

CURRICULUM VITAE

NAME: POOJA SHIVSHANKAR, PHD

PRESENT TITLE: Assistant Professor / Research
Center for Immunology and Autoimmune Diseases, IMM-McGovern Medical School,
UTHealth, Houston, Texas.

ADDRESS: 2123 Manor Green Drive, Houston, Texas 77077

CITIZENSHIP: US Citizen

ACADEMIC APPOINTMENTS:

TEACHING EXPERIENCE

- 1996- 1997: *Assistant Professor*, Department of Biochemistry, Prof. Dhanapalan College of Science and Management, Chennai, India - Taught Biochemistry, Bio-organic Chemistry, Microbiology and Signal Transduction to undergraduate and post-graduate students.
- 2010- 2011: Teaching Assistant for MD 1st year students, University of Texas Health Science Center at San Antonio (UTHSCSA), Texas- taught Medical Microbiology.
- 2013- present: Adjunct Instructor Department of Biology, and Department of Natural and Life Sciences Houston Community College (HCC), Houston, Texas - Teach Anatomy and Physiology I and II Lecture and Lab (BIOL2301, BIOL2302, BIOL2101 and BIOL2102), Microbiology Lecture and Lab (BIOL-2320, BIOL2120), General Biology Lecture and Lab (BIOL 1306, BIOL1106).
- 2023-present Facilitator for Problem-Based Learning (PBL) program for second year medical students at UTHealth McGovern Medical School

RESEARCH EXPERIENCE

- 2006-2013: Research Scientist Department of Microbiology, and Department of Cardiology, University of Texas Health Science Center at San Antonio, Texas.
- 2013-2015: Instructor/Research - Department of Pulmonary Medicine, Division of Internal Medicine, UT MD Anderson Cancer Center, Houston, Texas
- 2015- 2022: Instructor/ Research - The Brown Foundation Institute of Molecular Medicine-McGovern Medical School, UTHealth, Houston, Texas.
- 2022- Present: Assistant professor/Research- Center of Immunology and Autoimmune Diseases. The Brown Foundation Institute of Molecular Medicine-McGovern Medical School, UTHealth, Houston, Texas.

POSTDOCTORAL TRAINING:

Postdoctoral Fellowship (2004-2006): Audie L Murphy Veteran Affairs Medical Center, Department of Geriatrics, University of Texas Health Science Center at San Antonio, Texas.

EDUCATION:

- 1991 B. Sc. Bachelor in Science (Chemistry); University of Madras, Tamil Nadu, India
- 1993 M. Sc. Master in Science (Biochemistry); University of Madras, Tamil Nadu, India
- 1995 M. Phil. Master in Philosophy (Biochemistry); University of Madras, Tamil Nadu, India
- 2003 PhD (Biochemistry and Molecular Biology); University of Madras, Tamil Nadu, India
Visiting Scientist to complete PhD graduation- Department of NMR, All India Institute of Medical Sciences, New Delhi, India

GRANT SUPPORT:**R01 AI158694-01 (Multi-PI: Wetsel/ Mahan) 04/01/2021-03-31-2026****Project:** Complement and Circadian Interactions in Inflammation and Immunity**Role:** Co-investigator**UTHealth CCTS-Collaborative Research Pilot Funding**

UTHealth and Center for Clinical and Translational Sciences (2023-2024) - \$30,000.00

Project: Screening of microRNAs shuttling in the plasma extracellular vesicles in non-resolvable COVID-19 associated pulmonary fibrosis.**Role:** Principal Investigator**TRAINING RESPONSIBILITIES:**

2007- 2013 Trained Graduate and Honors students in biochemical, molecular, and microbiological research techniques in the Department of Microbiology and Immunology, and Cardiology division, Department of Medicine UTHSCSA, San Antonio, Texas.

2013- Training laboratory students of Anatomy and Physiology I and II (BIOL 2101/ BIOL 2102), Microbiology (BIOL 2120), General Biology Lab (BIOL 1106), Department of Biology, HCC.

