



CURRICULUM VITAE

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Education

- 2012 **Assistant Professor:** Department of Biological Sciences, The University of Texas at El Paso
- 2008 **Postdoctoral Training:** Pathology, Microbiology and Immunology, Mentor: Sebastian Joyce, Vanderbilt University, Nashville, TN
- 2008 **Ph.D.** Molecular Microbiology and Immunology, Mentor: Daniel F. Hoft, Saint Louis University, St. Louis, MO
- 2000 **B.A.** Biology, Washington University in St. Louis, St. Louis, MO

Service

University Service

- 2009—2012 Departmental representative to the local branch of the National Postdoctoral Association
- 2012—2016 Undergraduate advising
- 2013—2014 Educational Compliance Committee
- 2014— Departmental Website committee chair
- 2014— Institutional Animal Care and Use Committee
- 2016— Departmental Postdoctoral Student Advisory Committee
- 2016—2017 College of Science Teamwork Assessment Fellow
- 2016—2017 Provost's Community Engaged Scholar

Professional Service

- 2010—2011 Reviewer for the Defense Threat Reduction Agency, Chemical and Biological Technologies Directorate program
- 2013 SACNAS Undergraduate Poster Judge
- 2013 ABRCMS Presentation Judge
- 2014 ABRCMS Abstract Reviewer
- 2015 Metabolic Disease section chair for BBRC Symposium
- 2015 ABRCMS Abstract Reviewer
- 2015 SciMed Central Reviewer
- 2015— SRL Proteomics and Bioinformatics Editorial Board
- 2015— SRL Immunology and Immunotherapy Editorial Board
- 2015—2017 American Society for Microbiology Rio Grande Branch President
- 2016 ASM Rio Grande Branch Annual Meeting Organizing Committee Chair

2016 Lead Guest editor for Advances in Emerging and Neglected Infectious Diseases Special Issue of BioMed Research International
2016 Ad hoc reviewer for Arizona Department of Health Services (ADHS) Biomedical Research Commission (ABRC)
2016 Ad hoc reviewer for Proteomes
2017 Served on NSF BIO advisory panel
2017 BBRC Symposium organizing committee

Grants

Ongoing

365304 Charles Spencer, PI 9/1/2015 – 8/31/2017
University of Texas System
Neural invasion by *Francisella tularensis* causes lethal neuroinflammation
The major goal of this project is to describe the novel observation that *Francisella tularensis* can invade the brain of infected animals and cause the same cytopathology as peripheral infection.
Role: PI

NSF 1626587 Charles Spencer, PI 9/15/2016 – 8/31/2019
MRI: Acquisition of MoFlo XDP FACS Sorter
The goal of this project is to acquire a fluorescence activated cell sorter for cooperative use by >20 faculty from multiple departments, colleges, and institutions in the El Paso, TX region.

Pending

NASA TRI Charles Spencer, PI 11/1/2017 – 10/31/2020
Monosodium Luminol Protects Against Space Radiation by Protecting From DNA-damaging Radicals
The goal of this project is to determine the efficacy of the drug monosodium luminol-GVT in protecting from space radiation in mouse analogs.
Role: PI

NIAID Charles Spencer, PI 9/1/2017 – 8/31/2019
Neuroinvasive *Francisella Tularensis*-induced Inflammation Changes Behavior
The goal of this project is to uncover whether the neuroinflammation elicited by neuroinvasive *Francisella tularensis* affects Behavior
Role: PI

NIAID Charles Spencer, PI 9/1/2017 – 8/31/2019
Type I NKT Cells Suppress the Cytokine Storm in Response to Infection
The goal of this project is to determine the mechanism by which type I NKT cells suppress the cytokine storm in response to *Francisella tularensis*
Role: PI

NIAID Amol Kulkarni, PI 4/1/2018 – 3/31/2020
Development of small molecule NLRP3 inhibitors to treat septic infections

The goal of this project is to develop novel inhibitors in collaboration with a laboratory at Howard University to suppress NLRP3-dependent inflammation induced by *Francisella tularensis*

Role: co-PI

Completed

University Research Incentive Charles Spencer, PI 2/1/2013 – 8/31/2014

Sexual Dimorphism in Survival from *Francisella tularensis* Infection

The goal of this project was to determine whether or not a difference in susceptibility to *Francisella tularensis* exists between males and females. The results from these studies demonstrated that female were more sensitive to infection. These preliminary data are being used to submit for federal funding for that project.

