

DENUSHA SHRESTHA
BVSc & AH, PhD
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Education

PhD (Veterinary Anatomy)

Iowa State University (ISU), College of Veterinary Medicine, 2016-2022
Department of Biomedical Sciences, Ames, IA, USA

Major in Anatomy under supervision of Dr. Chandrashekhar Charavaryamath

Research focus:

Cellular and Molecular Mechanisms of Lung Inflammation Due to Exposure to Organic Dust and H₂S

BVSc& AH (DVM equivalent),

2009-2014

Institute of Agriculture and Animal Science (IAAS),

Tribhuvan University (TU), Nepal

Thesis topic:

Prevalence of the Demodectic Mange in canines of Kathmandu Valley having skin disorders & its associated risk factors

Professional experience

Assistant Professor (Veterinary Anatomy) in College of Veterinary Medicine, Arkansas State University 07/2026-present

Assistant Professor (Veterinary Anatomy) in Department of Veterinary Biomedical Sciences, South Dakota State University 03/2023-05/2026

Teaching

- Primary instructor for veterinary anatomy, Microscopic anatomy and Non-traditional Pets
- Design course and develop lecture material

Research

- Understand the influenza virus induced lung inflammation in lung organoid model

Service

- Member for Dean's Faculty Advisory Committee (2024-2026)
- UMN DVM scholarship committee for the University of Minnesota (2024)

Mentoring

- a. Master's student
 - i. Ashma Pandey, MS 2024, "WIC infant formula: A comparative analysis of winning and losing bids from major manufacturers."

Graduate representative

- ii. Mahmuda Akter, MS 2025, “Impact of Laccase enzyme on the functionality of. Milk protein concentrate and micellar casein concentrate.”
Graduate representative

- b. Doctoral Student
Ramchander Nadipelly, 2023-present, PhD candidate in Mor lab
Committee member/Co-advisor

Assistant Teaching Professor (Veterinary Anatomy) in Department of Biomedical Sciences, Iowa State University 08/2022-03/2023

Postdoc Research associate in Veterinary Parasitology, Iowa State University 06/2022-08/2022

- Cell isolation from gut of nematode

Scientist at Nepal Agriculture Research Council, Khumaltar, Kathmandu, Nepal. 09/2015-07/2016

- Laboratory activities (ELISA, bacterial culture and identification, histopathological techniques)
- Field work (Sample collection, data collection, trainings, workshop)
- Molecular disease diagnosis (DNA & RNA isolation and PCR amplification)
- Developing proposal and manuscript writing
- Grant writing for holistic approach of investigating piglet mortality in Nepal

Technical officer at Winrock, Nepal 07/2015-09/2015

Lab intern at Central Veterinary Laboratory, Kathmandu, Nepal 02/2014-07/2015
Lab techniques (ELISA, Culturing)

Intern at Central Veterinary Hospital, Kathmandu, Nepal

- Attending medical and surgical cases under the supervising veterinarian
- Case preparation and support and overall management of clinic activities

Research Associate at Development Vision Nepal (A non-profit organization) 02/2014-05/2014

- Study of Priority Zoonotic Diseases in Palpa district, Nepal
- Evaluation of Socio-economic Impact of zoonotic diseases, report preparation

Research statement

I am an Assistant Professor of Veterinary Anatomy, and my research focuses on pulmonary inflammation and infectious pulmonary diseases. As a graduate student, I was actively involved

in understanding lung inflammation induced by organic dust and hydrogen sulfide exposure in different *in vitro* models (human bronchial epithelial cells, primary cell cultures, air-liquid interface cultures, precision lung slice cultures) and *in an in vivo* model (mice) and in how exposure to organic dust and hydrogen sulfide increased the susceptibility of mice to *Klebsiella pneumoniae* infection. Currently, I am focusing on developing and establishing lung organoid models from different farm animals, including pig, cattle, and bison lungs. I plan to use this *in-vitro* model (pig lung organoid) to study the influenza virus-induced lung inflammation.