2014- Training several graduate and technical staff in research lab in UTHealth, Houston

HONORS AND AWARDS:

2012 Invited Speaker on "Molecular aspects of cell senescence in age-related lung diseases" for Geriatrics, Gerontology and Palliative Medicine Grand Rounds Seminar Series (September 20th 2012) held by San Antonio Geriatric Research, Education and Clinical Center (GRECC), Audie L. Murphy VA Medical Center, San Antonio, Texas.

2013 American Thoracic Society (ATS) 2013 Conference Poster-selected as the BEST in the category of In vivo Pulmonary Fibrosis Model Study (Philadelphia May 17-22, 2013).

2013 Invited Speaker on "Role of dietary risk factors in intestinal cell proliferation-A metabolomics approach experimental mice" 105 Omics Group Conferences-Nutritional Science and Therapeutics (Philadelphia July 15-17, 2013).

2014 Faculty Research Seminar in Internal Medicine Divisional Seminar Series at UT MD Anderson Cancer Center, Houston, Texas (April 15th, 2014)

2019 Selected in Top Ten Best Posters for cutting edge-research and to give podium speech for highlights– Gulf Coast Vascular Research Consortium, Houston Methodist.

2020 International Webinar (08-20-2020)- Guest lecture organized by the Department of Biotechnology, Sri Venkateswara College of Engineering, Sriperumbudur- 602117, Tamil Nadu, India

2021 BiomedX-Merck boot camp (09/18/2021-09/25/2021)- Team leader on a project workshop, held in Heidelberg, Germany.

2022 Biochemistry and Molecular Biology Annual Retreat- Faculty seminar speaker (May 18, 2022).

2023 American Thoracic Society (ATS)- Poster selected for cutting-edge scientific discussion session with podium speech for two minutes.

2023 International Complement Workshop 08/31/2023- 09/05/2023)- Two abstracts selected for oral presentations, held in Newcastle, England (currently in UK).

EDITORIAL POSITIONS:

2013 Editorial board member - World Journal of Hepatology- World Journal of Gastroenterology Network Society. ID# 00070680; BeiShang Publishers, China.

2013 Annual Reviewer - World Journal of Gastroenterology, BeiShang Publishers, China.

2014 ADHOC reviewer of Colloids and Surfaces B: Biointerfaces. Elsevier Publication Group.

2016 Invited reviewer of African Journal of Pharmacy and Pharmacology. An International open access journal from the group of Academic African Medical Journals Group.

2020- Invited reviewer of bioRxiv-The preprint server for biology-section Rapid Reviews: COVID-19.

2021- Invited reviewer of Seminars in Immunopathology-Springer Nature Publishers.

2021- Invited reviewer of Frontiers in Physiology- section Respiratory Physiology-Open access publications.

2022- Associate Editor of Frontiers in Physiology - Respiratory Physiology and Pathophysiology.

2022- Invited reviewer of BIOCELL- Tech Science Press.

2023- Invited Reviewer of Medical Principles and Practice-Karger Publishers Journals.

Professional Membership

1996-2003	Society of Biological Chemists (SBC, India)
1996-2003	Indian Biophysical Society (IBS, India)
2005-2007	Chlamydia Basic Research Society (CBRS)
2011-present	American Thoracic Society (ATS)
2012-present	American Heart Association (AHA)
2015-present	International Complement Society (ICS)
2021-present	European Respiratory Society (ERS)

SERVICE TO THE UTHealth Scientific Community in Houston and San Antonio:

1. Facilitator for Problem-Based Learning (PBL) program for second year medical students at UTHealth McGovern Medical School (2023-present).
2. Interviewer for medical school admissions in The UTHealth-McGovern Medical School and Student Affairs, Houston (2022-present)
3. Teaching assistant for first year medical students at UTHealth-San Antonio Long Medical School (2010-2011).
4. Judging committee member for Junior/Senior Academy of Sciences. Conducted by: Alamo Regional Academy of Science and Engineering, Texas, USA (2007-2013)

PUBLICATIONS:

A. Refereed Original Articles in Journals

1. Wang R, Lee JH, Xiong F, Kim J, Al Hasani, L, Yuan X, **Shivshankar P**, Krakowiak J, Qi C, Wang Y, Eltzschig HK, Li W. SARS-CoV-2 restructures the host chromatin architecture. **Nat Microbiol.** **2023** Apr;8(4):679-694.
2. Jyothula SSK, Peters A, Liang Y, Bi W, **Shivshankar P**, Yau S, Garcha PS, Yuan X, Akkanti B, Collum S, Wareing N, Thandavarayan RA, Poli de Frias F, Rosas IO, Zhao B, Buja LM, Eltzschig HK, Huang HJ, Karmouty-Quintana H. **EBioMedicine.** **2022**; 86:104351.
3. Wilson C, Mertens TC, **Shivshankar P**, Bi W, Collum SD, Wareing N, Ko J, Weng T, Naikawadi RP, Wolters PJ, Maire P, Jyothula SS, Thandavarayan RA, Ren D, Elrod ND, Wagner EJ, Huang HJ, Dickey BF, Ford HL, Karmouty-Quintana H. Sine oculis homeobox homolog 1 plays a critical role in pulmonary fibrosis. **JCI Insight.** **2022**; 7(10):e142984.
4. **Shivshankar P**, Li Y-D, Mueller-Ortiz S, and Wetsel RA. In Response to Complement Anaphylatoxin Peptides C3a and C5a, Human Vascular Endothelial Cells Transmigrate and Mediate the Activation of B-cells and Polarization of T-cells. **FASEB J.** **2020**; 34(6): 7540-7560.
5. Mueller-Ortiz, S, **Shivshankar P**, and Wetsel RA. The Second Receptor for C5a, C5aR2, is Detrimental to Mice during Systemic Infection with *Listeria monocytogenes*. **J. Immunol.** **2019**; 203(10):2701-2711.
6. Kirkpatrick CT, Wang Y, Leiva Juarez MM, **Shivshankar P**, Pantaleón García J, Plumer AK, Kulkarni VV, Ware HH, Gulraiz F, Chavez Cavazos MA, Martinez Zayas G, Wali S, Rice AP, Liu H, Tour JM, Sikkema WKA, Cruz Solbes AS, Youker KA, Tuvim MJ, Dickey BF, Evans SE. Inducible Lung Epithelial Resistance Requires Multisource Reactive Oxygen Species Generation to Protect against Viral Infections. **Mol. Bio.** **2018**; 15;9(3):e00696-18.
7. Calhoun C, **Shivshankar P**, Saker M, Sloane LB, Livi CB, Sharp ZD, Orihuela CJ, Adnot S, White ES, Richardson A, Jourdan Le Saux C. Senescent Cells Contribute to the Physiological Remodeling of Aged Lungs. Senescent cells contribute to the physiological remodeling of aged lungs. **J Gerontol A Biol Sci Med Sci.** **2016**; 71(2):153-60.

