

Samantha L. Bell, Ph.D.

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Texas A&M Health Science Center

Postdoc 2015 – present	Texas A&M Health Science Center Microbial Pathogenesis and Immunology Sponsor: Robert O. Watson
Ph.D. 2010 – 2015	University of California, San Francisco Biomedical Sciences - Virology & Microbial Pathogenesis Advisor: Jeffery S. Cox
B.S. 2006 – 2010	University of Pittsburgh Molecular Biology with Biochemistry <i>Summa cum laude</i> (3.97 GPA)

Objectives:

Research	Investigate the molecular basis of host- <i>Mycobacterium tuberculosis</i> interactions to ultimately develop more effective anti-TB therapies.
Mentorship	Train creative and resilient scientists who are exceptional critical thinkers, collaborators, communicators, and leaders.
Service	Create and foster a supportive, diverse, and inclusive lab, department, and scientific community while promoting the involvement of women and underrepresented groups in STEM.

Significant Research Funding:

pending*	<u>NIAID DP2 New Innovators Award</u> \$1,500,000 over 5 years; \$300,000/year *Award activates upon acquisition of tenure-track position
2020 - 2021	Cain Fellowship – Department of Microbial Pathogenesis & Immunology, Texas A&M \$15,000 for unbiased studies (mass spec, sequencing) of <i>Mtb</i> -macrophage interaction
2012 - 2015	NSF Graduate Research Fellowship

Research Experience:

Postdoctoral Training – Texas A&M University Health Science Center 2015 – present
Sponsor: Dr. Robert O. Watson

- Identifying and characterizing pattern recognition receptors (pathogen- and damage-associated molecular patterns) involved in detecting and controlling *Mycobacterium tuberculosis* infection
- Investigating the mechanisms by which innate immune pathways (cytosolic DNA sensing, phagosomal damage, selective autophagy, mitochondrial homeostasis, etc.) are regulated during bacterial infection
- Using unbiased approaches (i.e., genetic screens and mass spec approaches) to discover novel host and bacterial factors that influence *M. tuberculosis*-host interactions
- Exploring how the liquid-liquid phase separation of host and bacterial proteins contributes to and controls innate immune responses to *M. tuberculosis* infection

Research Experience (continued):

Thesis Research – University of California, San Francisco 2010 – 2015
Advisor: Dr. Jeffery S. Cox

- Identified the cytosolic DNA sensor cGAS as a crucial host protein involved in eliciting type I interferons during bacterial infections and in targeting *M. tuberculosis* to autophagy
- Mapped the interactions between secreted *M. tuberculosis* proteins and macrophage host proteins using a mass spec-based screen
- Analyzed the *in vivo* and *ex vivo* functions of the CRISPR system in *M. tuberculosis* and assessed its role in growth, survival, and virulence

Undergraduate Research – University of Pittsburgh 2007 – 2010
Advisor: Dr. Jeffrey L. Brodsky

- Utilized yeast as a model system to characterize the TorsinA, the protein often responsible for the movement disorder torsion dystonia
- Characterized a malarial chaperone protein, PfHsp70-1, using a yeast-based expression system
- Tested potential antimalarial compounds using purified Hsp70s and *in vitro* ATPase assays

Summer Undergraduate Research Fellowship – University of California, San Diego 2008
Advisor: Dr. Jing Yang

- Piloted a three-dimensional primary cell culture system for mammary epithelial cells to study Twist, a transcription factor associated with tumor metastasis

Fellowships and Awards:

<i>pending</i>	<u>NIAID New Innovators Award (DP2) (\$1,500,000 over 5 years)</u> <i>Award activated upon confirmation of tenure-track position</i>
2020 - 2021	Cain Fellowship (\$15,000 for supplies & services), Department of Microbial Pathogenesis & Immunology, Texas A&M University Health Science Center
2019	Postdoctoral Association Travel Award, Texas A&M University Health Science Center
2018	People's Choice - Distinguished Flash Talk Presentation, Postdoc Research Symposium, Texas A&M University
2018	Postdoctoral Scholar Travel Award, TAMU Postdoc Association, Texas A&M University
2017	1 st Place - Distinguished Poster, Postdoc Research Symposium, Texas A&M University
2012 - 2015	NSF Graduate Research Fellowship
2009 - 2010	Horowitz Fellowship, Biological Sciences, University of Pittsburgh
2009	HHMI Summer Undergraduate Research Fellowship, University of Pittsburgh
2008	Chancellor's Undergraduate Research Fellowship, University of Pittsburgh
2008	Summer Undergraduate Research Fellowship, Pharmacology, UC San Diego
2007 - 2008	HHMI Undergraduate Research Fellowship, Biological Sciences, University of Pittsburgh

Publications:

Bell SL, Lopez KL, Cox JS, Patrick KL, Watson RO. Galectin-8 senses phagosomal damage and recruits selective autophagy adaptor TAX1BP1 to control *Mycobacterium tuberculosis* infection in macrophages. *bioRxiv*. 1 Jul 2020; doi: 10.1101/2020.06.30.180877. *Under revision at mBio*.

Highlighted by: Gibson J and Goh Z-E. Guardians from the galectins: Danger sensor galectin-8 promotes degradation of *M. tuberculosis* using selective autophagy. *preLights*. 27 Jul 2020.

Publications (continued):

Vail KJ, Petri da Silveira B, **Bell SL**, Bordin AI, Cohen ND, Patrick KL, Watson RO. The opportunistic intracellular bacterial pathogen *Rhodococcus equi* elicits type I interferons by engaging cytosolic DNA sensing in macrophages. *bioRxiv*. 29 Mar 2021; doi: 10.1101/2021.03.28.437424v1. Submitted to *PLoS Pathogens*.

Lei Y, Torres-Odio S, Martinez CG, **Bell SL**, Birdwell CE, Bryant JD, Tong CW, Watson RO, West LC, West AP. Elevated type I interferon responses potentiate metabolic dysfunction, inflammation, and accelerated aging in mtDNA mutator mice. *bioRxiv*. 23 Sep 2020; doi: 10.1101/2020.09.22.308171. In press at *Science Advances*.

Ding S, Pandey A, Feng X, Yang J, da Costa LF, Mouneimne RB, Rice-Ficht A, **Bell SL**, Watson RO, Patrick KL, Qin Q, Ficht TA, de Figueiredo P. Interactions between fungal hyaluronic acid and host CD44 promotes internalization by recruiting host autophagy proteins to forming phagosomes. *iScience*. 2021 Mar 19;24(3):102192; doi: 10.1016/j.isci.2021.102192; PMID: 33718841.

Hoffpauir CT, **Bell SL**, West KO, Jing T, Torres- Odio S, Cox JS, West AP, Li P, Patrick KL, Watson RO. TRIM14 is a key regulator of the type I interferon response during *Mycobacterium tuberculosis* infection. *J Immunol*. 2020 May 13, j1901511; doi: 10.4049/jimmunol.1901511; PMID: 32404352.

Highlighted by: Top Reads: TRIMming up the IFN response. *J Immunol*. May 2020.

Weindel CG**, **Bell SL****, Vail KJ, West KO, Patrick KL, Watson RO. LRRK2 maintains mitochondrial homeostasis and regulates innate immune responses to *Mycobacterium tuberculosis*. *eLife*. 2020;9:e51071 doi: 10.7554/eLife.51071; PMID: 32057291.

(**authors contributed equally)

Highlighted by: Wallings RL, Herrick MK, Malú Gámez Tansey MG. Parkinson's Disease: Linking mitochondria to the immune response. *eLife*. 2020;9:e56214 doi: 10.7554/eLife.56214.

See also: Weindel CG**, **Bell SL****, Huntington TE, Vail KJ, Srinivasan R, Patrick KL, Watson RO. LRRK2 regulates innate immune responses and neuroinflammation during *Mycobacterium tuberculosis* infection. *bioRxiv*. 2019 Jul 26. doi: 10.1101/699066.

