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**C. WAYNE MCILWRAITH
TRANSLATIONAL MEDICINE INSTITUTE**

JULY 2022 ISSUE

Translational News



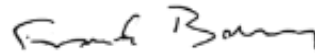
LETTER FROM THE DIRECTOR

I am very happy once more to provide a letter to accompany the most recent issue of Translational News. Over the past few months, I have engaged with many people at the Translational Medicine Institute and throughout Colorado State University and learned a great deal about the outstanding and ground-breaking work that goes on here. I continue to be impressed by work in education, basic science, biomedical engineering, surgical innovation, cell therapy, and other areas that is carried out here each day. The Institute is certainly fulfilling its mission to be a global center of innovation and translational achievement in veterinary and human medicine.

One of our objectives during the remainder of 2022 is to define our future ambition to continue to foster medical innovation and to enhance the health and quality of life of patients and the wider community. We will build a strategy – TMI 2030 – which will map out how we will grow and put in place new research programs, new investigators, and new infrastructure to enable this growth. This will involve wide consultation in the coming months with both internal and external stakeholders to define those objectives and the practical and financial steps needed to meet them.

I want to offer a special word of thanks to Dr. Heather Pidcoke for her work as the Associate Director of Research over the past few years. Heather has recently returned to her role as the University's Chief Medical Research Officer. I am grateful for her contribution to the Institute in its early days and wish her the very best. We look forward to continued interaction in the years ahead.

With my best regards,



Dr. Frank Barry, Director
C.Wayne McIlwraith
Translational Medicine Institute
Colorado State University

INSIDE THE INSTITUTE

The people of the Translational Medicine Institute include veterinarians, physicians, clinicians, researchers, engineers, educators, administrators, industry partners, specialized staff, technicians, and research associates. It's their creativity and passion for veterinary medicine that realizes the institute's vision of leading the way in discovery and implementation of the body's therapeutics to improve the lives of animals and their humans.

The Institute comprises three areas of focus: **Research**, **Education**, and **Commercialization**. **Sustainability and Social Responsibility** is embedded in the Institute's culture.

RESEARCH

The Institute's research team comprises six groups working in an integrated fashion, applying advanced capabilities, clinical discovery, and cross-functional/cross-institutional collaborations to address problems and work toward solutions. Read more about these groups of research professionals below.

DIRECTOR RECOGNITION

From Horses to Humans:
The Translational Medicine of
Dr. Laurie Goodrich



[Read more](#)

Dr. Jeremiah Easley named Director
of the Preclinical Surgical
Research Laboratory



[Explore PSRL](#)

PROVOST AWARD WINNERS 2022

Faculty Excellence: Lincoln Laureate

Dr. Kirk McGilvray, Mechanical Engineering, WSJCOE (Honorable Mention)

Faculty Excellence: Provost Research Scholar

Dr. Jeremiah Easley, Clinical Sciences, CVMBS



[Read more](#)

RECENTLY AWARDED GRANTS AND FUNDING



The Dow Laboratory for Immunotherapy in the Translational Medicine Institute was recently awarded a grant from the Pandemic Disease Resilience and Countermeasure Agility awards program at CSU to develop a new intranasal Covid vaccine. This project represents a collaborative effort between the Institute's team (Steven Dow, Lyndah Chow, William Wheat) and the SolaVAX team (Ray Goodrich, Marcela Henao-Tamayo, Richard Bowen) to combine unique technologies for creating a new vaccine platform for Covid and other emerging infections.

Additional grants and funding awarded to the Institute:

[Read more](#)

2022 PUBLICATIONS FROM OUR PRINCIPAL INVESTIGATORS

Daniels, A., Pezzanite, L.M., Griffenhagen, G., Hendrickson, D. **Evaluation of factors**

associated with surgical site infection in equine proximal interphalangeal joint arthrodesis: 54 cases (2010-2019). Accepted, *Vet. Med. Sci.* 2022. <https://doi.org/10.1002/vms3.839>.

