



A Community of Scientists

addressing
global
challenges

2024 | Annual Report



Dear friends, supporters and members of the Baker Institute for Animal Health, I am delighted to present the 2024 annual report for the Baker Institute, highlighting the work we have been doing over the past year, and in particular the people who are making it happen.

I have been serving as Interim Director since June, and it is exciting to once again lead the Institute – a lot has changed since I last was in this role between 2010 and 2016. The Institute is looking forward to its 75th year in 2025, and it is an honor to be able to guide the fantastic faculty, staff and trainees towards that historic landmark. The Baker Institute remains committed to its mission of being the leading academic Institute advancing veterinary and human medicine worldwide, and training the next generation of scientists.

In this report we are highlighting the faculty who have joined the Institute in the last few years – Drs. Sarah Caddy, Mandi de Mestre, Laura Goodman, and Jacqueline Evans. All have conducted some of their training here at the Baker Institute themselves. Since its founding in 1950 the Baker Institute has been preeminent in the training of graduate and postdoctoral

students striving to be at the forefront of research transforming the future of veterinary and human medicine. Trainees have gone on to lead in fields of academic research, teaching, industry, and government service. And we are lucky that some have returned, to continue their career as dedicated and visionary researchers working together—learning and building upon each other’s successes—to achieve extraordinary results.

Together these four faculty are perpetuating the strong legacy of veterinary research training here at the Baker Institute, and they are forging interconnected pathways to discovery in key areas of priority to the Institute and its mission. Those include canine genetics related to inherited diseases and cancer, equine reproduction and physiology, optimizing protection against viruses – particularly for newborns, and studies of emerging pathogens in animals and humans. Each have set up a vibrant and active research program, with far reaching impacts that you can read more about below.

Unlike traditional academic settings, an institute benefits from dedicated funding and operational flexibility, allowing it to pursue ambitious, long-term projects, while fostering

a collaborative culture of creativity and innovation. The Baker Institute’s groundbreaking research drives critical advancements in disease prevention and treatment across species, improving the health of animals and humans through practical, real-world applications.

We are continually grateful to our supporters, partners, and the entire Baker Institute community for your dedication to making a long-lasting impact on the health and well-being of animals and humans around the world.

Thank you for your continued support.

Sincerely,



Colin R. Parrish, Ph.D.
John M. Olin Professor of Virology
Interim Director, Baker Institute for Animal Health



2024 by the numbers

14

Baker Institute
Faculty
Members

85

Trainees
conducting research
throughout Baker labs

30 New publications

70

Total active grants (includes both federal and non-federal grants)

27

Active
federal
grants

+

40

Active
non-federal
grants

+

3

Active student
scholarship
funded positions

addressing global challenges

Cutting edge research with a global reach keeps Baker Institute for Animal Health faculty members at the forefront of their specialties and continues to invite collaborations from around the world.

Working with other laboratories, researchers, governments, veterinarians, and citizen scientists worldwide, Baker faculty are often leading the way, designing and conducting research that will have a global impact for generations to come. The four newest faculty members are no exception, bringing samples from horses, birds, dogs, cats, and even Vietnamese infants into their Ithaca laboratories, where they study genetics, infectious diseases, and immunology.

And while they are all traveling very different paths, they are working together to create a world of healthier animals and people.

Mandi de Mestre, BVSc (hons), Ph.D., PGCAP, MRCVS In the Equine Pregnancy Laboratory (EPL), Dr. Mandi de Mestre, the Dorothy Havemeyer McConville Professor of Equine Medicine in the Department of Biomedical Sciences, focuses her work on reproduction and fertility. Using the horse as a model to understand healthy pregnancies and the diseases that compromise them, she is leading genetic research into why 10-15% of horses around the world lose established pregnancies each year.

“We’re addressing the genetic characteristics that are needed for survival (of the equine fetus),” said de Mestre, who collaborates closely with veterinarians desperate to find the underlying causes of pregnancy loss. As a global leader in this research, the lab uses samples from around the world to study the genetic disruptions that lead to miscarriages in horses.

The EPL at the Baker Institute now receives samples from more than a half dozen states, as well as Argentina, Ireland, France, and Germany. The global reach, de Mestre says, helps them understand the larger picture of the underlying causes behind the genetic variants they found – whether it’s purely genetic errors or involves an interaction between genes and exposures in the horses’ environment. “It’s an incredibly common phenomenon that is found in horses around the world, but our data suggests the frequency differs. Through the study of these diverse populations and breeds, we hope to distinguish between underlying genetic causes of these chromosomal errors versus tangible environmental exposures that could ultimately be modified to reduce the impact of this devastating condition,” she said.

The horse also provides a unique model for human medicine, where doctors are working to understand the 23 million miscarriages suffered annually by women worldwide. Studying shared fundamental genetic mechanisms, equine and human researchers can benefit from each other’s’ knowledge. A former Baker trainee in the lab of Dr. Doug

Antczak, de Mestre continues to strengthen those collaborations, and is soon to be working with human researchers, sharing data from her Baker Institute lab.

Laura Goodman, Ph.D.’07 Working at the intersection of human, animal, and environmental health, Dr. Laura Goodman, and the Goodman Pathogen Genomics Lab investigates antimicrobial resistance, which occurs when bacteria and viruses develop the ability to resist drugs and treatment. It’s a worldwide phenomenon that affects both animals and people.