Teaching experience

Courses	Year
Vet 622/622L- (2+2 PPVM) I (1st year DVM)	
• Primary Veterinary Anatomist • Developed the lecture material • Lecture and provide guidance in lab • Creating lab and application exam • Grading the assignments and lab exams • Established the embalming protocol for large animal cadaver preparation	Spring 2024/Spring 2025/Spring 2026
Vet 631- (2+2 PPVM) I (1st year DVM)	
• Primary Instructor for Non-traditional pets • Create application exams, assignments and grade	Spring 2026
Vet 603/603L- (2+2 PPVM) I (1st year DVM)	
• Primary Veterinary Anatomist • Developed the lecture material • Lecture and provide guidance in lab • Creating lab and application exam • Grading the assignments and lab exams	Fall 2023/Fall 2024/Fall 2025
Vet 601/601L- (2+2 PPVM) I (1st year DVM)	
• Primary Instructor for Microscopic Anatomy I • Developed the lecture material • Lecture and provide guidance in lab • Creating lab and application exam • Grading the assignments and lab exams	Fall 2025
BMS 331- Principles of Morphology II (1st year DVM)	
• Guidance in lab- Involved in person interaction (11 hours/week) with students and helping them during the laboratory hours. Helping them understand the course material along the dissection of their specimen • Preparation and proctoring of lab exam	Spring 2023

BMS 330- Principles of Morphology I (1st year DVM)

- Guidance in lab- Involved in person interaction (10 hours/week) with students and helping them during the laboratory hours. Helping them understand the course material along the dissection of their specimen
- Preparation and proctoring of lab exam
- Grading the lab exam

Fall 2022

BMS 334- Biomedical Sciences I (1st year DVM)

- Guidance in lab- Involved in person interaction (6 hours/week) with students and helping them during the laboratory hours. Helping them understand the course material
- Proctoring of lab exam
- Grading the assignments and lab exams

Spring 2022

BMS 333- Biomedical Sciences I (1st year DVM)

- Guidance in lab- Involved in person interaction (6 hours/week) with students and helping them during the laboratory hours. Helping them understand the course material
- Proctoring of lab exam
- Grading the assignments and lab exams

Fall 2021

BMS 331- Principles of Morphology II (1st year DVM)

- Guidance in lab- Involved in person interaction (11 hours/week) with students and helping them during the laboratory hours. Helping them understand the course material along the dissection of their specimen
- Preparation and proctoring of lab exam

Spring 2021

BMS 330- Principles of Morphology I (1st year DVM)

- Guidance in lab- Involved in person interaction (10 hours/week) with students and helping them during the laboratory hours. Helping them understand the course material along the dissection of their specimen
- Preparation and proctoring of lab exam
- Grading the lab exam and scanning the answer sheets for record keeping
- Arranging and managing the zoom meeting for every lecture tutorial, exam reviews.

Fall 2020

BIOL 212- Principles of Biology II (undergraduates)

- Grading exams and assignments
- Uploading grades
- Helping students to understand course material

Spring 2019

BMS 333- Biomedical Sciences I (1st -year DVM)

- Guidance in lab- Involved in person interaction with students and helping them during the laboratory hours. Helping them understand the course material
 - Grading quiz and lab exams
 - Uploading grades
- Fall 2019

BMS 538- Principles of Physiology (1-year Master)

- Prepared and taught one lecture for Gastrointestinal physiology
 - Prepared quiz and exam questions for my part
 - Arranged recitation class for my lecture
 - Grading everyday quiz
 - Uploading grades
 - Helping students to understand course material
- Fall 2018

BMS 538- Principles of Physiology (1-year Master)

- Grading everyday quiz
 - Uploading grades
 - Helping students to understand course material
- Fall 2017

Presentations**Oral presentation**

1. Hydrogen sulfide exposure modulates innate responses to the lipopolysaccharide and organic dust” at 6 Annual Graduate & Professional Student Research Conference April 10th, 2019.