Hindman, B.J., Dexter, F., Gadomski, B.C., Puttlitz, C.M. **Relationship Between Glottic View and Intubation Force during Direct- and Video-Laryngoscopy and Intubation.** *Anesthesia & Analgesia*, Accepted 2022.

Ivanovska, A., Wang, M., Arshaghi, T.E., Shaw, G., Alves, J., Byrne, A., Butterworth, S., Chandler, R., Cuddy, L., Dunne, J., Guerin, S., Harry, R., McAlindan, A., Mullins, R.A., and Barry, F. (2022). **Manufacturing Mesenchymal Stromal Cells for the Treatment of Osteoarthritis in Canine Patients: Challenges and Recommendations.** *Front. Vet. Sci.* In press.

Fitzgerald, J. C., Duffy, N., Cattaruzzi, G., Vitrani, F., Paulitti, A., Mazzarol, F., Mauro, P., Sfiligoj, A., Curcio, F., Jones, D. M., McInerney, V., Krawczyk, J., Kelly, J., Finnerty, A., McDonagh, K., McCabe, U., Duggan, M., Connolly, L., Shaw, G., Murphy, M., Barry, F. (2022). **GMP-Compliant Production of Autologous Adipose-Derived Stromal Cells in the NANT 001 Closed Automated Bioreactor.** *Front. Bioeng. Biotechnol.*, 10, 834267. <https://doi.org/10.3389/fbioe.2022.834267>.

Gadomski, B.C., Labus, K.M., Stewart, H., Nelson, B., Puttlitz, C.M., McGilvray, K.C., Regan, D.P., Easley, J.T. **A Large Animal Model for Orthopaedic Foot and Ankle Research.** *Frontiers in Veterinary Medicine.* 2022. <https://doi.org/10.3389/fvets.2022.816529>.

Johnson, V., Chow, L., and Dow, S. **Activated Stromal Cell Therapy for Treatment of Multi-Drug Resistant Infections in Dogs.** *Front. Vet. Sci.* (2022)

Krause, D., Pezzanite, L.M., Griffenhagen, G., Hendrickson, D. **Comparison of equine synovial sepsis rate following intrasynovial injection in ambulatory versus hospital settings.** *Equine Vet J.* 2022;54(3):523-530. <https://doi.org/10.1111/evj.13485>.

Lattermann, C., Leite, C.B.G., Frisbie, D.D., Schlegel, T.S., Bramlage, L.R., Koch, T., Centeno, C., Goodrich, L., Johnstone, B., Trumper R., Watts, A., Little C., Barry, F., Guilak, F., McIlwraith, C.W. (2022). **Orthobiologics in Orthopaedic applications: A Report from the TMI Havemeyer Meeting on Orthobiologics.** *JCJP*, 100055, ISSN 2667-2545, <https://doi.org/10.1016/j.jcjp.2022.100055>.

Liu, W., Nguyen-Truong, M., LeBar, K., Labus, K.M., Gray, E., Ahern, M., Neelakantan, S., Avazmohammadi, R., McGilvray, K.C., Puttlitz, C.M., Wang, Z. **Multiscale Contrasts Between the Right and Left Ventricle Biomechanics in Healthy Sheep and Translational Implications.** *Frontiers in Bioengineering and Biotechnology.* 2022. 10:857638. <https://doi.org/10.3389/fbioe.2022.857638>

McCready, E., Easley, J.T., Risch, M., Troyer, K.L., Johnson, J.W., Gadomski, B.C., McGilvray, K.C., Kisiday, J.D., Nelson, B.B. **Biomechanical, morphologic, and biochemical characteristics of articular cartilage of the ovine humeral head.** *Cartilage.* 2022. <https://doi.org/10.1177/19476035221081465>.

McDermott, J.E., Pezzanite, L., Goodrich, L., Dow, S., Santangelo, K., Chow, L., Wheat, W. **Equine innate immunity and osteoarthritis.** *Animals* (Basel). 2022, DOI: [10.3390/ani11113247](https://doi.org/10.3390/ani11113247).

