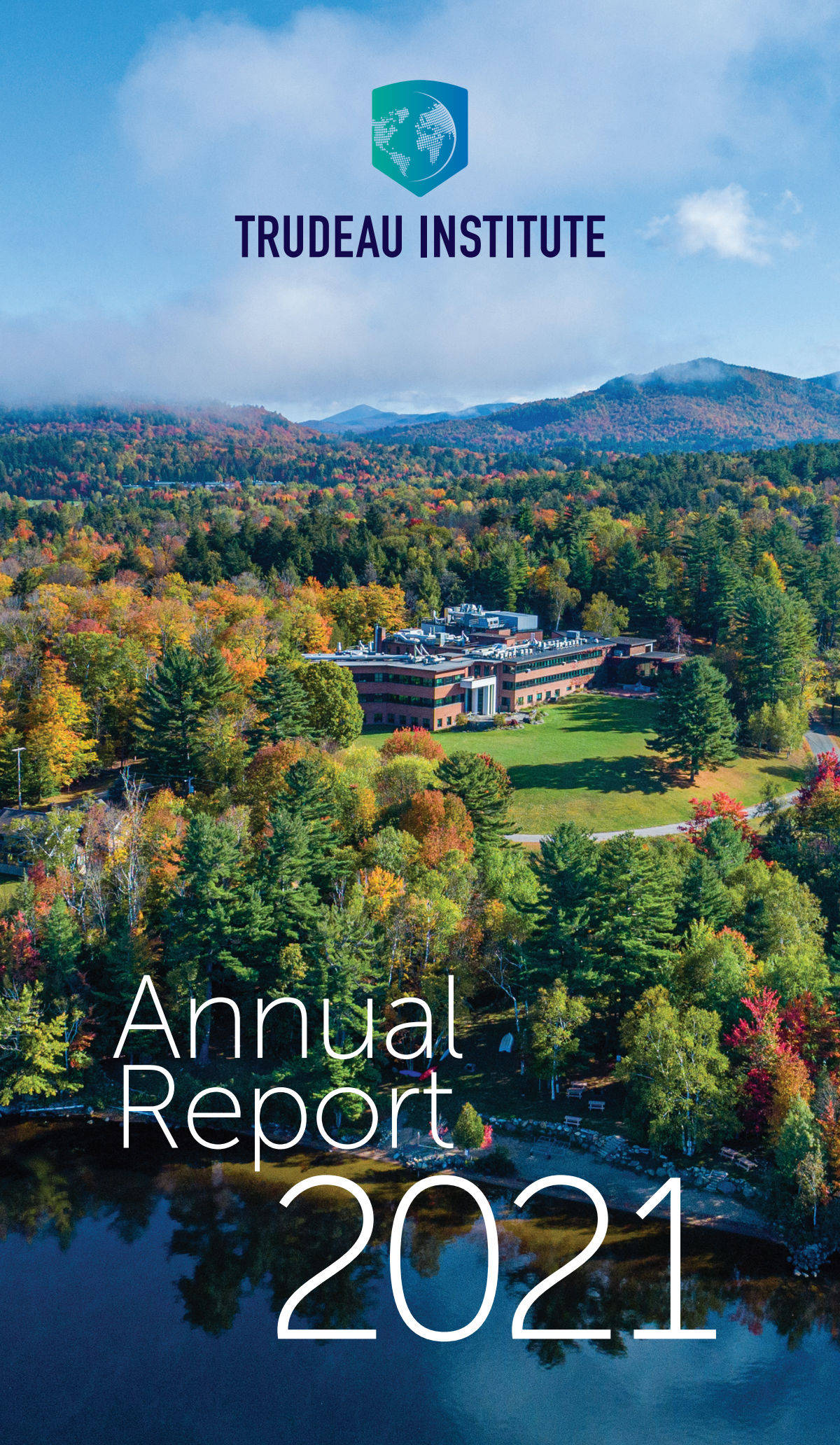


TRUDEAU INSTITUTE

Annual Report 2021


TRUDEAU INSTITUTE

A LETTER FROM THE PRESIDENT

Dear Friends:

I sometimes wonder: If we could bring Edward Livingston Trudeau and his grandson, Frank, to the Institute today, what would they say?