“A lot of our work starts with surveillance and understanding what’s out there, and then we try to understand how pathogens adapt to different hosts,” said Goodman of her current global outreach. “What happens with animals and the environment is eventually going to affect us and we can affect animals as well.”

Using this One Health approach, the lab analyzes, among other things, domestic avian flu and canine flu samples and, most recently, international feline infectious peritonitis cases, working towards making all the data public for researchers worldwide. As part of Baker’s mission for training and education, Goodman, an assistant professor in the Department of Public & Ecosystem Health, who was a former Baker trainee in the lab of Dr. Colin Parrish, is now training others in emerging genetic technologies, and next planning a trip to a Kenyan laboratory in the near future.

True to the Baker Institute’s vision of a world of healthier animals, Goodman is very interested in understanding how antimicrobial resistance impacts companion animals. “Not only can they potentially give us infections, but they can suffer from resistant infections themselves,” she said as she looks to not only improve the fundamental understanding of how microbes replicate but keep an eye out for pathogens in animals that could eventually infect people.

Sarah Caddy, MA ,VetMB, Ph.D., DACVM, FRCVS

Rotavirus is the leading cause of infectious acute gastroenteritis around the world in humans and animals. It impacts children under 5 particularly hard. And while a vaccine is 95% effective in protecting children in the United States, in low- and middle-income countries it struggles to protect half the children.

In her lab, assistant professor in the Department of Microbiology and Immunology Dr. Sarah Caddy and her team focus on anti-viral antibodies and have partnered globally to study the processes underlying this issue.



Drs. Mandi de Mestre, Laura Goodman, Jacquelyn Evans, and Sarah Caddy. Photo by John Enright, Baker Institute for Animal Health

“Mothers in low- and middle-income countries are exposed to more infectious diseases, so their immune system is constantly making more antibodies,” explained Caddy, a former Baker trainee in the lab of Dr. John Parker. “Mothers pass down these antibodies to their children via the placenta and in breast milk, but these interfere with the rotavirus vaccine. This means the child isn’t able to mount their own immune response to vaccination quite so well.”

Working with teams in Vietnam and Zambia, as well as the global vaccine non-profit organization PATH and the Gates Foundation, the Caddy lab receives serum samples from vaccinated children and screens them for antibodies. The data is returned to a large repository where comparison and analysis is done.

“It’s our hope that understanding how vaccine-induced antibodies are working will help design the next generation of vaccines. This has the potential to reduce child mortality in the longer term,” said Caddy, adding that the work will also benefit our pets. “Understanding more about this in humans will pave the way for exploring this in our dogs and cats.”

Jacquelyn Evans, Ph.D. The Evans Lab, led by Dr. Jacquelyn Evans, puts our pets’ DNA under the microscope, focusing its research on canine disease genetics. By finding genetic markers, scientists can predict the possibility of a dog developing a given disease during its lifetime, and ultimately, genetic tests can help breeders produce healthier dogs.

As Baker’s reputation for excellence and groundbreaking work grows, so, too, do its collaborations. Researchers, academic institutions, and global non-profits all regularly reach out to faculty for their insight and expertise. The Evans Lab is currently involved in four major studies and collaborating on three more and de Mestre is strengthening her partnerships with human medicine researchers. Through collaborative grants, the Caddy Lab has hosted rotavirus immunology researchers from Zambia and the Goodman lab works here at home with the federal Food and Drug Administration’s Center for Veterinary Medicine, sequencing isolates and making the data publicly available to researchers around the world.

She is the primary investigator for a global gastric cancer study, collaborating with Utrecht University in the Netherlands and the University of California at Davis. Relatively rare in the greater canine population, it’s more common in the Belgian Sheepdog and Belgian Tervuren breeds. Gastric cancer is also a complex disease with 15 genes involved, so Evans, an assistant professor in the Department of Biomedical Sciences, must cast a wide net.

“It takes a large population to find all those genetic components,” she said. Breed clubs are important partners, and the lab has harnessed the power of social media to reach breed enthusiasts worldwide. With both affected and healthy dogs needed to validate the science, they are collecting samples from hundreds of dogs.

Here is where man’s best friend really steps up. People, too, are affected by gastric cancer, but our genetic diversity makes it a lot harder to find the problem DNA.

“You would need tens of thousands of people,” said Evans of the sample size to pin down the gene mutations in humans. “But when we work within a dog breed, they are genetically very similar and key differences stand out. Almost all the diseases we work on have a direct human counterpart. We’ve found a lot of overlap with the genes that are important in the human disease process; we’ve even seen the exact same mutation occur in both dogs and humans.”

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2024 financials

Operations and research at the Baker Institute for Animal Health are supported through a variety of means. As a philanthropic organization which is part of the College of Veterinary Medicine at Cornell University, we rely on the support of our generous donors who recognize the importance of basic research, and the impact the results of our work has on the health and wellness of all animals. 73% of operational expenses goes directly to research seeking to better understand animal and human health. We couldn’t do this without your support!



revenue

Total: \$9,973,120

- Endowment Income41.1%
- Grants & Contracts28.3%
- College Support11.5%
- Gifts & Bequests5.4%
- Faculty Support4.0%
- Revenues & Royalties.....1.4%
- Use of Funds.....8.3%

expenses

Total: \$9,973,120

- Research Support73%
- College & University Support & Services12%
- Infrastructure.....11%
- Administration & Development4%