Moorman, V., Pezzanite, L., Griffenhagen, G. **Liposomal bupivacaine provides longer duration analgesia than bupivacaine hydrochloride in an adjustable sole pressure**

duration analgesia than bupivacaine hydrochloride in an adjustable sole-pressure model of equine lameness. *Am J Vet Res.* 2022. <https://doi.org/10.2460/ajvr.21.08.0132>

Nelson, B.B., Lawless, S.P., McIlwraith, C.W. **Slab fractures of the third carpal bone involving both radial and intermediate facets and outcomes after surgical repair in racing Quarter Horses.** *Equine Vet J.* 2022 May;54(3):556-562. <https://doi.org/10.1111/evj.13468>. Epub 2021 Jun 28. PMID: 34033156.

Pezzanite, L.M, Easley, J.T., Bayless, R., Aldrich, E., Nelson, B.B., Seim, H.B. 3rd, Nout-Lomas YS. **Outcomes after cervical vertebral interbody fusion using an interbody fusion device and polyaxial pedicle screw and rod construct in 10 horses (2015-2019).** *Equine Vet J.* 2022;54(2):347-358. <https://doi.org/10.1111/evj.13449>.

Pezzanite, L.M., Hendrickson, D.A., Dow, S., Stoneback, J., Chow, L., Krause, D., Goodrich, L. **Intra-articular administration of antibiotics in horses: justifications, risks, reconsideration of use and outcomes.** *Equine Vet J.* 2022;54(1):24-38. <https://doi.org/10.1111/evj.13502>.

Ochs, J., Hanga, M., Shaw, G., Duffy, N., Kulik, M., Tissin, N., Reibert, D., Biermann, F., Moutsatsou, P., Ratnayake, S., Hewitt, C., Nienow, A., Koenig, N., Schmitt, R., Rafiq, Q., Barry, F., Murphy, M.M.J. (2022). **Needle to Needle Robot-Assisted Manufacture of Cell Therapy Products.** *Bioeng. Transl. Med.* In Press.

Shum, J.M., Gadomski, B.C., Tredinnick, S.J., Fok, W., Fernandez, J., Nelson, B., Palmer, R.H., Hooper, G., Puttlitz, C.M., Easley, J., Woodfield, T.B.F. **An *in silico* and *in vivo* pilot study of homogenous and locally-optimized low-stiffness AM scaffolds in a TTA model.** *Acta Biomaterialia*, 2022.

Wolynski J.G., Ilic, M.M., Labus, K.M., Notaros, BM., Puttlitz, C.M., McGilvray, K.C. **Direct Electromagnetic Coupling to Determine Diagnostic Bone Fracture Stiffness.** *ATM.* 2022. 10(9):510. DOI: 10.21037/atm-21-5315.

Conversations with
Dr. Simon Turner, Part 3
Catch up on [Part 1](#) and [Part 2](#)