In many ways, I think they'd find it very familiar. Throughout our history, we have maintained a commitment both to our community and global health. That remains unbroken today. In our quest to safeguard human health, we are focused on 21st-century global health crises—from Zika and the novel coronavirus to, still, tuberculosis, which remains a deadly threat in much of the world.

Yet over and over, Trudeau Institute has reinvented itself to keep pace with the demands of the times. When Frank brought the Institute into a new era—Trudeau 2.0, as we call it—he did so with a recognition that the times called for something different than the patient-driven model that his grandfather introduced. And we, too, have embarked on our own re-thinking of how a small biomedical research institute can not only survive, but thrive, in today's world. How can we deploy our resources most effectively, in order to have the greatest impact on the global health stage?

We call it Trudeau 3.0. And we're well on our way to a new era of discovery.

We began this process in 2016, with a recognition that we needed to do a better job blending business and science to build a self-sustaining institute. To get there we created the Trudeau Research Network, a portfolio of approaches that fulfills our goal to bring our discoveries to more people, more quickly.

Today, a key component of our research is identifying leads for drugs that can significantly improve treatment regimens for drug-resistant threats. Tuberculosis remains a major focus of these drug discovery efforts (p. 9), but we expect to introduce other candidates as well. For this strategy to work, we will forge deeper partnerships with organizations that have the mechanisms in place to advance our discovery pipeline toward clinical testing.

We are also building a platform on which other institutions can conduct their own research on emerging viral diseases and pandemics. Our close relationship with organizations such as the Walter Reed Army Institute of Research has yielded important findings on new vaccines and treatments for COVID-19 (p. 14) and Zika. We're able to do this because of the expertise not just of our researchers, but our entire staff, which has excelled in these areas for decades.

Trudeau 3.0 represents a wholesale shift from the way we used to conduct business. Today, we're blending multiple models of biomedical research: We're combining the nimbleness of entrepreneurial biotech with the scientific rigor of academic research by our disease modeling teams. Our success depends on proving Trudeau's value as a partner, every day. At Trudeau, we transform medicine, together.

I can only hope Edward and Frank would see our progress as part of the profound legacy they started.

Sincerely,

Atsuo Kuki, Ph.D.
President and Director

GROUNDBREAKING SCIENCE—THE TYPE THAT WILL YIELD TREATMENTS FOR TUBERCULOSIS, COVID-19, TICK-BORNE ILLNESSES AND OTHER VIRAL DISEASES ON WHICH WE'RE WORKING AT TRUDEAU—DOESN'T HAPPEN IN A VACUUM. IT TAKES PARTNERS. AND IT TAKES RESOURCES.

Alex Maue

Alex Maue is Trudeau Institute's director of partnership development, a new role meant to fuel the work of today's Trudeau. For generations, we relied primarily on federal grants to fund work done by our researchers. Increasingly, though, we're leveraging our capabilities in infectious disease research and pre-clinical animal models to help other organizations achieve their goals—while finding new goals to achieve together.

Maue has an insider's understanding how others can draw on Trudeau's expertise: In addition to serving as a portfolio director at Taconic Biosciences and the head of an immunology laboratory at the Naval

Medical Research Center, he started his postdoctoral career at Trudeau.

In this conversation, Maue explains how our Trudeau 3.0 vision will become the Trudeau 3.0 reality.

What is your role at Trudeau?
I work primarily on the business side of the Institute, to bring in new partners and new clients who want to accelerate their research with us.

Through my experiences as a scientist and businessman, I acutely understand how a research institution can provide value to those in the biopharmaceutical industry.

What can a small research institute in the Adirondacks deliver for major biotech and pharmaceutical companies? What do we have that they don't?
Over the last several years, Big Pharma has outsourced more elements of research and development, especially within the pre-clinical phase. If you can send out your samples to someone else who's able and willing to do it, why would you buy a $200,000 piece of equipment with a $50,000 service contract every year?

Even when I was at the lab bench, I've always felt if you were going to outsource a study or find a partner, you should consider a biomedical research institute. Historically, the knock on working with an academic-focused partner has been turnaround times, and the quality of the deliverable. The scholarly expertise may indeed be great. But most academics haven't developed a workflow or scale that's compatible with the needs of biopharma.

