

2024 ANNUAL REPORT

Dr. Kenítra Hendríx, ADDL Dírector

2024 was another year of significant growth and progress for the Indiana Animal Disease Diagnostic Laboratory (ADDL). As detailed on page 2, our caseload increased by 11% from 2023 to 2024, reflecting the growing demand for our diagnostic services. The five most frequently requested tests in 2024 were Influenza PCR, Brucella serology, PRRS PCR, histopathology of surgical biopsies, and Turkey Coronavirus PCR. Additionally, a 35% increase in state funding was implemented in FY24, enabling us to expand our team and redirect fee-based revenue toward upgrading essential equipment.

A major milestone this year was the renaming of our West Lafayette facility as the **Willie M. Reed Animal Disease Diagnostic Laboratory** in honor of our Dean Emeritus, former ADDL pathologist, and assistant director. This tribute recognizes Dr. Reed's lasting impact on the laboratory and his dedication to advancing animal health and diagnostics.

Advancing Our Strategic Priorities

Invest in a highly-skilled workforce and provide a stimulating and rewarding work environment.

Management expert Dave Ulrich once said, "People are our greatest asset." I couldn't agree more. The ADDL team continues to provide high-quality, efficient services, delivering timely and accurate diagnostic results that inform treatment and management decisions. On pages 4 and 5, we highlight team members recognized for their outstanding contributions in 2024. Additionally, pages 7-10 feature publications authored by our faculty, staff, and residents, showcasing the ADDL's contributions to the scientific community.

- This year, we introduced biannual "Lunch and Learn" sessions, where clients from the poultry and swine industries shared how our diagnostic results impact their operations. These sessions provided valuable insights for our staff, deepening their understanding of the industries we serve. To further support professional growth, we also launched regular supervisor meetings and training sessions.
- Provide accurate and prompt Foreign Animal Disease (FAD) surveillance and response.

We continue to strengthen our FAD surveillance and response efforts in collaboration with the National Animal Health Laboratory Network (NAHLN) to enhance preparedness for Avian Influenza Virus (AIV), African Swine Fever Virus (ASFV), and other emerging diseases. Our participation in proficiency testing (PT) programs ensures compliance with regulatory standards and keeps us at the forefront of FAD detection and response. In 2024, the ADDL worked closely with the Indiana Board of Animal Health (BOAH) on FAD investigations, providing prompt diagnostics to protect Indiana's animals. With H5N1 remaining a concern for avian species and recent spillover into the national dairy herd, ADDL tested approximately 10,000 samples for Avian Influenza.

Invest in state-of-the-art equipment and facilities

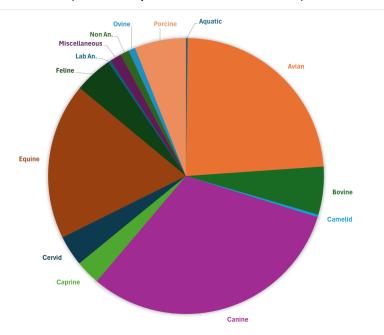
Thanks to grant funding and service fee revenue, we tripled our molecular testing capacity, replaced outdated equipment, and acquired a state-of-the-art slide scanner to introduce digital pathology capabilities. These upgrades enhance diagnostic accuracy, efficiency, and overall service quality.

Looking Ahead to 2025

The coming year promises continued innovation and growth. In 2025, we will launch a new Laboratory Information Management System (LIMS), streamlining the client experience and improving data management after more than a year of careful evaluation. Additionally, the Reed Laboratory pathology floor renovation is scheduled to begin in May 2025. This project will be carefully managed to ensure minimal disruption to our diagnostic services.

We look forward to another year of progress and collaboration as we work together to advance animal health and diagnostics.