Poster presentations

1. CVM Summer Scholar Research Day, August 2017- Poster “Swine Barn Dust Induced Lung Inflammation and Expression of Transient Receptor Potential Ankyrin 1 (TRPA1)”.
2. Global Toxicology CSSOT, Sept 2017- Poster “Swine Barn Dust Induced Lung Inflammation and Expression of Transient Receptor Potential Ankyrin 1 (TRPA1)”.
3. American Thoracic Society, May 2019- Poster “Hydrogen sulfide exposure modulates innate responses to lipopolysaccharide and organic dust”
4. American Thoracic Society, May 2020- Poster “Repeated Exposure to H₂S and Organic Dust Increases Susceptibility to Klebsiella pneumoniae Infection of the Airway Epithelium” (Accepted)
5. CVM Research Day, August 2020- Poster “Repeated Exposure to H₂S and Organic Dust Increases Susceptibility to Klebsiella pneumoniae Infection of the Airway Epithelium”
6. International Society Cell and Gene therapy, May 2021- Poster "In Vitro Evaluation of Umbilical Cord Tissue-Derived Mesenchymal Stromal Cells to Alleviate Occupational Lung Disease."

7. American Thoracic Society, May 2022- Poster “NRF2- activation via RTA-408 partially rescues organic dust induced lung inflammation and increased systemic invasion of *Klebsiella pneumoniae* in a mouse model”

Awards

1. Iowa State University Research Excellence Award, 2022
1. The Lora and Russ Talbot Graduate Fellowship- Iowa State University, 2020
2. Won 3rd place in poster presentation in ISU CVM Research Day 2020
3. CGRER travel award, 2020
4. GPSS-PAG travel award, 2020
5. Iowa State University Teaching Excellence Award (BMS 538X), 2019
6. CGRER travel award, 2019
7. GPSS-PAG travel award, 2019
8. International Graduate Student Travel Award, 2019
9. Awarded with University Merit Scholarship by IAAS Rampur, Chitwan, Nepal (Based on academic performance, this award provided fee waiver for 8 of the 9 semesters of BVSc & AH study)
10. Scholarship for 3-week Diploma Course on Global Health organized in August 2015 by Tribhuvan University and University of Tampere.

Grant

1. “Establishment of swine lung organoid” - PI
Granting agency- SDSU Internal
Under review
2. “Reducing Disease Risks and Strengthening Producer Profitability Through an Integrated Animal Housing–Controlled Environment Agriculture System” - Co-PI
Granting agency- USDA-NIFA
Under review

Publications

1. Nyzil Massey, Sanjana Mahadev Bhat, **Denusha Shrestha**, Emir Malovic, Locke A Karriker, Shivani Choudhary, Alan P Robertson, Hai Minh Nguyen, Heike Wulff, Anumantha G Kanthasamy, Chandrashekhar Charavaryamath. Kv1. 3 as an upstream regulator of oxidative stress-mediated neuroinflammation following organic dust exposure in murine in vitro, ex vivo, and in vivo models. *Frontiers in Toxicology*, 2026 March 2026. <https://doi.org/10.3389/ftox.2026.1765108>
2. **Denusha Shrestha**, Nyzil Massey, Sanjana Mahadev Bhat, Tomislav Jelesijević, Orhan Sahin, Qijing Zhang, Kristina Bailey, Jill A. Poole, Chandrashekhar Charavaryamath. Nrf2 activation protects against organic dust and hydrogen sulfide exposure induced epithelial barrier loss and *K. pneumoniae* invasion. *Frontiers Cellular and Infection Microbiology*, 2022 April 19. <https://doi.org/10.3389/fcimb.2022.848773>
3. Nyzil Massey, **Denusha Shrestha**, Sanjana Mahadev Bhat, Piyush Padhi, Chong Wang Locke A. Karriker, Jodi L. Smith, Anumantha G. Kanthasamy, Chandrashekhar Charavaryamath. Mitoapocynin attenuates organic dust exposure induced neuroinflammation and sensory-motor deficits in a mouse model: Relevance to the role of

lung-brain axis in the pathogenesis of chronic neurological diseases during environmental organic dust exposure. *Frontiers in Cellular Neuroscience*, 2022 April 13.
doi: [10.3389/fncel.2022.817046](https://doi.org/10.3389/fncel.2022.817046)