Role: PI

University of Texas at El Paso Charles Spencer, PI 12/1/2014 – 7/31/2015

College of Science Research Incentive

Rapid, onsite detection of microbes using modified carbon nanotube-based sensors

Role: PI

2G12MD007592-22 Kristine Garza, PI 4/1/2014-3/31/2016

NIH/NIGMS

The stress of obesity

The major goal of this project is to generate preliminary data regarding the effects of obesity on survival in response to an inflammatory infectious disease. My role on this project is the comparative challenge of lean and obese mice with *Francisella tularensis*.

Role: Co-PI

2G12MD007592-21 Hugues Ouellet, PI 10/1/2014-3/31/2016

NIH/NIGMS

Role of the truncated hemoglobin trHBN for persistence of *Mycobacterium tuberculosis*

The major goal of this project is to generate preliminary data on the role of the mycobacterial protein trHBN in detoxifying nitric oxide (NO). My role on this project is the *in vivo* challenge of mice with mycobacterium deficient in functional trHBN.

Role: Co-PI

Honors and Awards

1998	Howard Hughes Medical Institute Summer Fellow, Washington University in St. Louis
1998	Howard Hughes Medical Institute Travel Award, Washington University in St. Louis
2007	American Society of Microbiology Kadner Institute for professional development participant
2010-2012	NIH T32 Immunobiology of Blood Vascular Systems Training grant recipient
2012	Travel Award for presentation at Immunology 2012

2013	ASCB Minority Affairs Committee Professional Development Symposium 2013
2015	AAI Travel Award for presentation at Immunology 2015
2015-2016	ASCB Faculty Research and Educational Development program
2016	AAI Travel Award for presentation at Immunology 2016
2016	ASCB Faculty Research and Educational Development Travel award

Publications

Peer reviewed

1. **Spencer CT**, Abate G, Blazevic A, and Hoft DF. (2008) Only a subset of phosphoantigen-responsive $\gamma\delta$ T cells mediate protective TB immunity. *The Journal of Immunology* **181**: 4471-4484.
2. Lee K, Gudapati P, Dragovic S, **Spencer C**, Joyce S, Killeen N, Magnuson MA, and Boothby M. (2010) Mammalian target of rapamycin protein complex 2 regulates differentiation of Th1 and Th2 cell subsets via distinct signaling pathways. *Immunity* **32**: 743-753.
3. Hoft DF, Babusis R, Worku S, **Spencer CT**, Lottenbach K, Truscott SM, Abate G, Sakala IG, Edwards KM, Creech CB, Gerber MA, Bernstein DI, Newman F, Graham I, Anderson EL and Belshe RB. (2011) Live and inactivated influenza vaccines induce similar humoral responses but diverse cellular immune responses in young children. *Journal of Infectious Disease* **204**: 845-853.
4. Gordy LE, Bezbradica JS, Flyak AI, **Spencer CT**, Dunkle A, Sun J, Stanic AK, Boothby MR, He Y-W, Zhao Z, Van Kaer L and Joyce S. (2011) IL-15 regulates homeostasis and terminal maturation of NKT cells. *The Journal of Immunology* **187**:6335-6345.
5. **Spencer CT***, Abate G*, Sakala I*, Xia M, Truscott SM, Eickhoff CS, Linn R, Blazevic A, Metkar SS, Peng G, Froelich CJ and Hoft DF. (2013) Granzyme A produced by $\gamma\delta$ T cells induces human macrophages to inhibit growth of an intracellular pathogen. *PLoS Pathogens* **9**(1): e1003119. doi:10.1371/journal.ppat.1003119
*Equal contribution
6. **Spencer CT**, Dragovic SM, Conant SB, Gray JJ, Zheng M, Samir P, Niu X, Moutaftsi M, Van Kaer L, Sette A, Link AJ and Joyce S. (2013) Sculpting MHC class II-restricted self and non-self peptidome by the class I antigen-processing machinery and its consequences on TH cell responses. *Eur J Immunol.* **43**:1162-1172.
7. Gilchuk P, **Spencer CT**, Conant SB, Hill T, Gray JJ, Niu X, Zheng M, Erickson J, Boyd K, McAfee J, Oseroff C, Hadrup S, Bennink J, Hildebrand W, Edwards K, Crowe JE, Jr., Williams J, Buus S, Sette A, Schumacher TN, Link AJ and Joyce S. (2013) Discovering protective T-cell responses by interrogating naturally processed antigenic determinants. *J Clin Invest.* **123**:1976-1987.
8. **Spencer CT**, Bezbradica JS, Ramos MG, Arico CD, Gilchuk P, Conant SB, Gray JJ, Zheng M, Niu X, Hildebrand W, Link AJ and Joyce S. (2015) Viral infection causes a