Accessions by Species (West Lafayette & Heeke combined)



Tests by Calendar Year

	2022	2023	2024
WL ADDL	108,480	112,148	127,543
HEEKE	31,753	41,458	54,523
TOTAL	140,233	153,606	182,066

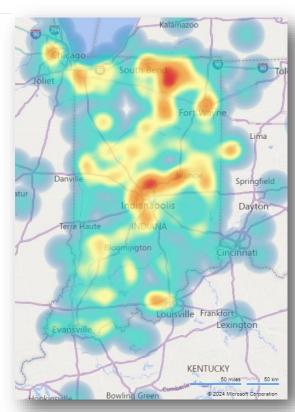
Accessions by Calendar Year

	2022	2023	2024
WL ADDL	27,607	28,238	31,360
HEEKE	1,871	2,151	2,423
TOTAL	29,478	30,389	33,783

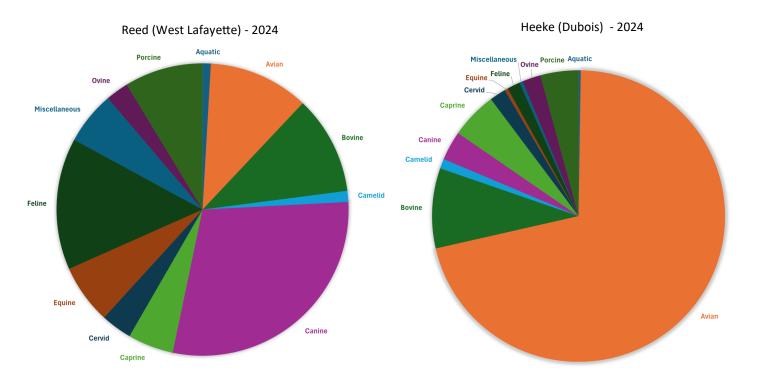
Measuring Impact

Consisting of both the Reed Laboratory in West Lafayette and the Heeke Laboratory in Southern Indiana, the ADDL supports animal agriculture in Indiana by partnering with Indiana's State Board of Animal Health for both surveillance and outbreak testing, and foreign animal disease investigations including Highly Pathogenic Avian Influenza testing in both birds and dairy cattle.

The heat density map depicts the geographical origin of samples that have been tested at the ADDL, which is fully accredited by the American Association of Veterinary Laboratory Diagnostics (AAVLD) and serves as the official diagnostic laboratory for the State of Indiana.



AUTOPSY (NECROPSY) CASE NUMBERS BY SPECIES



REVENUE SOURCES

Type of Revenue	FY 2022	FY 2023	FY 2024
Fees	\$2,473,751.15	\$2,772,162.73	\$3,769,892.10
Grants	\$216,929.19	\$484,295.51	\$1,223,456.19
State Appropriations	\$3,711,516.00	\$3,711,516.00	\$5,000,000.00
Total	\$6,402,196.34	\$6,967,974.24	\$9,993,348.29





Seed for Success Acorn Award

Dr. Kenitra Hendrix and Dr. Craig Bowen were honored with the Purdue Seed for Success Acorn Award. This award goes to Purdue employees who received grant funding of \$1 million or more. The ADDL, under Dr. Hendrix and Dr. Bowen, received \$1 million through the NAHLN ARP funding. This grant supported expansion and modernization of molecular diagnostic equipment, increasing the molecular laboratory's testing capacity and strengthening our disease response capabilities.

Promotions

Clinical Professor **Dr. Nobuko Wakamatsu Utsuki**





William Iverson
Associate Professor of
Comparative Pathology **Dr. Abigail Cox**



2024 AgSEED Recipient **Dr. Deepti Pillai** was awarded an AgSEED grant for her research project titled

"Accelerating and Improving Antibiotic Selection for Farm Animal Treatment: A Novel Approach."





BRAVO AWARD

Congratulations to the following on receiving Bravo Awards in 2024!















Jaime Nichols, Farren Osborn, Abigail Props,
Amber Furr, Aimee Highland, Anji Lee, Margie Veverka



Congratulations to Dr. Cassie Powers on receiving the H. Leon Thacker Fellowship Award for Outstanding Teaching and Diagnostic Performance in Veterinary Pathology.