(**authors contributed equally)

Zhao B, Du F, Xu P, Chang Shu, Sankaran B, **Bell SL**, Liu M, Lei Y, Gao X, Ji J, West AP, Watson RO, and Li P. A conserved PLPLRT/SD motif within the C-terminal tail of STING mediates the recruitment and activation of TBK1. *Nature*. 2019 May 22. doi: 10.1038/s41586-019-1228-x; PMID: 31118511.

Patrick KL*, Wojcechowskyj JA*, **Bell SL**, Riba M, Jing T, Talmage S, Xu P, Cabello AL, Xu J, Shales M, Jimenez-Morales D, Ficht TA, de Figueiredo P, Samuel JE, Li P, Krogan NJ, Watson RO. Quantitative yeast genetic interaction profiling of bacterial effector proteins uncovers a role for the human retromer in Salmonella infection. *Cell Systems*. 2018 Sep 26;7(3):323-338.e6; doi: 10.1016/j.cels.2018.06.010; PMID: 30077634.

Penn BH, Netter Z, Johnson JR, Von Dollen J, Jang GM, Johnson T, Ohol YM, Maher C, **Bell SL**, Geiger K, Golovkine G, Du X, Choi A, Parry T, Mohapatra BC, Storck MD, Band H, Chen C, Jäger S, Shales M, Portnoy DA, Hernandez R, Coscoy L, Cox JS, Krogan NJ. An Mtb-Human protein-protein interaction map identifies a switch between host antiviral and antibacterial responses. *Mol Cell*. 2018 Aug 16;71(4):637-648.e5; doi: 10.1016/j.molcel.2018.07.010; PMID: 30118682.

Watson RO**, **Bell SL****, MacDuff DA, Kimmey JM, Diner EJ, Olivas J, Vance RE, Stalling CL, Virgin HW, Cox JS. The cytosolic sensor cGAS detects *Mycobacterium tuberculosis* DNA to induce type I interferons and activate autophagy. *Cell Host Microbe*. 2015 June 10;17(6):811-9. doi: 10.1016/j.chom.2015.05.004. PMID: 26048136.

(**authors contributed equally)

Zacchi LF, Wu HC, **Bell SL**, Millen L, Paton AW, Paton JC, Thomas PJ, Zolkiewski M, Brodsky JL. The BiP molecular chaperone plays multiple roles during the biogenesis of torsinA, an AAA+ ATPase associated with the neurological disease early-onset torsion dystonia. *J Biol Chem*. 2014 May 2;289(18):12727-47. doi: 10.1074/jbc.M113.529123. PMID: 24627482.

Publications (continued):

Bell SL, Chiang AN, and Brodsky JL. Expression of a malarial Hsp70 improves defects in chaperone-dependent activities in *ssa1* mutant yeast. *PLoS One*. 2011;6(5):e20047. doi: 10.1371/journal.pone.0020047. PMID: 21625512.

Chiang AN, Valderramos JC, Balachandran R, Chovatiya RJ, Mead BP, Schneider C, **Bell SL**, Klein MG, Huryn DM, Chen XS, Day BW, Fidock DA, Wipf P, Brodsky JL. Select pyrimidinones inhibit the propagation of the malarial parasite, *Plasmodium falciparum*. *Bioorg Med Chem*. 2009 Feb 15;17(4):1527-33. doi: 10.1016/j.bmc.2009.01.024. PMID: 19195901.

Reviews:

Patrick KL, **Bell SL**, Weindel C, Watson RO. Exploring the “multiple-hit hypothesis” of neurodegenerative disease: bacterial infection comes up to bat. Review. *Front Cell Infect Microbiol*. 2019 May 28; doi: 10.3389/fcimb.2019.00138; PMID: 31192157.

Patrick KL**, **Bell SL****, Watson RO. Cytosolic DNA sensing during intracellular bacterial infection induces potent innate immune responses. Review. *J Mol Bio*. 2016 Apr 29 pii: S0022-2836(16)30111-5; doi: 10.1016/j.jmb.2016.04.030; PMID: 27139640.