Laboratory Spotlight
Orthopaedic Engineering
Research Laboratory



MASS SPECTROMETRY EQUIPMENT INSTALLATION

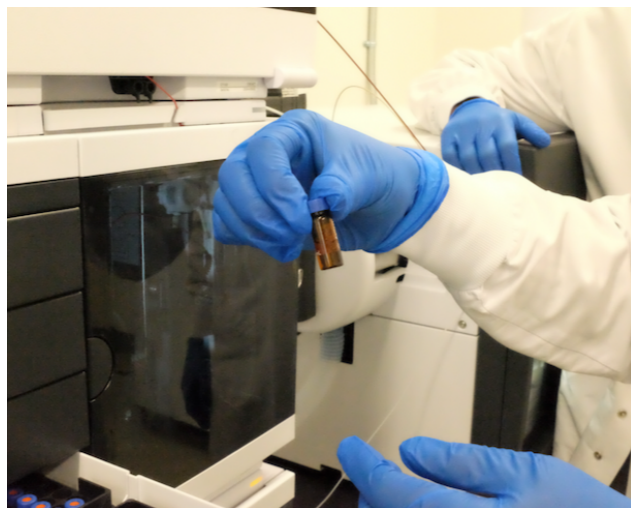
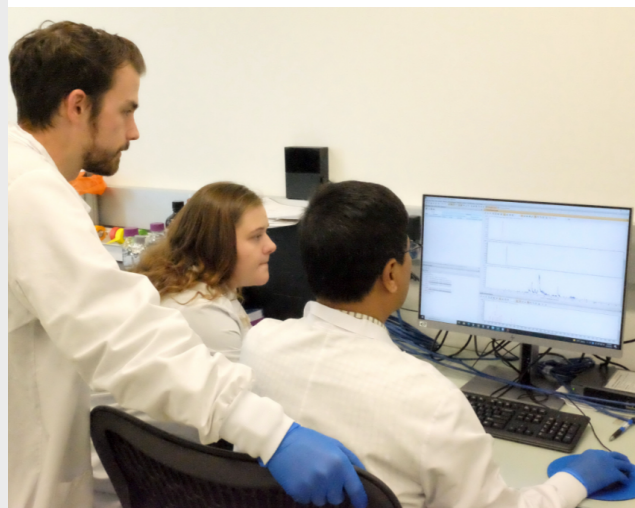
Under the Clinical Diagnostic Assay Development & Processing Center (CDADPC) the Translational Medicine Institute's mass spectrometry facility will support basic and clinical research.

Mass spectrometry can be used to detect and analyze a wide variety of organic and inorganic molecules based on the molecular mass of the individual molecules. A single mass spectrometry experiment can detect and analyze a single molecule or several thousands of molecules in a single sample. The instrumentation available through the Institute is primarily designed for the detection and analysis of low molecular mass organic molecules (typically less than 1,500 Da.).

The new liquid chromatography-mass spectrometry systems provide the ability to:

- Perform “metabolomics” and “lipidomics” studies with a broad variety of clinical samples.
- Identify and characterize novel metabolites.
- Develop mass spectrometry based assays that can be applied in a clinical laboratory.

These instruments are also able to fragment (break apart these molecules) and measure the mass of the individual substructures. This allows investigators to obtain structural information about individual molecules and to develop highly specific and quantitative assays to measure individual molecules. Studies involving these instruments can be performed in collaboration with the well-trained technical staff of the CDADPC. This staff is available to support grant applications. The instrumentation is available to support research activities across the CSU campus and activities outside of CSU.



The availability of the CDADPC technical staff will allow investigators to apply the instrumentation to their research objectives without the need of having expertise in liquid chromatography-mass spectrometry approaches.

Investigators interested in the use of the instrumentation, the development of clinical assays, or in performing metabolomics or lipidomics based studies should contact John Belisle (jbelisle@colostate.edu), Dr. Nurul Islam (nurul.islam@colostate.edu), or Paul Soma (paul.soma@colostate.edu).

3-YEAR REPORT FROM THE ORTHOPAEDIC RESEARCH CENTER

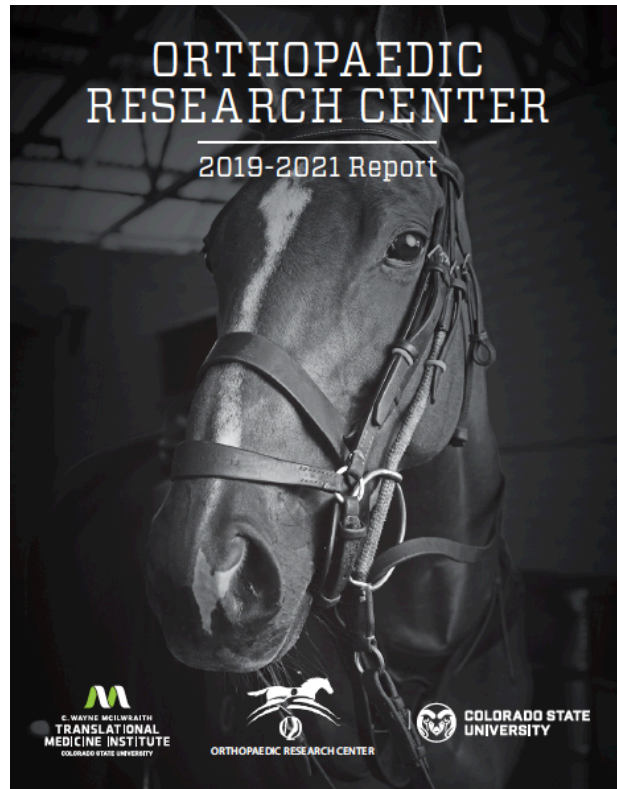
From the Director of the Orthopaedic Research Center, Dr. Laurie Goodrich:

It is with great enthusiasm, as the new director of the Orthopaedic Research Center, to present the 2019-2021 report from our program. I had the privilege of serving as the interim director in the second half of 2019 and, within a few months, a raging pandemic began. This situation tested our abilities to carry on the important research that has led the field of equine orthopedics and translational orthopedics. I had great support from our founding director, C. Wayne McIlwraith, and of course an incredible team of researchers, graduate students, and staff. We found our way through the difficult times to come out on the other side, still with excellent productivity and excitement for the future.

This report spans three years (2019-2021) versus our typical two-year time span due to the challenges of the past few years. With the publication of this report, we are making two major changes: 1. The report will now be online in PDF format (although we will print out some copies for visitors, so please let us know if you'd like a hard copy), and 2. As we move forward, we will have an annual report that spans each previous year to keep our collaborators, donors, and funding partners updated on our progress. Thank you for reading this report and I look forward to updating you annually.

Very respectfully,

Laurie R. Goodrich, DVM, MS, PhD
Diplomate, American College of Veterinary Surgeons
ACVS Founding Fellow in Minimally Invasive Surgery,
Large Animal Orthopedics
Barbara Cox Anthony University Chair in Orthopaedics
Director | Orthopaedic Research Center
Professor, Equine Surgery and Lameness



[Read report](#)

EDUCATION

CSU VetCE's purpose is to foster the collision between inspired learners, engaged educators, and meaningful experiences; that is our heritage dating back to Dr. C. Wayne McIlwraith being the inspired young veterinary learner in a human diagnostic arthroscopy course taught by Lanny Johnson, MD in 1976 and it guides our daily actions today. By looking at the educational experience through our stakeholders' lenses, we recognize that every touch matters in our vision to improve the world by inspiring and equipping others to improve theirs.

In our state-of-art educational facilities within the Institute, CSU VetCE provides more than 85 post-graduate veterinary continuing education (CE) courses each year on more than 185 calendar days with training ranging from introductory early career stage courses to the most advanced levels of specialist training. CSU VetCE has rapidly emerged as the leader in university-based continuing medical education in the USA, if not the world. Our instructors are key leaders across a broad spectrum of subject areas in large animal, small animal, and zoological species. Building upon our heritage, and with the generous support of *Arthrex Vet Systems* and *Karl Storz Veterinary Endoscopy* as the Institute's educational & research partners, we offer the most innovative training programs in minimally invasive diagnostic and therapeutic techniques.



INSPIRED EXPERIENTIAL LEARNING

Private, customized training courses and more. Building upon a solid foundation of learner-focused, hands-on experiential learning, CSU VetCE is building a robust library of online e-courses and hybrid course designs. Additionally, we design and deliver private customized training courses for various corporate veterinary practice groups such as the Veterinary Emergency Group, Veterinary Centers of America, and Veterinary Management Group, amongst others. For information about design of a private, customized training experience for your team, please contact us at support@csuvetce.com.



CSU VETCE SPONSORSHIP & ADVERTISING

We provide nearly endless opportunities for companies like yours to reach your target market through sponsorship of our many in-person / hands-on training courses, a growing library of online CE courses, and our *CSU VetCE Community* page that includes nearly 50 live/recorded webinars and plans for regular podcasts on our recently launched new website (www.csuветce.com). While we pride ourselves in customer service for our in-person training experiences, the fact remains that our website is our front door and our first point of contact with CE shoppers and our loyal customers. We've invested heavily, both time and finances, to create a friendly and inviting website user experience that will help us to shift from a transactional to a relational connection with our stakeholders.