8. **Shivshankar P**, Payan H, Calhoun C, Martinez C, Williams III RO, Jagirdar J, Peters JI, Le Saux CJ. Inhaled Tacrolimus Modulates pulmonary fibrosis without promoting inflammation in bleomycin-injured mice. **J. Drug Deli. Sci. Technol.** **2014**; 24 (5): 469-477.
9. **Shivshankar P**, Halade GV, Calhoun C, Escobar GP, Mehr AJ, Jimenez F, Martinez C, Bhatnagar H, Mjaatvedt CH, Lindsey ML, Le Saux CJ. Caveolin-1 deletion exacerbates cardiac interstitial fibrosis by promoting M2 macrophage activation in mice after myocardial infarction. **J. Mol and Cell Cardiol.** **2014**; 76C: 84-93.
10. Le Saux CJ, Davy P, Brampton C, Ahuja SS, Fauce S, **Shivshankar P**, Nyugen H, Ramaseshan M, Tressler R, Pirot Z, Harley CB, Allsopp R. A Novel Telomerase Activator Suppresses Lung Damage in a Murine Model of Idiopathic Pulmonary Fibrosis. **PLoS One.** **2013**; 8(3):e58423.
11. **Shivshankar P***, Brampton C*, Miyasato S, Kasper M, Thannickal VJ, Le Saux, CJ. Caveolin-1 deficiency protects from pulmonary fibrosis by modulating epithelial cell senescence in mice. **Am. J. Resp. Cell and Mol. Biol.** **2012**; 47(1):28-36.
12. Boyd AR, **Shivshankar P**, Jiang S, Berton MT, Orihuela CJ. Age-related defects in TLR2 signaling diminish the cytokine response by alveolar macrophages during murine pneumococcal pneumonia. **Exp. Gerontol.** **2012**; 47(7):507-18.
13. Sanchez CJ, Kumar N, Lizcano A, **Shivshankar P**, Hotopp JCD, Jorgensen JH, Tettelin H, Orihuela CJ. *Streptococcus pneumoniae* in biofilms are unable to cause invasive disease due to altered virulence determinant production. **PLoS One.** **2011**; 6(12):e28738.
14. Sanchez CJ, Hinojosa CA, **Shivshankar P**, Hyams C, Camberlein E, Brown JS, and Orihuela CJ. Changes in capsular serotype alter the surface exposure of pneumococcal adhesins and impact virulence. **PLoS One.** **2011**; 6(10):e26587.
15. Sanchez CJ, Hurtgen BJ, Lizcano A, **Shivshankar P**, Cole GT, and Orihuela CJ. Biofilm and planktonic pneumococci demonstrate disparate immunoreactivity to human convalescent sera. **BMC Micro.** **2011**; 11:245-256.
16. **Shivshankar P**, Angela R. Boyd, LesauX CJ, Yeh, IT, and Orihuela CJ. Cellular senescence increases expression of bacterial ligands in the lungs and is positively correlated with increased susceptibility to pneumococcal pneumonia. **Aging Cell.** **2011**; 10(5):798-806.
17. Sanchez CJ, **Shivshankar P**, Stol K, Trakhtenbroit S, Sullam PM, Sauer K, Hermans PWM, and Orihuela CJ. The pneumococcal serine-rich repeat protein is an inter-bacterial adhesin that promotes bacterial aggregation in vivo and in biofilms. **PLoS Path.** **2010**; 12;6(8). pii: e1001044.
18. **Shivshankar P**, Sanchez CJ, Rose L, Orihuela CJ. The *Streptococcus pneumoniae* adhesin PsrP binds to Keratin 10 on lung cells. **Mol. Micro.** **2009**; 73(4):663-79.
19. Chen L, Cheng W, **Shivshankar P***, Lei L, Zhang X, Wu Y, Yeh IT, Zhong G. Distinct roles of CD28- and CD40L-mediated costimulation in the development of protective immunity and pathology during *Chlamydia muridarum* urogenital infection in mice. **Infection and Immunity.** **2009**; Vol. 77(7):3080-9.
20. Rose L, **Shivshankar P***, Hinojosa E, Rodriguez A, Orihuela CJ. Antibodies against PsrP, a novel *Streptococcus pneumoniae* adhesion, block adhesion and protect mice against pneumococcal challenge. **J. Inf. Dis.** **2008**; Vol. 98(3):375-83.
21. **Shivshankar P**, Lei L, Wang J, Zhong G. Inhibition of Chlamydial growth by Kinase inhibitor Rottlerin. **Appl. Environ. Micro.** **2008**; Vol. 4(4):1243-9.