shift in the self peptide repertoire presented by human MHC class I molecules. *Proteomics: Clinical Applications*. **9**(11-12):1035-1052. **(Invited)** PMID: 26768311

9. Abate G, **Spencer CT**, Hamzabegovic F, Blazevic A, Xia M and Hoft DF. (2015) Mycobacteria-specific $\gamma\delta$ T cells mediate both pathogen inhibitory and CD40L-dependent antigen presentation effects important for TB immunity. *Infection and Immunity*. **84**(2):580-589. PMID: 26644385
10. K.C. Nune, M.C. Somani, **C.T. Spencer** & R.D.K. Misra (2016): Cellular response of *Staphylococcus aureus* to nanostructured metallic biomedical devices: surface binding and mechanism of disruption of colonization. *Materials Technology*, 1-10. doi: 10.1080/10667857.2015.1112572
11. M. Xia, D. Hesser, P. De, I. Sakala, C.T. Spencer, J. Kirkwood, G. Abate, D. Chatterjee, K. Dobos and D.F. Hoft (2016) A Subset of Protective $\gamma\delta$ T cells is Activated by Novel Mycobacterial Lipid Components. *Infection and Immunity*, **84**(9): 2449-2462.

Peer Reviewed Editorials & Reviews

12. **Spencer CT**, Gilchuk P, Dragovic SM and Joyce S. (2010) Minor histocompatibility antigens: presentation principles, recognition logic and the potential for a healing hand. *Curr Opin Organ Transplant*. **15**: 512-525.
13. **Spencer CT** and Joyce S. (2012) Know thyself: Variations in self peptidomes and their immunologic consequences. *Amer Soc Histocompatibility & Immunogenetics Quart*. **36** (3): 28-36.
14. Duarte TT and **Spencer CT** (2016) Personalized Proteomics: The Future of Precision Medicine. *Proteomes* **4**(4):29, doi:10.3390/proteomes4040029. **PMC5117667**

Non-peer Reviewed Editorials & Reviews

15. **Spencer CT** (2015) Immunoproteomics: from Reductionist to Systems Immunology. *SRL Proteomics & Bioinformatics*. **1**(1): 001-003.
16. **Spencer CT** (2015) Don't Neglect Neglected Diseases. *SRL Immunology & Immunotherapy*. **1**(1): 001-002.
17. **Spencer CT** and Vasconcelos J (2017) Advances in Emerging and Neglected Infectious Diseases. *BioMed Research International*. Special Issue: Advances in Emerging and Neglected Infectious Diseases. Article ID 1467693, doi:10.1155/2017/1467693.

<https://www.ncbi.nlm.nih.gov/myncbi/browse/collection/42698439/>

Abstracts and Meetings

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| 2000 | Immunology 2000 - Integrin Engagement in Neutrophils Deficient in SHP-1. (Poster) |
| 2004 | US-Japan Conference on Tuberculosis and Leprosy – Human Mucosal & Systemic TB Immunity. (Poster) |
| 2004 | FASEB Experimental Biology 2004 – Direct effector and helper functions of mycobacteria-specific $\gamma\delta$ T cell lines. (Poster) |