40 YEARS

OF SERVICE

Elizabeth Baronowsky



10 YEARS OF SERVICE

Dr. Grant Burcham
Angie Chan

Meggan Drinski









2024 Outstanding
Staff Award
Cristy Rice

Submission Forms

ADDL Submission forms are routinely updated with current test offerings. Please visit the **Submission Form** page of the website to ensure you are up-to-date.

Online Results Portal

The online portal for web access to case reports has undergone several back-end changes to allow the IT developers to create new and exciting features for the future. We appreciate your patience and understanding as we navigate any glitches that were not uncovered during beta testing. If you discover an issue while working in the portal, please **email** the lab and let us know.

ADDL Advisory Committee

The ADDL Advisory Committee serves the critical role of representing the interests of various sectors to the ADDL leadership. Thank you to the following individuals for their time and dedication to the ADDL.

John Baugh College of Agriculture

Michelle Benavidez Westrich IN Department of Natural Resources

Paul Brennan Poultry,

Jenni Browning American Dairy Association

Dr. Angela Hines USDA/APHIS

Dr. Jake Jensen Equine

Becky Joniskan Indiana State Poultry Association

Dr. Greg Kurtz Dairy, Beef Cattle

Dr. Ellen Lowery Purdue Veterinary Hospital

Dean Bret Marsh Purdue College of Veterinary Medicine

Megan Ritter Indiana Farm Bureau

Dr. Sandra San Miguel Associate Dean for Engagement, PVM

Dr. Kyle Shipman Indiana Board of Animal Health

Dr. Joel Sparks Porcine,

Josh Trenary Indiana Pork Producers

<u>How You Can Help</u>

Help support our work! By giving to our ADDL programs, you will help us meet the most important and urgent needs affecting animal and human health. Having financial flexibility ensures that the ADDL can remain a front-runner in scientific knowledge and discovery as our world evolves. Make a gift today at connect.purdue.edu/s/addlgifts. For more information, visit vet.purdue.edu/addl/about-us.php. Thank you!





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Publications

*Bold font indicates ADDL affiliation

LeCuyer TE, Sellon RK, Byrne BA, Daniels JB, Diaz-Campos DV, **Hendrix GK**, Burbick CR, Besser TE, Davis MA. Multicenter molecular investigation of recurrent *Escherichia coli* bacteriuria in dogs. Vet Microbiol. 2024 Jan;288:109914. PMID: 38113575.

Wilkes RP, Kattoor JJ, Weng HY, Anis E. Targeted next-generation sequencing assay to detect 3 *Moraxella* spp. Directly from bovine ocular swabs. J Vet Diagn Invest. 2024 Jan;36(1):120-123. PMID: 38018659.

Bates MG, Risselada M, **Peña D**, **Hendrix GK**, Moore GE. Antibacterial activity of silver nanoparticles against *Escherichia coli* and methicillin-resistant *Staphylococcus pseudintermedius* is affected by incorporation into carriers for sustained release. Am J Vet Res. Jan 16:1-11. PMID: 38194717.

Ciubotariu II, Wilkes RP, Kattoor JJ, Christian EN, Carpi G, Kitchen A. Investigating the rise of Omicron variant through genomic surveillance of SARS-CoV-2 infections in a highly vaccinated university population. Microb Genom. 2024 Feb;10(2):001194. PMID: 38334271.

Kattoor JJ, Gaug J, Nemser SM, **Wilkes RP**. Development of ion torrent-based targeted next-generation sequencing panel for identification of animal species in pet foods. Res Vet Sci. 2024 Feb;167:105117. PMID: 38160490.

Wilkes RP, Anis E, **Kattoor JJ**. *Moraxella oculi sp*. nov., isolated from a cow with infectious bovine keratoconjunctivitis. Int J Stst Evol Microbiol. 2024 Feb;74(2). PMID: 38415687.

Bhat S, Ansari MI, **Kattoor JJ**, Sircar S, Dar PS, Deol P, Kumar OV, Thomas P, Ghosh S, El Zowalaty ME, Malik YS. Emerging porcine Enterovirus G infections, epidemiological, complete genome sequencing, evolutionary and risk factor analysis in India. Virology. 2024 Feb;590:109906. PMID: 38096748.

