HIS-Tag Fluorophores to Differential Scanning Fluorimetry Screening of Small Molecule Libraries](https://www.biorxiv.org/content/10.1101/2022.08.31.506021v1)**

**Michael H Ronzetti**, Bolormaa Baljinnyam, Zina Itkin, Sankalp Jain, Ganesha Rai, Alexey V. Zakharov, Utpal Pal, Anton Simeonov

*Frontiers in Pharmacology, Published 2022*

* [**Protein Refolding Guided by High-Throughput Differential Scanning Fluorimetry: a case study of an HtrA-Family Bacterial Protease**](https://www.biorxiv.org/content/10.1101/2022.01.27.477556v1)

**Michael Ronzetti**, Bolormaa Baljinnyam, Utpal Pal, Anton Simeonov

*Protein Science, Published 2022*

* Investigating potent small molecule inhibitors that disrupt IQGAP1-Cdc42 interactions

Samar Sayedyahossein, Jessica Smith, Elena Barnaeva, Zhigang Li, Chris Dextras, Xin Hu, Juan Marugan, Noel Southall, **Michael Ronzetti**, Bolormaa Baljinnyam, Marc Ferrer, David B Sacks

*Scientific Reports, Accepted 2022*

* Controlled proteolysis of an essential virulence determinant dictates infectivity of Lyme disease pathogens

Meghna Thakur, Sandhya Bista, Xiuli Yang, Shelby D. Foor, **Michael Ronzetti**, Vipin S. Rana, Chrysoula Kitsou, Sara B. Linden, Shraboni Dutta, Amanda S. Altieri, Bolormaa Baljinnyam, Daniel Nelson, Anton Simeonov, Utpal Pal

*Molecular Microbiology, Published 2022*

* [**Mannose receptor (CD206) activation in tumor-associated macrophages enhances adaptive and innate antitumor immune responses**](https://www.science.org/doi/10.1126/scitranslmed.aax6337)
* Jesse M. Jaynes\*, Rushikesh Sable\*, **Michael Ronzetti**\*, Wendy Bautista-Guzman, Taylor Aiken, Mica Dashnyam, Anju Singh, Raul Calvo, Maura O’Neill, Abisola Abisoye-Ogunniyan, Dandan Li, Anghesom Ghebremedhin, Ruksana Amin, Jason White, Theresa Guerin, Yansong Bian, Zachary Knotts, Raymond Hughley, Ahmad Bin Salam, Lixin Fan, George Martin, Marc Ferrer, Thorkell Andresson, Chan-Young Ock, Henry Lopez, Juan Marugan, Serguei Kozlov, Natalia de Val, Clayton Yates, Bolormaa Baljinnyam, Udo Rudloff

\*These authors contributed equally to this work

*Science Translational Medicine, Published 2020*

* Application of Fluorescence Technologies to High Throughput Screening Assays

Bolormaa Baljinnyam, Maya L. Gosztyla, **Michael Ronzetti**, Anton Simeonov

*High Throughput Screening: Methods, Techniques and Applications, Published 2020*

* [Applications of Differential Scanning Fluorometry and Related Technologies in Characterization of Protein–Ligand Interactions](https://pubmed.ncbi.nlm.nih.gov/31773647/)

Bolormaa Baljinnyam, **Michael Ronzetti**, Adam Yasgar, Anton Simeonov

*Methods in Molecular Biology, Springer Science, Published 2019*

* [Testing for Drug-Human Serum Albumin (HSA) Binding Using Fluorescent and Related Probes](https://pubmed.ncbi.nlm.nih.gov/30320522/)

**Michael Ronzetti**, Bolormaa Baljinnyam, Adam Yasgar, Anton Simeonov

*Expert Opinion in Drug Discovery, Published 2018*

### Posters and Presentations

* Temperature-responsive HIS-tag fluorophores applied to differential scanning fluorimetry screening of small molecule libraries

*NIH Graduate Partnership Program Symposium, NIH, Bethesda, 2023*

* Small Molecule Stabilization of Protein Targets in the Cell Measured by Novel Broadly Enabling Technologies *Graduate Partnership Program Symposium, NIH, Bethesda, 2022*
* The Global HTS Ring Testing Initiative

*NCATS Center Meeting, NIH, Bethesda, 2019*

* Microscale Thermophoresis and Differential Scanning Fluorimetry – Biophysical Methods to Study Target Engagement

*Adenine Team, NCATS, NIH, Bethesda, MD, 2018*

* Binding Studies of in-silico-Optimized Peptides to Human CD206

*NIH Postbaccalaureate Poster Day, NIH, Bethesda, MD, 2018*

*NIH Outstanding Poster Award*

* The biosimilar RP-182, a synthetic host defense peptide (HDP), selectively suppresses the M2 phenotype of tumor associated macrophages (TAM) and cooperates with gemcitabine to improve anti-tumor immunity and extend survival in genetically- engineered murine models of pancreas cancer.