(**authors contributed equally)

Leadership Experience:

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| 2019 | President, TAMU Postdoc Association, Texas A&M University |
| 2018 | Vice President, TAMU Postdoc Association, Texas A&M University |
| 2016 - 2019 | Chair, Events Committee, TAMU Postdoc Association, Texas A&M University |
| 2016 - 2018 | Treasurer, TAMU Postdoc Association, Texas A&M University |
| 2016 - 2018 | Postdoc Coordinator, Microbial Pathogenesis Journal Club, Texas A&M University |
| 2016 - 2017 | Founding executive member, TAMU Postdoc Association, Texas A&M University |
| 2011 - 2013 | Chemical Safety Officer, Cox Lab, UC San Francisco |

Teaching Experience:

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| 2017 - 2021 | Completed coursework & trainings: <ul style="list-style-type: none"> • Academic Lab Management & Leadership Symposium (9 session workshop from Torrey Pines Training Consortium) • Research Mentor Training (3 day workshop from National Research Mentoring Network & Gulf Coast Consortium) • Implicit Bias Training (full day workshop from Texas A&M School of Innovation) • Building Scientific Relationships (4 week course [met twice weekly] from Texas A&M Department of Biochemistry and Biophysics) |
| 2018 - 2019 | Creator & instructor, Bullet Journal Workshop, TAMU Postdoc Association, Texas A&M University |
| 2018 - present | Academy for Future Faculty Fellow Certificate (<i>in progress</i>), Center for the Integration of Research, Teaching, and Learning (CIRTL), Texas A&M University |
| 2016 | Discussion Leader, Responsible Conduct of Research, Texas A&M University |
| 2012 - 2014 | Tutor, Cell Biology, Biomedical Sciences Program, UC San Francisco |
| 2012 - 2014 | Instructor & mentor, NSF Fellowship Workshop, UC San Francisco |
| 2012 | Volunteer, Science & Health Education Partnership, UC San Francisco and San Francisco Unified School District |
| 2011 | Teaching Assistant, Cell Biology, Biomedical Sciences, UC San Francisco |

Service and Outreach:

- 2015 - present Reviewer for *eLife*, *Cell Host & Microbe*, *mBio*, *Nature Communications*, *Frontiers in Microbiology*, *Frontiers in Infection and Cellular Microbiology*, *Journal of Cell Biology*, *Journal of Infectious Diseases*, *iScience*, *IUBMB Life*
- 2015 - present Member of American Society for Cell Biology (ASCB), National Postdoctoral Association (NPA), Texas A&M chapter of Women in Science and Engineering (WISE), Texas A&M University and Texas A&M Health Science Center Postdoctoral Associations
- 2020 - 2021 Judge, Texas Science and Engineering Fair
- 2018 - 2021 Active Listener/Moderator, Undergraduate Research Symposium, Texas A&M University
- 2017 - 2021 Judge, Student Research Week, Texas A&M University
- 2017 - 2020 Judge, Texas Science and Humanities Symposium, Texas A&M University
- 2017 - 2020 Judge, Texas Junior Academy of Science, Texas A&M University
- 2016 - 2017 Volunteer, South Texas Academy for Medical Professions, Texas A&M University
- 2012 - 2014 Judge, Junior Sciences & Humanities Symposium, California-Nevada Region
- 2012 - 2014 Judge, Regional Intel Science Fairs, San Francisco and Alameda Counties
- 2011 - 2013 Volunteer, Bay Area Science Festival, San Francisco, California

Select Presentations:

Cytosolic detection of *Mycobacterium tuberculosis* activates potent immune responses