Duan C, Anderson JL, Schepers LE, Damen FW, **Cox A**, Goergen CJ, Sivasankar MP. In vivo visualization and quantification of rat laryngeal blood supply after hydration challenge. Laryngoscope. 2024 Feb;134(2):779-785. PMID: 37584333.

Barrantes Murillo DF, Negrao Watanabe TT, Sasaki E, Pirie GJ, **Wakamatsu N**. Coinfection by *Mycobacterium marinum* and *Mycolicibacterium fortuitum* in a captive adult diamond-back water snake causing disseminated mycobacteriosis with acute cutaneous ulceration. J Vet Diagn Invest. 2024 Mar;36(2):269-273. PMID: 38205524.

Hastain SA, Mumm L, Ozawa S, Petritz O, **Gaudette C**, Troan BV, Stowe DM. Osteosarcoma of the wing in a sulfur-crested cockatoo. Vet Clin Pathol. 2024 Mar;53(1):111-115. PMID: 38164741.



Publications, cont.

*Bold font indicates ADDL affiliation

Kattoor JJ, Mlalazi-Oyinloye M, Nemser SM, **Wilkes RP**. Development of a targeted NGS assay for the detection of respiratory pathogens including SARS-CoV-2 in felines. Pathogens. 2024 Apr 17;13(4):335. PMID: 38668290.

Cooper-Khan RS, **Frankovich AN**, Thompson CA, Thomovsky SA, Lewis MJ. Clinical findings and outcome in 30 days with presumptive or confirmed nerve sheath tumors. Vet Sci. 2024 Apr 28;11(5):192. PMID: 38787164.

Hooser SB. Investigative and diagnostic toxicology and feed-related outbreaks. Vet Clin North Am Equine Pract. 2024 Apr;40(1):1-10. PMID: 38151405.

Gopalakrishnan B, Galili U, Saenger M, Burket NJ, Koss w, Lokender MS, Wolfe KM, Husak SJ, Stark CJ, Solorio L, **Cox A**, Dunbar A, Shi R, Li J. a-Gal nanoparticles in CNS trauma: II. Immunomodulation following spinal cord injury (SCI) improves functional outcomes. Tissue Eng Regen Med. 2024 Apr;21(3)437-453. PMID: 38308742.

Reichard MV, Cotey SR, **Dangoudoubiyam S**, Weerarathne P, Tussey K, **Wilkes RP**, Miller CA, Mehringer L, **Burcham GN**. Cytauxzoonosis in Indiana, USA: a case series of cats infected with *Cytauxzoon felis* (2018-2022). J Feline Med Surg. 2024 May; 26 (5): 098612X231224139. PMID: 38695724.

Campler MR, Cheng TY, Lee CW, Hofacre CL, **Lossie G**, Silva GS, El-Gazzar MM, Arruda AG. Investigating the uses of machine learning algorithms to inform risk factor analyses: the example of avian infectious bronchitis virus (IBV) in broiler chickens. Res Vet Sci. 2024 May;171:105201. PMID: 38442531.

Dangoudoubiyam S, Norris JK, Namasivayam S, de Paula Baptista R, Cannes do Nascimento N, Camp J, Schardl CL, Kissinger JC, Howe DK. Temporal gene expression during asexual development of the apicomplexan *Sarcocystis neurona*. mSphere. 2024 Jun 25;9(6):e0011124. PMID: 38809064.

Bryak G, **Cox A**, Lionakis MS, Thangamani S. Yeast and filamentous *Candida auris* stimulate distinct immune responses in the skin. mSphere. 2024 Jun 21:e0005524. PMID: 38904381.

Santarem VA, Kmetiuk LB, Ferreira IV, Lescano SAZ, de Souza Filho RT, da Cunha GR, Morikawa VM, **Dangoudoubiyam S**, Pires Dos Santos A, Biondo AW. Seropositivity for *Toxocara* spp. in individuals with animal hoarding disorder in southern Brazil: an alarm for public health. Acta Parsitol. 2024 Jun;69(2):1309-1313. PMID:38536614.