At Trudeau, we focus on meeting the deliverable, commercial scale and execution. Our approach is working: We have repeat business from clients across all sectors.

Being a "best-kept secret" isn't necessarily a good thing. What's the reaction when new clients discover what they can do here?
Scientists may have a basic idea that they want to do a certain type of experiment. But once they learn more about the facilities and core capabilities we have here—flow cytometry, imaging, histology, enabling assays that we can integrate and perform—this increases our value significantly. Often, other service providers will outsource these functions. We can leverage Trudeau's resources to build more comprehensive project solutions.

How hard is it to put these under one roof?
Well, as an example, a university has everything. That's a one-stop shop. But it's not a commercial platform. Even if someone has access to a piece of core equipment, you have to find someone else who has access to another piece of core equipment. And typically the drive to complete work on behalf of those clients is not always central to the university's mission.

How does your job fit into Trudeau's direction?
What inspires me is looking for relationships that are not purely transactional, and result in 1+1=3—where we can create something that's better than each individual party. Those relationships are meant to foster innovation, whether it's ours or a partner's, and to some extent they build an even more comprehensive offering through conducting pre-clinical infectious disease research.

What drew you back to Trudeau?
I was a postdoctoral fellow here from 2005 through 2008. It was a very vibrant time, very collaborative. It was a great atmosphere of like-minded and driven individuals. Saranac Lake is somewhat remote, but there was a real sense of community. Helping each other out. That always stuck with me. I wanted to take that with me when I left to be a PI (principal investigator) doing vaccine research.

I kept up to date with the Institute after I left, and I sensed a real momentum based on what Atsuo (Kuki) was doing here. I wanted to come back and be a

In five years, Trudeau will have a portfolio of antibacterial drug candidates. We will have one to two joint enterprise relationships with major partners. Five years from now, we will have grown our ranks and have a sustainable financial model.

part of it—and the most impactful thing I can bring is my experience from the business world.

Why did that new direction—Trudeau 3.0—resonate?
From a business standpoint, this approach is a way to generate intellectual property and assets. But when we look at the mission of the Institute—fighting infectious diseases, and advancing human health—this may be a more direct path than we've ever taken.

It's hard to do that when you're focused on basic research. Science is a noble pursuit. Basic research can add to the body of knowledge, and someone may use your discovery to ultimately help people. Our pursuits are more focused on real-world impact.

You've seen other operations at work. What makes Trudeau special?
Over its history, Trudeau has gotten a lot done. Despite the fact that we're in a remote location, and that we don't have a billion-dollar endowment. But that brings benefits as well: We're able to work without distraction. We can focus on research, and science. And I think the Institute can offer a lot to not just the scientific world, but also to the Adirondacks.

How does a small place like Trudeau compete?
It's true: There are fewer PIs (principal investigators) than there were 10 years ago. But with Atsuo and Felix Sheinerman, we have veterans of pharmaceutical drug development. Atsuo has a very good mind when it comes to platform approaches. And he's already brought in new talent like Michaelle Chojnacki to augment that vision. (See p.8.) And we have people like Deb Brown, who brings decades of expertise in viral immunology, and In-Jeong Kim, who has worked in pharma. Bill Reiley, at TICRO, is an expert in lung immunology, which is why it's seamless for him to move between influenza, coronavirus and TB. And there's Brian Weinrick, whose expertise in tuberculosis is helping to build deeper relationships with key players in that space.

In five years, where do you expect Trudeau to be?
In five years, Trudeau will have a portfolio of antibacterial drug candidates. We will have one to two joint enterprise relationships with major partners. Five years from now, we will have grown our ranks and have a sustainable financial model.

I believe the partnerships are key.

What hasn't changed since you left?
The approach to conducting the best science possible has not changed. The will and the drive of the entire Institute staff has always been there.

FOR MUCH OF THE WORLD, FALLING ILL WITH TUBERCULOSIS (TB) IS ALL TOO EASY TO IMAGINE.

It's the cure that's hard to contemplate.

In 2020, 10 million people contracted TB, killing 1.5 million. No infectious disease was deadlier, except for COVID-19. In the best-case scenario, tuberculosis patients must take four different antibiotics over a six-month period via a daily regimen of large pills.