22. Cheng W, **Shivshankar P**, Zhong Y, Chen D, Li Z and Zhong G. Intracellular IL-1 α mediates IL-8 production induced by *Chlamydia trachomatis* infection via a mechanism independent of IL-1 receptor. **Infection and Immunity**. **2008**; Vol.76 (3):942-51.
23. Cheng W, **Shivshankar P**, Li Z, Chen L, Yeh I-Ten and Zhong G. Caspase 1 contributes to *Chlamydia trachomatis*-induced upper urogenital tract inflammatory pathologies without affecting the infection course. **Infection and Immunity**. **2008**; Vol. 76(2):515-22.
24. Flores R, Luo J, Chen D, Sturgeon G, **Shivshankar P**, Zhong Y, Zhong G. Characterization of the hypothetical protein Cpn1027, a newly identified inclusion membrane protein unique to *Chlamydia pneumoniae*. **Microbiology**. **2007**; 153 (Pt 3):777-86.
25. Elango N, Li Y, **Shivshankar P**, Katz MS. Expression of RUNX2 isoforms: involvement of cap-dependent and cap-independent mechanisms of translation. **J Cell Biochem**. **2006**; 99 (4): 1108-21.
26. Elango N, Elango S, **Shivshankar P**, Katz MS. Optimized transfection of mRNA transcribed from a d(A/T)₁₀₀ tail-containing vector. **Biochem. Biophys. Res. Comm**. **2005**; 330 (3): 958-66.
27. **Shivshankar P**, Shyamala Devi CS. Screening of stimulatory effects of dietary risk factors on mouse intestinal cell kinetics. **World J. Gastroenterol**. **2005**; 11 (2): 242-8.
28. **Shivshankar P**, Shyamala Devi CS. Evaluation of co-stimulatory effects of Tamarindus indica L. on MNU-induced colonic cell proliferation. **Food Chem. Toxicol**. **2004**; 42 (8): 1237-44.

B. Abstracts (Shown only selected):

1. **Shivshankar P**, Li Y, Domozhirev A, Li Y-D, Wagner E, Yalamanchili HK, Karmouty-Quintana H, Wetsel RA. Novel alternative polyadenylation as a post-transcriptional mechanism in C5ar1 signaling-dependent pleural hypertrophy and fibrosis in collagen-induced arthritic mice. International Complement Workshop (Oral presentation), Newcastle, England, **2023**.
2. **Shivshankar P**, Mueller-Ortiz, S Weng-Mills T, Domozhirev A, Wetsel RA. Activated C5ar1 signaling induces fibrogenic development in Mycobacterium avium (Mav)-infected mouse lungs via the proinflammatory T helper-type I cell response (Oral presentation). Newcastle, England, **2023**.
3. **Shivshankar P**, Li Y, Domozhirev A, Karmouty-Quintana H, Wetsel RA. C5a anaphylatoxin receptor 1 mediates pleural hypertrophy and rheumatoid lung fibrosis in collagen-induced arthritic mice. (Poster presentation).
Selected in: Discussion session on cutting edge research-American Thoracic Society International conference, Washington DC, **2023**.
Published in: **Am J Respir Crit Care Med** **2023**;207:A6781
4. **Shivshankar P**, Collum S, Bi W., Peters A.M, Shidid A, Thandavarayan R, Huang H, Akkanti B, Jyothula S, Karmouty-Quintana H. *Haemophilus influenzae* is associated with fibrotic phenotype of COVID-19 and idiopathic pulmonary fibrosis. European Respiratory Society (LSC), Portugal, **2022**.
5. **Shivshankar P**, Wang W, Collum S, Wilson C, Peters AM, Bi W, Karmouty-Quintana H. Differential effects of Carvedilol and Clenbuterol in bleomycin-induced group-3 pulmonary hypertension in mice. (Poster presentation). American Thoracic Society-International conference, San Francisco, CA, **2022**.
6. **Shivshankar P**, Li Y-D, Wetsel, RA. Chronic Intradermal C5a exposure stimulates cardiac fibrosis- A role of inflammatory lymphatic endothelium. (Poster presentation). Selected into top ten best posters of cutting-edge research- Selected to give podium speech to highlight the study. Houston Methodist- Gulf-Coast Vascular Research Consortium, Houston TX. **2019**.