Publications, cont.

*Bold font indicates ADDL affiliation

Serafini Poeta Silva AP, Arruda Cezar G, Sousa Magalahaes E, Rupasinghe K, Chandra S, Silva GS, Almeida M, Crim B, Burrough E, Gauger P, Siepker C, Mainenti M, Zeller M, Main RG, Thurn M, Fioravente P, Corzo C, Rovira A, Naikare H, McGaughey R, Matias Ferreyra F, Retallick J, Gebhardt J, Pillatzki A, Greseth J, Kersey D, Clement T, Christopher-Hennings J, Prarat M, Johnson A, Summers D, Bowen C, Hendrix K, Boyle J, Lima Linhares DC, Trevisan G. Monitoring emerging pathogens using negative nucleic acid test results from endemic pathogens in pig populations: application to porcine enteric coronaviruses. PLoS One. 2024 Jul 5;19 (7):e0306532. PMID:38968319.

Lanman NA, Meco E, Fitchev P, Kolliegbo AK, **Broman MM**, Filipovich Y, Kothandaraman H, Cresswell GM, Talaty P, Antoniak M, Brumer S, Glaser AP, Higgins AM, Helfand BT, Franco OE, Crawford SE, Ratliff TL, Hayward SW, Vickman RE. Infiltrating lipid-rich macrophage subpopulations identified as a regulator of increasing prostate size in human benign prostatic hyperplasia. bioRxiv. 2024 Aug 1:2024.06.07.597992. PMID: 38915654.

Wahl ML, **Burcham GN**, Herbert AM, Humberg LA, Zollner PA, Jones LR, Quinby BM, Kluever BM. Taphonomic signatures of early scavenging by black and turkey vultures. PLoS One. 2024 Aug 14;19(8):e0307610. PMID: 39141675.

Mukkamala R, Carlson DJ, Miller NK, Lindeman SD, Bowen ER, Tudi P, Schleinkofer T, Booth OC, **Cox A**, Srinivasarao M, Low PS. Design of a fibroblast activation protein-targeted radiopharmaceutical therapy with high tumor-to-healthy-tissue rations. J Nucl Med. 2024 Aug 1:65(8): 1257-1263. PMID: 38871387.

Tauro A, Macri J, **Gaudette C**, Mariani CL, Brenseke B. Obstructive hydrocephalus and cardiomyopathy secondary to disseminated protothecosis in a Boxer dog. Case Rep Vet Med. 2024 Aug 12;2024:1402828. PMID: 39161575.

Amoah S, Cao W, Sayedahmed EE, Wang Y, Kumar A, Mishina M, Eddins DJ, Wang W-C, Burroughs M, Sheth M, Lee J, Shieh W-J, Ray SD, Bohannon CD, Ranjan P, Sharma SD, Hoehner J, Arthur RA, Gangappa S, **Wakamatsu N**, Johnston HR, Phol J, Mittal SK, Sambhara S. The frequency and function of nucleoprotein-specific CD8+ T cells are critical for heterosubtypic immunity against infulenza virus infection. J. Virol. 2024 Aug 20;98(8):e0071124. PMID: 39082839.

Dietrich J, LeCuyer TE, Hendrix GK, Burbick CR, Jacob ME, Byrne BA, Olsen K, Mitchell M, Ceric O, Lin R, **Joneson JJ, Lintner M**, Fox A, McClendon D, Alexander T, Joyce K, Byrd M, Clinton J, Snipes K, Peak L, Cole SD. Prevalence and molecular epidemiology of carbapenemase-producing Enterobacterales isolated from dog and cat faeces submitted to veterinary laboratories in the USA. Zoonoses and Public Health. 2024 Aug;71(5):538-548. PMID: 38750653.

Manikantan V, Ripley NE, Nielsen MK, **Dangoudoubiyam S**. Protein profile of extracellular vesicles derived from adult *Parascaris* spp. Parasit Vectors. 2024 Oct 10;17(1):426. PMID: 39390471.



Publications, cont.