Not everyone, though, is so lucky. Patients with drug-resistant TB—which can't be cured with standard measures—have required even more arduous treatment, such as routine intravenous infusions and taking pills for as long as two years. And while recent advances have shortened that duration, treatment remains expensive and can have harrowing side effects; COVID, too, has disrupted treatment regimens. As a result, many tuberculosis patients never finish their treatment, which only makes those drug-resistant strains even harder to kill.

That's the challenge Michaelle Chojnacki joined Trudeau to overcome. As the principal investigator of our new Innovative Therapeutics laboratory, her job is to find new treatments for entrenched diseases. Her prime target is tuberculosis, which has menaced humanity for thousands of years. But soon, she hopes, the work she's doing with other Trudeau scientists will yield TB treatments that work more quickly, exact a smaller toll on the patients who take them, and cost less to administer.

"This is a unique opportunity," says

Chojnacki, who joined Trudeau from a postdoctoral fellowship at the University of Rochester to launch the lab. "When I was thinking about my future, I was considering careers in industry or academia. But there are not many opportunities to arrive at an institute and build a program, which I found to be a unique and exciting option."

Chojnacki's lab is comprised of her and Derek Bernacki, a research scientist who has worked at Trudeau for several years. While the work they're doing is new, in a way, it's the last piece in a puzzle started by two other principal investigators at Trudeau, Felix Sheinerman and Brian Weinrick.

The team has complementary roles. Weinrick, a noted TB expert who joined Trudeau from the Albert Einstein College of Medicine, has developed a keen understanding of the cellular defenses that tuberculosis relies on to resist treatment. Sheinerman, a pioneer in computational chemogenomics, has honed techniques to scour vast libraries of previously discovered molecules that might breach those defenses.

For the past few years, the two have worked in tandem: Weinrick identifies the specific genes TB can't live without. Then Sheinerman looks for a molecule that might shut those genes down, and allow treatment to work.

"If Felix thinks he has identified a TB-killing molecule, we purchase the drug and biologically evaluate it," she says. "That's the first step. We answer the question: Yes or no? Does this kill tuberculosis?"

In fact, Trudeau researchers had gone as far as that first step already, testing some of the drugs Sheinerman's models indicated might be effective. Chojnacki's expertise allows her to carry the ball farther down the field—hopefully, someday, yielding a therapy ready for clinical testing.

"If the drug kills tuberculosis, there are many more questions that need answers," she says. "How does it work? What is it doing to the cell? Can the bacteria become resistant to that drug?"

Michaelle Chojnacki

The problem of drug resistance, and the rise of persistent strains of the disease that defy treatment, has plagued tuberculosis researchers. TB has proven so wily because it is effective at evading treatment: Even when treated, a small amount of the bacteria may continue to persist in its host.

Chojnacki is familiar with that kind of foe. At Rochester, she worked with methicillin-resistant Staphylococcus aureus (MRSA) and Acinetobacter baumannii, bacteria famous for resisting antibiotics. Commonly found in hospitals, these

The team of Chojnacki, Weinrick, and Sheinerman are developing a TB drug discovery pipeline that so far has revealed a half-dozen candidate molecules capable of sterilizing TB.

organisms cause patient infections that are difficult to treat and can be fatal. "In some ways TB is trickier," says Chojnacki, whose expertise lies in finding how bacteria escape antibiotic treatment and finding new lines of attack. "But TB evades drug treatment in some of the same ways as those other bacteria and shares some of the same resistance mechanisms."

Part of the key to finding drugs that can treat persister strains is developing assays—or tests—that reflect the real-world conditions in which these diseases thrive. As researchers have learned, there's a big difference between finding treatments that work in controlled environments and finding ones that are effective in organisms.

"In its natural environment, such as in a human, the bacterium recognizes that it needs to employ different survival mechanisms than in a test tube," Chojnacki says. "Researchers therefore must develop drugs that work in very specific environments."

Tuberculosis is no different.

Six months into her time at Trudeau, Chojnacki and Bernacki are focusing on a half-dozen candidates that are ripe for further testing in animals. Though these treatments are promising, there's a long way to go before any of the potential treatments are refined enough to try in humans. But they're confident, though, that Trudeau's approach gives them a leg up. By starting with treatments that have already been developed—even if not for TB specifically—the discovery process is shortened. So does the fact that many of those drugs have even been approved for use in humans.