7. **Shivshankar P***, Fekry, B, Li Y-D, Mahan, KE, Wetsel RA. C5a modulates immune cell egression in lymphoid tissues via endothelial-dependent inducible nitric oxide synthase. **(Oral Presentation)**. *Molecular Immunology* 102 (2018) pp-214, Santa Fe, New Mexico, **2018**.

Shivshankar P*, Li Y-D, Wetsel RA. Chronic Intradermal C5a Exposure Stimulates Cardiac Fibrosis- A Role of Inflammatory Lymphatic Endothelium. Santa Fe, New Mexico, **2018**
Published in: *Molecular Immunology* 102 (2018) pp-213.

Shivshankar P*, Aldrich, M, Sevick, E, and Wetsel, RA. Near-infrared fluorescence optical imaging demonstrates that C5a-C5aR1 signaling impairs normal lymphatic function. Japan, **2016**
Published in: *Immunobiology*, 2016; 221(10): 1186-1187.
8. **Shivshankar P***, Mueller-Ortiz, S, and Wetsel, RA. In response to C3a/C5a, Human Vascular Endothelial Cells Transmigrate and Mediate the Activation of B-cells and Polarization of T-cells. **(Oral presentation)** *Immunobiology*, 2016; 221(10): 1221-1222, Japan, **2016**
9. Le Saux CJ, **Shivshankar P**, Calhoun C, Sloane LB, Orihuela CJ, Richardson A. Mammalian Target Of Rapamycin (mTOR) signaling pathway mediated age-associated senescence but not pro-fibrotic responses **Published in: *Am J Respir Crit Care Med*. 187; 2013:**
Category: A5I44. THE BEST FROM IN VIVO MODELS OF PULMONARY FIBROSIS.
10. **Pooja Shivshankar**. Invited Speaker on “Role of dietary risk factors in intestinal cell proliferation-A metabolomics approach experimental mice” 105 Omics Group Conferences- Nutritional Science and Therapeutics. Philadelphia, PA, **2013**.
11. Chang TT, Han Z, Kazhdan I, Marciniak RA, Bandyopadhyay A, **Shivshankar P**, Zhong G, Wang ZJ. Is PDX-1 A New Universal Molecular Target for PDX-1 Positive Human Cancer Therapy? In Vitro and In Vivo Evidence 101st American Association for Cancer Research (AACR) <http://aacrmeetingabstracts.org/>. **2010**.

C. Invited Articles (Reviews, Editorials, etc.) in Journals

1. **Shivshankar P**, Karmouty-Quintana H, Mills T, Doursout MF, Wang Y, Czopik AK, Evans SE, Eltzschig HK, Yuan X. SARS-CoV-2 infection: Host response, immunity, and therapeutic targets. ***Inflammation*. 2022; 45(4):1430-1449.**
2. **Shivshankar P**, Fekry B, Eckel-Mahan K, Wetsel RA. Circadian Clock and Complement Immune System- Complementary Control of Physiology and Pathology? ***Frontiers in Cellular and Infection Microbiology- Bacteria and Host*. 2020; Open Access <https://doi.org/10.3389/fcimb.2020.00418>**
3. **Shivshankar P**. Modulation of bacterial pathogenesis by oppressive aging factors – insights into host pneumococcal interaction strategies. *ISRN Inflammation*. 2012; Open Access Review Article Code: 267101. doi:10.5402/2012/267101. <http://www.isrn.com/journals/inflammation/2012/267101/ref/>.

D. Book Chapters

1. Contributing author names: **Pooja Shivshankar**, Claude Jourdan-LeSaux.
Book Title: The Aging Lung: Molecular Mechanisms of Lung aging
Chapter 5: The Cellular Senescence Program.
Publishers: Willey-Blackwell Publishers **2014**.
2. Contributing Author names: Carlos J Sanchez, **Pooja Shivshankar**, Kim Stol, Samuel Trakhtenbrot, Peter M. Sullam, Karen Sauer, Peter WM Hermans, Carlos J Orihuela.
Book Title: Otitis Media: Interplay between host and pathogen.
Publishers: Kim Stol (Self Publisher) **2013**; ISBN-9090277668, 9789090277660