We offer our sincere thanks to the many companies whose generous support of our educational program have made us the fastest growing university-based CE program in the US and, now, we're excited to share with you even more ways that you can reach your market with valuable information about your products and services. For information about annual sponsorships, course sponsorships, and series or episode sponsorship of our webinars, podcasts, or blogs, please contact us at support@csuветce.com.

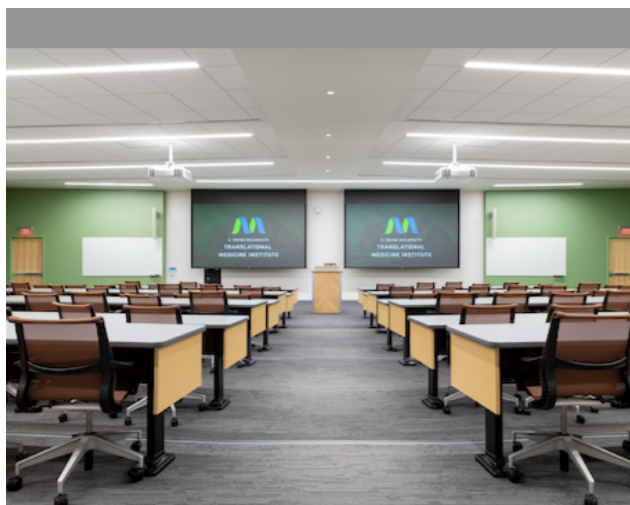


CE ELEVATED

a CSU VetCE WEBINAR SERIES

EDUCATIONAL PARTNERS PROGRAM

In addition to designing private, customized courses for corporate veterinary practice groups, we also offer our Educational Partners Program (EPP). Enrollment of your large practice group in our EPP offers your members the benefits of priority early access registration for our publicly-accessible courses, discounted DVM and Veterinary Technician course registrations, and a customized quarterly newsletter that includes tips from the trenches, just-in-time news updates, and upcoming CE course highlights. For information about becoming an CSU VetCE Educational Partner, please contact us at support@csuvetce.com.



FRIENDS OF CSU VETCE

We also enjoy the support of generous philanthropists, such as the Lulu Fund, who embrace our vision to improve the lives of animals and the humans who love them with our high tech / high touch approach to post-graduate veterinary continuing education. This support allows us to design and deliver innovative, cutting-edge courses that leverage state-of-the-future technologies. If you are interested in learning more about how your support can advance and elevate CSU VetCE, please contact support@csuvetce.com.

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COMMERCIALIZATION

Commercialization goals at the Translational Medicine Institute aim to accelerate research and product development in an effort to launch novel solutions to market and attract industry partners.

COMPUTED TOMOGRAPHY WORK AT TRANSLATIONAL MEDICINE INSTITUTE



We are finalizing the evaluation of the Equinos prototype at the Institute and are drafting hardware modifications for the beta units that will be developed for four practice partners. We have acquired diagnostic images of the fetlock and foot in live horses and find the scanning to be well-received by horses and rapid in acquisition time. Elliptical trajectory scanning algorithm development is occurring simultaneously with the goal of having beta units in place next spring, 2023.

SUSTAINABILITY AND SOCIAL RESPONSIBILITY

The Translational Medicine Institute is a shared space where incredible research and medical breakthroughs happen each day. But in order to sustain the institute's momentum, we must recognize the humanity in our students, staff, and faculty who carry and embody the Institute's mission and vision. Covid created many challenges, but one of the largest was reconnecting with one another and building back community and culture in the Institute.

We established a Communication & Culture Committee in 2019, which is comprised of members from each TMI unit. The committee meets monthly to share ideas, feedback, and to create meaningful engagement opportunities for all TMI personnel. This work is helping to establish an inclusive and diverse culture as well as build strong relationships, especially after two years of a hybrid working environment.

SOLAR PANEL INSTALLATION FOR LEED CERTIFICATION



Solar panels were installed this past spring, adding to the sustainability of our green building system. LEED-certification creates environmentally and socially responsible buildings.