"Often, effective drug candidates don't make it to market over safety concerns that are discovered late in the development process," says Bernacki, who has been at Trudeau four years. "This modern drug-development approach we're building tackles issues early on, helping us identify liabilities sooner."

Fail fast. It's a Silicon Valley mantra that fits well in a Trudeau that has embraced a team-first, entrepreneurial mindset. "When you're dealing with problems like this, things don't always go as planned," Bernacki says. "Trudeau can pivot quickly. We can rely on the broad expertise of scientists here and if we lack expertise in an area we can lean on our network of collaborators."

Chojnacki was drawn by the promise of collaboration and freedom. "We're not a pharmaceutical company, but we're not a university. We're something in between," she says.

Together, Trudeau's team is working to reduce tuberculosis' staggering toll. After generations of progress, it's still killing one person every 22 seconds. Chojnacki is realistic about what to expect. After thousands of years, she said, it's unlikely to come up with a magic bullet that will eradicate tuberculosis. "I don't know if that's possible," she says. "But can we do better than six months on four different antibiotics that make you sick? I think so."

FROM THE OUTSIDE, AMPERSAND BIOSCIENCES'S HEADQUARTERS HASN'T CHANGED MUCH SINCE ITS DAYS AS AN ELEMENTARY SCHOOL MORE THAN A DECADE AGO.

The one-story building in Lake Clear, about 10 miles from Saranac Lake, still has a playground in back. A sign on the front door instructs visitors to report to the school office.

Inside, though, industrial, walk-in refrigerators fill the space that was once a cafeteria-slash-gym. High-tech testing equipment fills the back of a classroom. Rows of desks have given way to lab benches. That's where the company is putting the finishing touches on a first-of-its-kind product that could help researchers better understand the immune response triggered by influenza, SARS-CoV-2, and other infectious diseases.

And Trudeau Institute is playing a vital role in making that happen.

The partnership with Ampersand was enabled by a $572,000 Small Business Innovation Research (SBIR) grant, a program designed to help start-ups and other small companies bring needed products to market. In this case, the product under development is a blood test that allows researchers to test vaccines and other drugs on ferrets.

"We'll be the first to market on a lot of these products, so there's a lot of potential," said Laurie Stephen, the company's president.

While most of Ampersand's testing involves mice—a standard used for generations—they're not always good predictors of how humans will respond to potential treatment. The coronavirus, for example, doesn't generate disease in mice the same way that it does in humans. Nor does the flu.

Ferrets, though, get closer. Ferrets sneeze, for example, while mice don't. Because sneezing is a key method for transmitting respiratory disease, that helps researchers replicate real-world conditions more readily. And receptors on lung cells in ferrets are more closely related to those in humans than mice. So if a ferret responds to a particular medicine—or gets ill—researchers can project how humans might respond in the same situation.

The National Institutes of Health, which administers the SBIR grants, noted the increasing demand for these types of tests. In response, it asked companies to submit proposals to develop new reagents to detect immune response biomarkers in ferrets. Ampersand had already worked with TICRO, Trudeau's research services arm, on similar projects in the past; with Ampersand Senior Scientist Tori Race taking the lead, we received the grant in 2020.

Ampersand's tests use antibodies to detect the presence of diseases in blood samples. (Antibodies are proteins produced by our body's immune system to fight disease.) Before Ampersand can mass-produce the antibodies it uses in those tests, though, it needs to start with an original antibody produced through an immune response in a living animal. Trudeau, using proteins provided by Ampersand, produces those

> "Any time we can collaborate, combine our skills and bring grant money into the North Country, that's a win-win situation for everybody."
>
> —DEB BROWN

antibodies in our labs. Ampersand then selects the purest of the lot to produce clones, which go into its test kits and other products.

Deb Brown, a principal investigator at Trudeau in the influenza and vaccines program, expects the work to yield dividends not just for vaccine research, but the Adirondacks.