- 2021 Presentation, Microbial Pathogenesis & Immunology Research in Progress, Texas A&M Health Science Center
- 2021 Invited seminar, Microbial Sciences Institute, Department of Immunobiology, and Department of Microbial Pathogenesis, Yale School of Medicine, New Haven, CT
- 2021 Invited seminar, Department of Microbiology, Boston University Medical School, Boston, MA
- 2021 Invited seminar, Department of Molecular Microbiology & Immunology, Keck School of Medicine, University of Southern California, Los Angeles, CA
- 2021 Invited seminar, Department of Pathology, The University of Texas Medical Branch, Galveston, TX
- 2020 Invited seminar, Center for Emerging Pathogens, Rutgers New Jersey Medical School, Newark, NJ

A network of galectins senses phagosomal damage to control bacterial infection in macrophages

- 2019 Poster, Cold Spring Harbor Microbial Pathogenesis & Host Response, Cold Spring Harbor, NY
- 2019 Presentation, Microbial Pathogenesis & Immunology Research in Progress, Texas A&M Health Science Center
- 2018 Poster, 2018 ASCB | EMBO Meeting, San Diego, CA
- 2018 Presentation (Flash Talk), Postdoc Research Symposium, Texas A&M University**
People's Choice - Distinguished Flash Talk Presentation

Galectins sense membrane damage to target and kill *Mycobacterium tuberculosis*

- 2018 Presentation, Graduate Research Symposium, Texas A&M Health Science Center
- 2018 Presentation, Microbial Pathogenesis & Immunology Research in Progress, Texas A&M Health Science Center

LRRK2 and *in vivo* *Mycobacterium tuberculosis* infection

- 2018 Presentation, Innate Immunity/Host Pathogen Interaction Group, Texas A&M Health Science Center

Galectin-8 recognizes *Mycobacterium tuberculosis*-containing phagosomes to control infection

- 2017 Poster, Texas Branch ASM, Texas A&M University
- 2017 Poster, Annual Postdoc Science Symposium, MD Anderson Cancer Center
- 2017 Poster, Postdoc Research Symposium, Texas A&M University**
1st Place - Distinguished Poster Presentation
- 2017 Poster, Cold Spring Harbor Microbial Pathogenesis & Host Response, Cold Spring Harbor, NY
- 2017 Presentation, Microbial Pathogenesis & Immunology Research in Progress, Texas A&M Health Science Center
- 2017 Poster, Graduate Research Symposium, Texas A&M Health Science Center

Select Presentations (continued):

Recognition of extracellular microbial ligands regulates galectin-8-mediated innate immunity

- 2016 Presentation, Innate Immunity/Host Pathogen Interaction Group, Texas A&M Health Science Center
- 2016 Poster, Texas Regional Immunology Conference, MD Anderson Cancer Center
- 2016 Presentation (Flash Talk), Postdoc Research Symposium, Texas A&M University
- 2016 Poster, EMBO | EMBL Symposia: Innate Immunity in Host-Pathogen Interactions, Heidelberg, Germany
- 2016 Presentation, Microbial Pathogenesis and Immunology Research in Progress Seminar, Texas A&M Health Science Center

Cytosolic Detection of the Vacuolar Pathogen, *Mycobacterium tuberculosis*

- 2015 Invited seminar, Microbial Pathogenesis & Immunology, Texas A&M Health Science Center
- 2015 Presentation, Microbial Pathogenesis and Host Defense Seminar, UC San Francisco
- 2014 Presentation, Bay Area Microbial Pathogenesis Symposium, UC San Francisco
- 2013 Poster, UCSF/UCB Immunology Retreat, Asilomar, California

Determining the Role of the CRISPR-Cas System in *Mycobacterium tuberculosis* Virulence

- 2013 Poster, Bay Area Microbial Pathogenesis Symposium, UC San Francisco
- 2012 Poster, Biomedical Sciences Program Retreat, Lake Tahoe, California

A Yeast-Based System to Characterize the Malarial Chaperone, PfHsp70-1

- 2010 Presentation, Departmental Honors Symposium, Department of Biological Sciences, University of Pittsburgh
- 2010 Poster, Midwest Stress Response & Molecular Chaperone Meeting, Northwestern, Evanston, IL
- 2009 Presentation, Undergraduate Researchers' Summer Symposium, University of Pittsburgh