4. Sanjana Mahadev Bhat, Nyzil Massey, **Denusha Shrestha**, Locke A Karriker, Tomislav Jelesijevic, Chong Wang, Chandrashekhar Charavaryamath. Transcriptomic and ultrastructural evidence indicate that anti-HMGB1 antibodies rescue organic dust-induced mitochondrial dysfunction. *Cell Tissue Res.* 2022 March 4. <https://doi.org/10.1007/s00441-022-03602-3>
5. Sanjana Mahadev Bhat, **Denusha Shrestha**, Nyzil Massey, Locke A Karriker, Anumantha G Kanthasamy, Chandrashekhar Charavaryamath. Organic dust exposure induces stress response and mitochondrial dysfunction in monocytic cells. *Histochemistry and Cell Biology*. 2021. <https://doi.org/10.1007/s00418-021-01978-x>
6. Nyzil Massey, **Denusha Shrestha**, Sanjana Mahadev Bhat, Naveen Kondru, Adhithiya Charli, Locke A Karriker, Anumantha G Kanthasamy, Chandrashekhar Charavaryamath. Organic dust-induced mitochondrial dysfunction could be targeted via cGAS-STING or cytoplasmic NOX-2 inhibition using microglial cells and brain slice culture models. *Cell Tissue Res.* 2021. [10.1007/s00441-021-03422-x](https://doi.org/10.1007/s00441-021-03422-x)
7. Cristina M. Santana, Phillip Gauger, Amber Vetger, Drew Magstadt, Dong-Suk Kim, **Denusha Shrestha**, Chandrashekhar Charavaryamath, and Wilson K. Rumbeiha. "Ambient hydrogen sulfide exposure increases the severity of influenza A virus infection in swine." *Archives of Environmental & Occupational Health* (2021): 1-13. <https://doi.org/10.1080/19338244.2021.1896986>
8. **Denusha Shrestha**, Sanjana Mahadev Bhat, Nyzil Massey, Cristina Santana Maldonado, Wilson K. Rumbeiha, Chandrashekhar Charavaryamath. Pre-exposure to hydrogen sulfide modulates the innate inflammatory response to organic dust. *Cell Tissue Res.* 2021 Jan 6. doi: <https://doi.org/10.1007/s00441-020-03333-3>
9. S Mahadev Bhat, **D Shrestha**, N Massey, LA Karriker, A Kanthasamy, C Charavaryamath. Organic Dust Exposure Induces Mitochondrial Damage and Mitochondrial DNA Release and Organelle Targeted Antioxidant Therapy Appears Protective. *American Thoracic Society* (May 2019). https://www.atsjournals.org/doi/pdf/10.1164/ajrccm-conference.2019.199.1_MeetingAbstracts.A2767
10. Nyzil Massey, **Denusha Shrestha**, Sanjana Mahadev-Bhat, Locke A Karriker, Anumantha G Kanthasamy, Chandrashekhar Charavaryamath. Organic Dust Induces Mitochondrial and ER Stress Response in Activated Microglia. *The FASEB Journal*. The Federation of American Societies for Experimental Biology, 2019. https://www.fasebj.org/doi/abs/10.1096/fasebj.2019.33.1_supplement.451.3
https://www.fasebj.org/doi/abs/10.1096/fasebj.2018.32.1_supplement.781.7
11. **D Shrestha**, S Mahadev Bhat, N Massey, C Santana, WK Rumbeiha, LA Karriker, C Charavaryamath. Hydrogen Sulfide Exposure Modulates Innate Responses to Lipopolysaccharide and Organic Dust. *American Thoracic Society* (May 2019). https://www.atsjournals.org/doi/pdf/10.1164/ajrccm-conference.2019.199.1_MeetingAbstracts.A2767

[conference.2019.199.1_MeetingAbstracts.A2770](#)conference.2019.199.1_MeetingAbstracts.A2770