This video comes directly from our rooftop and includes the exceptional view of Colorado's Front Range to the Institute's west. A big thank you to Dane Aragon, Learning and Media Technologies Coordinator, who braved the heights and captured this footage.

[Watch video](#)

FOOD TRUCK FRIDAYS
Complimentary breakfast from
Fort Collins local favorite,
Waffle Lab



FUN AND FRIENDLY COMPETITION
Bowling Tournament hosted
by Preclinical Surgical
Research Laboratory



**PLAN YOUR NEXT MEETING OR EVENT AT
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Choose the Translational Medicine Institute for your next business meeting, social event, celebration, board meeting & retreat, or annual conference. The Institute is a high-tech innovation hub, bringing together scholars, creators, and entrepreneurs to work in collaborative spaces where innovation thrives. Enjoy stunning views of the Rocky Mountains, fresh in-house catering, full media support, event planning, and concierge to make your next event at the Institute is successful.

For planning assistance and room reservations, please contact our Event Planning Coordinator, Sam Mallouf at S.Mallouf@colostate.edu.

Explore TMI event spaces

NEWS AND UPDATES

Veterinary Health System

Senior Associate Dean, VHS Sheila McMullen

Sheila began at part time remote capacity March 1, 2022 and transitioned to full time status in Fort Collins July 1, 2022. Sheila has a proven track record as a collaborative leader that strives to empower administrators to lead within their own programs. As strategic thinker with over 20 years of experience in higher education, and over 10 years of executive level oversight of budget, finance, HR, technology, data integration, and systems design operations, she is well equipped to drive the development and oversee implementation of the VHS. Seeking to lead by example those she works with and for, Sheila is eager to join the college and be a strong partner in developing and executing the Veterinary Health System vision.

Dr. Susan VandeWoude Named Dean of the College of Veterinary Medicine & Biomedical Sciences

Dr. Sue VandeWoude, Colorado State University Distinguished Professor with the Department of Microbiology, Immunology and Pathology and world-renowned veterinary virologist, was announced as Dean of the College of Veterinary Medicine and Biomedical Sciences. Dr. VandeWoude will begin her appointment August 16, stepping down from her position as Director of CSU One Health Institute.

Elected to the National Academy of Sciences in 2019, Dr. VandeWoude participates in several large interdisciplinary research teams as project manager and is principal investigator on a research team awarded a \$12.5 million NSF grant last year. During her more than 30-year career at CSU, Dr. VandeWoude has held leadership roles for the past 15 years including as CVMBS Associate Dean for Research before accepting the role as Director at the One Health Institute in 2020. She also has used her leadership roles to help advance diversity, inclusion, and more equitable pathways to success for all, which led her peers to honor her with the 2019 CVMBS Diversity and Inclusion Award and 2020 CVMBS Collaboration Award.

In addition to the recognitions above, Dr. VandeWoude's contributions as an elite scholar in the field of veterinary and translational medicine have earned her a long list of national awards as a leader in veterinary medicine: e.g., Fulbright Scholar, University of Tasmania; American Association of Veterinary Medical Colleges (AAVMC) Excellence in Research Award, presented by Zoetis; Virginia-Maryland College of Veterinary Medicine's Lifetime Achievement Alumni Award; American College of Laboratory Animal Medicine (ACLAM) Comparative Medicine Scientist Award, and many other accolades. She also has represented CSU externally on several scientific committees and boards, and various internal committees, task forces, and work groups.

Dr. VandeWoude's professional achievements are extraordinary, and her dedication to CSU's teaching and research mission as a public land-grant university is a point of enormous pride for her and recognized by all with whom she engages. We look forward to working with her in this new role and are excited to see what she will accomplish in collaboration with the talented leadership team, faculty, staff, and students of CVMBS. Dr. Colin Clay will continue to serve in the interim role until Dr. VandeWoude steps in.

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College of Veterinary Medicine and Biomedical Sciences



Clinical trials benefit animals and humans

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Comparative oncology research: Accelerating discovery for pets and people

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Finding balance: Twin biomed students set nearly identical goals

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