*NCI Intramural Scientific Investigators Retreat, Bethesda, MD 2018*

* High-throughput screening of drug libraries to identify novel inhibitors of cytosine methylation

*NIH Summer Poster Day, NIH, Bethesda, 2017*

### Patents

* METHODS AND SYSTEMS FOR ANALYZING TARGET ENGAGEMENT DATA FROM BIOLOGICAL ASSAYS

*Inventor, HHS Reference: E-022-2022-0-US-01, Filed December 22, 2021*

* REAL-TIME CELLULAR THERMAL SHIFT ASSAY (RT-CETSA) FOR RESEARCH AND DRUG DISCOVERY

*Co-Inventor, HHS Reference: E-200-2020-0-PCT-02, Filed August 9, 2021*

### Whitepapers and Other Publications

* [Intellia Therapeutics Is Pushing CRISPR-Based Therapy Forward, Slowly But Surely](https://seekingalpha.com/article/4527753-intellia-therapeutics-pushing-crispr-therapy-forward-slowly-surely)

*SeekingAlpha Exclusive, July 30, 2022*

* [Revisiting Beam Therapeutics Among Collaborative Catalysts](https://seekingalpha.com/article/4522592-revisiting-beam-therapeutics-collaborative-catalysts)

*SeekingAlpha Exclusive, July 10, 2022*

* [Beam Therapeutics: Recent Selling Pressure Leaves Behind A CRISPR Buying Opportunity](https://seekingalpha.com/article/4475972-beam-therapeutics-stock-selling-crispr-buying-opportunity)

*SeekingAlpha Exclusive, December 19, 2021*

* [10x Genomics: Expensive And Poised For Growth Post-COVID](https://seekingalpha.com/article/4436479-10x-genomics-expensive-and-poised-for-growth-post-covid)

*SeekingAlpha Exclusive, June 24, 2021*

* [Crispr Therapeutics Deserves Attention After Positive CRISPR/Cas9 Patient Data](https://seekingalpha.com/article/4394258-crispr-therapeutics-deserves-attention-after-positive-crispr-cas9-patient-data)

*SeekingAlpha Exclusive, December 11, 2020*

## Awards

**NCATS Director’s Award 2019**

For the discovery and characterization of a new class of cancer immunotherapy that can target solid tumors by selectively reprogramming tumor-associated macrophages.

**NIH Outstanding Poster Award 2018**

Poster title:  High-throughput screening of drug libraries to identify novel inhibitors of cytosine methylation.

## Certifications

**ACS Reviewer Lab Certification, American Chemical Society 2021**

Course on the principles of high-quality peer review, including reviewer ethics, tools, and components of a constructive, comprehensive review. Papers reviewed: 2

[**Public Policy Analytical Methods Certificate, Science and Technology Policy Academy**](https://www.credly.com/badges/4902c133-5be1-4c7c-9acf-bbca035596bd/linked_in) **2021**

Benefit-cost analysis, cost-effectiveness analysis, and risk analysis as quantitative techniques used to support the assessment of effectiveness, efficiency, and equity in the policy analysis process.

## Education

**Comparative Biomedical Science Program, University of Maryland 2019 – Current**

Ph.D. | GPP NCATS/NIH/UMD

Coursework:  Drug Discovery, Recombinant Viral Vectors, Genomics and Proteomics, Seminar in Veterinary Medical Sciences

**University of Michigan, Ann Arbor 2010 – 2016**

B.S. | Neuroscience

Coursework:  Neurobiology, Animal Physiology, Organic Chemistry, Statistics, Genetics, Biochemistry, Cell Biology, Pharmacology of Drugs of Abuse

University of Michigan Rugby Team (2012-2014)

## Continued Education, Training, and Skills

### Coursework

* Principles of Clinical Pharmacology, NIH Library **2021**
* Introduction to the Principles and Practice of Clinical Research, NIH Library
* Public Policy Analytical Methods, NIH FAES
* Computational Biology Methods for Drug Discovery, NIH FAES **2020**
* Virtual Lab on Deep Learning with MatLab, NIH Library
* Leadership and Influence, EDX [USMx BUMM600]
* The Science and Business of Biotechnology, EDX [MITx 15.480x] **2019**
* The Science and Business of Biotechnology, EDX [MITx 15.480x]
* The Science and Business of Biotechnology, EDX [MITx 15.480x]
* Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning, Coursera [DeepLearning.AI]
* Advanced Valuation and Strategy - M&A, Private Equity, and Venture Capital, Coursera [Erasmus University]

**NIH Poster Day Judge**

* NIH Postbac Poster Day, Judge, 2021, 2022
* NIH Postbac Poster Day, Lead Judge, 2020

**NIH-AIM ICORPS Program**

* NIH-AIM Program, Team Leader, 2020

**Programming**

* **R:** Proficient, packages developed and released for public use under the GNU General Public License v 3.0 include:
  + [RT-CETSA](https://github.com/ncats/RT-CETSA-Analysis)

Scripts and functions to clean, baseline-fit, and analyze real-time CETSA data using nonparametric analysis of model fits.

* + [GlowingCouscous](https://github.com/mronzetti/glowing-couscous)

Software to pull protein sequences from NCBI IDs and construct MSA/Phylogenetic tree.

* + [Roche QPCR](https://github.com/mronzetti/Roche-qPCR)

Processing of Roche DSF plates to allow for easier analysis using GraphPad Prism or other analytical/graphing software. Working on internal DSF analysis functionality.

* + [RotationalETFAnalysis](https://github.com/mronzetti/RotationalETFAnalysis)

Back-testing and time series analysis to optimize rotational ETF strategies with downside protection.

* **Python:** Practicing
  + [fastasplit](https://github.com/mronzetti/fastasplit)

Script to split multifasta files up into individual fasta files ready for modeling using NIH HPC resources.

* + [ClusterDuck](https://github.com/mronzetti/ClusterDuck)

Clustering, fingerprinting, and selection of cluster representatives from a small molecule sdf file.