12. KM Feye, Joseph S Smith, Lionel Sebbag, AE Hohman, Sreemoyee Acharya, Benjamin K Schneider, JT Tucker, Lucia A Cherep, BR Nordeng, AL Richardson, Meghan C Gage, Diou Luo, **Denusha Shrestha**, Patricia Izicki, Emir Malovic, MA Jefferson, Sireesha Manne, Pongrat Jaisil, Naveen Kondru, Nyzil Massey, Brandon S Klinedinst, Steve A Carlson. Veterinary Considerations for the Theoretical Resurrection of Extinct Species. Journal of Veterinary Science & Animal Husbandry (2018). https://www.researchgate.net/profile/Sireesha_Manne/publication/330929529_Veterinary_Considerations_for_the_Theoretical_Resurrection_of_Extinct_Species/links/5c6c7176a6fdcc404ebee71a/Veterinary-Considerations-for-the-Theoretical-Resurrection-of-Extinct-Species.pdf
13. Nyzil Massey, Sreekanth Puttachary, Sanjana Mahadev-Bhat, **Denusha Shrestha**, Anumantha G Kanthasamy, Chandrashekhar Charavaryamath. Ethyl Pyruvate Reduces Swine Barn Dust Exposure Induced Brain Microglial Cell Inflammatory Responses via Targeting HMGB1-RAGE Signaling. The FASEB Journal. The Federation of American Societies for Experimental Biology 2018.
14. Garrett R Schmidt-McCormack, Kristina M Feye, Sreemoyee Acharya, Gregory SA Mlynarczyk, Stephen A Anderson, Patricia Izicki, Emir Malovic, KC Luna, Joseph S Smith, Matthew A Jefferson, Aron Nakama, Kasandra Diaz Santana, Naveen C Kondru, Michael D Kleinhenz, James G Tipton, Shivani Choudhary, Robin D Kokemuller, Sireesha Manne, Marson R Putra, Nyzil Massey, **Denusha Shrestha**, Diou Luo, Shaunik Sharma, Pongrat Jaisil, Carrie A Berg, Steve A Carlson. Theoretical Engineering of the Gut Micro biome for the Purpose of Creating Superior Soldiers. Journal of Medical and Health Sciences (2017). https://lib.dr.iastate.edu/vdpam_pubs/133/
15. Nyzil Massey, Sreekanth Puttachary, Sanjana Mahadev-Bhat, **Denusha Shrestha**, Anumantha G Kanthasamy, Chandrashekhar Charavaryamath. Swine Barn Dust Exposure Activates Microglia through Induction of Oxidative Stress and the Resultant Neuroinflammation Appears to Involve HMGB1 and RAGE Signaling. The FASEB Journal. The Federation of American Societies for Experimental Biology 2017. https://www.fasebj.org/doi/abs/10.1096/fasebj.31.1_supplement.747.2
16. Gaurav Rawal, **Denusha Shrestha**, & Sikes Manandhar. Nettle as immunomodulator and growth promoter in Poultry. www.farm.com.np
17. Gaurav Rawal, **Denusha Shrestha**. Sero-detection of *Leptospira hardjo* in Cattle of Bhaktapur District of Nepal. International Journal of Applied Sciences and Biotechnology, 2019.
18. **Denusha Shrestha**, Gaurav Rawal, Balaram Thapa, Santosh Dhakal & Bishwas Sharma. 2015 “Prevalence of the Demodectic Mange in canines of Kathmandu Valley having skin disorders & its associated risk factors”. in International Journal of Applied Sciences and Biotechnology.
19. Gaurav Rawal, **Denusha Shrestha**. & Pragya Koirala. 2014 ‘Sero-prevalence of *Leptospira hardjo* in Cattle of Bhaktapur district, Nepal’ published in the Proceedings of Scientific Presentation and Conference Information, 2014.

8. Manuscript under preparation

1. “Organic dust exposure alters the actin cytoskeleton to produce tight junction proteins dysfunction”
2. “Nrf2 activation and organic dust induced lung inflammation in mouse model”
3. “Oxidative stress induced alteration in epithelial barrier integrity in lungs”- review paper
4. “Establishment of lung organoid cultures from lungs of different farm animals”
5. “Respiratory organoids in Veterinary medicine”- review paper
6. Establishment of lung organoids in swine

Leadership

1. Advisor for Nepalese Student Association in SDSU (2024-2025)
2. Member of the American Thoracic Society
3. Vice president (Membership) at Toastmaster International Club, Ames, Iowa (July 2018-April 2019)
4. Social Chair of Nepal Student Association (NSA) Ames, Iowa from 2017-2018
5. Secretary at Toastmaster International Club, Ames, Iowa (May 2017-June 2018)
6. Elected Research and Communication coordinator of Nepal Veterinary Student Association 16th committee, 2012
7. Coordinated several animal health camps and cultural programs
8. Past member of the Red Cross and the Rotaract Club of Narayangarh