- 2004 FASEB Experimental Biology 2004 - Differential Effects of IPP and BCG Expanded $V\gamma_9^+V\delta_2^+$ T cells on Intracellular Mycobacterial Growth. (Poster)
- 2005 US-Japan Conference on Tuberculosis and Leprosy - Differential Activation of $\gamma_9\delta_2$ T cells by Live BCG & Isopentenyl Pyrophosphate: Relevance for TB Protective Immunity. (**Speaker**)
- 2005 FASEB Experimental Biology 2005 - Antigen Specificity of $\gamma_9\delta_2$ T cells. (Poster)
- 2007 Immunology 2007 - Mycobacteria Induce Protective Effector Functions in a Subset of Nonprotective Phosphoantigen-reactive $\gamma_9\delta_2$ T cells. (Poster)
- 2012 Immunology 2012 - The MHC class I antigen processing components TAP and ERAAP sculpt the MHC class II-restricted self peptidome and modulate the $CD4^+$ T cell receptor repertoire impacting TH responses to microbial pathogens. (**Speaker**)
- 2013 SACNAS 2013 – Attendee and judge
- 2013 ABRMCS 2013 - Setzu N, Ramos R and Spencer CT. What are NKT cells doing to control a Francisella tularensis infection? (Poster)
- 2013 ABRCMS 2013 - Martinez DY, Setzu N, Ramos M, and Spencer CT. Females are more susceptible to death following Francisella tularensis infection. (Poster)
- 2013 Immunology 2013 - Attendee
- 2014 ISMHHD 2014 – D. Martinez, N. Setzu, M. Ramos, C. Spencer. Females are more susceptible to F. tularensis-mediated death. (Poster)
- 2014 Immunology 2014 – Attendee
- 2015 Immunology 2015 – C. Spencer, D. Martinez, N. Setzu, M. Ramos. The heightened inflammatory response makes females are more susceptible to F. tularensis-mediated death. (Poster)
- 2015 BBRC Symposium on Health Disparities 2015 – C. Spencer, D. Martinez, M. Ramos. A Change of Fortunes: Women are more susceptible to Francisella tularensis. (**Speaker**)
- 2016 Immunology 2016 – M. Ramos, A. Pon, D. Jones and C. Spencer. Peripheral Francisella tularensis infection results in neural invasion and pathologic inflammation. (Poster)
- 2016 Immunology 2016 – N. Setzu, N. Molina-Limon, A. Chaidez-Sandoval, R. Devoll, M. Ramos and C. Spencer. NKT Cell-Mediated Inhibition of Inflammation. (Poster)
- 2016 Immunology 2016 – C. Spencer, M. Ramos, D. Olsen, N. Setzu, and D. Martinez. Deficiencies in myeloid cell populations lead to increased sensitivity of females compared with males to Francisella tularensis infection. (Poster)

Research Experience

- 1997 Summer Student, Laboratory of Dr. James Crowe, Department of Pediatrics, Vanderbilt University School of Medicine, Nashville, Tennessee. We attempted to identify the receptor for Respiratory Syncytial Virus using mutational screens.

- 1998 Summer Student, Laboratory of Dr. Michael Dustin, Department of Pathology, Division of Immunology, Washington University School of Medicine, St. Louis, Missouri
- 1998—2000 Student Research Associate, Laboratory of Dr. Michael Dustin, Department of Pathology, Division of Immunology, Washington University School of Medicine, St. Louis, Missouri. In collaboration with Dr. Matthew L. Thomas, we investigated the role of SHP-1 in neutrophil adhesion and activation using the motheaten mouse which is functionally deficient in SHP-1.
- 2000—2001 Research Assistant, Laboratory of Dr. Michael Dustin, Department of Pathology, Division of Immunology, Washington University School of Medicine, St. Louis, Missouri. Continuation of my undergraduate research project.
- 2001—2002 Research Assistant, Laboratory of Dr. Andrey Shaw, Department of Pathology, Division of Immunology, Washington University School of Medicine, St. Louis, Missouri. Working with Dr. Richard Burack, we studied the translocation of the transcription factor ERK1/2 from the cytoplasm to the nucleus in response to stimulation.
- 2002—2003 Graduate Student rotations and didactic classwork.
- 2003—2008 Graduate Student, Laboratory of Dr. Daniel F. Hoft, Division of Immunobiology, St. Louis University, St. Louis, Missouri. My project focused on the immune response of $\gamma\delta_2$ T cells against mycobacteria.
- 2008—2012 Postdoctoral Fellow, Laboratory of Dr. Sebastian Joyce, Department of Pathology, Microbiology and Immunology, Vanderbilt University, Nashville, Tennessee. Numerous projects focused on mass spectrometric analysis of host and viral infections.
- 2012—present Assistant Professor, Department of Biological Sciences, The University of Texas at El Paso, El Paso, Texas. Numerous projects focused on inflammation and innate immunity to *Francisella tularensis* infection.