*Bold font indicates ADDL affiliation

Cooper PO, Yang J, Wang HH, **Broman MM**, Jayasundara SM, Sahoo SS, Yan B, Awdalkreem GD, Cresswell GM, Wang L, Goossens E, Lanman NA, Doerge RW, Zheng F, Cheng L, Alqahtani S, Crist SA, Braun RE, Kazemian M, Jerde TJ, Ratliff TL. Inflammation impacts androgen receptor signaling in basal prostate stem cells through interleukin 1 receptor antagonist. Commun. Biol. 2024 Oct 25;7 (1):1390. PMID: 39455902.

Lambert JR, Cheng AC, Lee LM, Raiford D, Zuber E, Kilbane E, Fish EJ, Krolak E, Hlusko KC, McMichael M, **Wilkes RP**, Wiederhold NP, Canete-Gibas CF, Barrantes Murillo DF. Intra-abdominal nocardiosis and scedosporiosis in a dog; case report and literature review. J. Vet Diagn Invest. 2024 Oct 14:10406387241287799. PMID: 39397659.

English AL, Klutzke JB, Thomovsky SA, **Wakamtsu N**. Disseminated Neospora caninum encephalomyelitis and myositis in a 3-month -old Cane Corso puppy. Vet Sci. 2024 Nov 6;11(11):544. PMID: 39591318.

Balakumar A, **Cox A**, Thangamani S. Cell aggregation mediated by ACE2 deletion in *Candida auris* modulates fungal colonization and host immune responses in the skin. mSphere. 2024 Nov 21;9(11):e0073424. PMID: 39475280.

Bailey TW, Venkatraman A, Cannes do Nascimento N, **Cox A**, Sivasankar MP. Water versus electrolyte rehydration on vocal fold osmotic and oxidative stress gene expression. Laryngoscope. 2024 Nov;134(11):4636-4641. PMID: 38979957.

Cezar G, Magalhaes E, Rupasinghe K, Chandra S, Silva G, Almeida M, Crim B, Burrough E, Gauger P, Siepker C, Mainenti M, Zeller M, Fano E, Pineyro P, Main R, Thurn M, Lages P, Corzo C, Rovira A, Naikare H, McGaughey R, Matias-Farreyra F, Retallick J, Gebhardt J, Greseth J, Kersey D, Clement T, Pillatzki A, Christopher-Hennings J, Prarat M, Johnson A, Summers D, Bowen C, Boyle J, Hendrix K, Arruda AG, Linhares D, Trevisan G. Using diagnostic data from veterinary diagnostic laboratories to unravel macroepidemiological aspects of porcine circoviruses 2 and 3 in the United States from 2002-2023. PLoS One. 2024 Dec 10;19(12):e0311807. PMID: 39656698.

Broman MM, Lanman NA, Vickman RE, Cresswel GM, Kothandaraman H, Kolliegbo A, Paez Paez JS, Glaser AP, Helfand BT, Henry G, Strand DW, France OE, Crawford SE, Hayward SW, Ratliff TL. Immune cell single-cell RNA sequencing analyses link an age-associated T cell subset to syptomatic benign prostatic hyperplasia. bioRxiv. 2024 Dec 30:2024.12.30.629739. PMID: 39803459.

Shay EO, Morrison RA, Zhang L, Kaefer SL, Wesson T, **Cox A**, Voytik-Harbin SL, Halum S. Scaffold-forming collagen and motor-endplate expressing muscle cells for porcine laryngoplasty. Laryngoscope. 2024 Dec; 134(12):4988-4997. PMID: 39011835.

Novotny L, **Powers CM**, Royal SM, Preston AK, **Hendrix GK**, **Sola MF**. Chytridiomycosis in a colony of hellbenders *Cryptobranchus alleganiensis*. 2024 Dec;36(4):303-309. PMID: 39620492.





WEST LAFAYETTE STAFF



HEEKE STAFF



Animal Disease Diagnostic Laboratory

RELIABLE, INNOVATIVE, VIGILANT

THE PERSISTENT PURSUIT OF HEALTHIER ANIMALS AND COMMUNITIES

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