"Adding this to Ampersand's portfolio increases their footprint and it increases the footprint of biotech in the North Country," said Brown, who also oversees Trudeau's educational programs with Clarkson University and local schools. Grants like these, she says, are a linchpin for keeping—and growing—STEM-related opportunities in the area.

"These partnerships are essential for workforce development," she said. "Getting these grants means we can hire another technician, for example. Ampersand is a small outfit; so is Trudeau, compared to other research institutes. Any time we can collaborate, combine our skills and bring grant money into the North Country, that's a win-win situation for everybody."

Ampersand, which employs seven, is poised to grow more. As work on the SBIR grant wraps up—Stephen says she's hoping to go to market this fall—Ampersand and Trudeau won a second SBIR grant to develop more tests for hamsters, which are especially good models for COVID researchers.

For Ampersand, having a local partner like Trudeau solves logistical hurdles. And it looks good, too. "For us, it adds more credibility if you're working with an institute like Trudeau," Stephen said. "And when we publish our research, that's even better."

Laurie Stephen and Tori Race

TWO AND A HALF YEARS INTO A PANDEMIC THAT HAS KILLED MORE THAN 6.3 MILLION PEOPLE, IT'S ALL TOO EVIDENT THAT COVID-19 IS FAR FROM FINISHED.

While the availability of safe, effective vaccines has saved countless lives, a parade of variants, each triggering a new wave of infections, has shown other solutions are needed.

"The problem with the current vaccines is the same that we have with seasonal influenza," said William Reiley, head of research services at Trudeau Institute. "Our concern is that the SARS-CoV-2 virus, like influenza, could become an endemic pathogen. Each new variant or seasonal strain might contain small or large mutations leading to decreased efficacy in the previous year's vaccines. In fact, we are already seeing this with the SARS-CoV-2 Omicron BA.5 variant."

The goal, said Reiley, is to develop both vaccines and treatments that provide universal coverage against multiple strains of SARS-CoV-2. Trudeau is playing a role helping to accomplish just that: Working with researchers from the Walter Reed Army Institute of Research (WRAIR), we've conducted pre-clinical studies that show early promise on both those fronts.

William Reiley

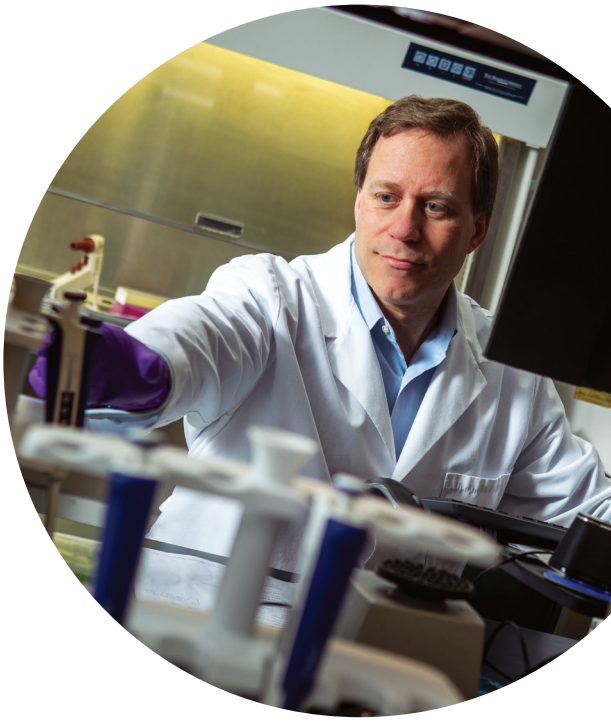
Those findings were published in a pair of major journals at the end of 2021. One paper, about a new COVID-19 vaccine, was published in Cell Reports; the other, which tested a monoclonal antibody treatment aimed at infected individuals, was published in Nature Immunology.

Existing coronavirus vaccines and treatments target the distinctive spike protein found on the surface of the virus. Those spikes bind to

receptors on host cells, triggering infection. The challenge, as Reiley noted, is that the spike protein is constantly mutating in order to evade detection by our immune system. Variants such as Alpha, Delta and Omicron are mutations of the original strain.

To get around this, WRAIR's researchers are trying to attack a region of the virus that remains stable, even while its spike protein changes. The results were promising. In the case of the new vaccine, Trudeau researchers found that it prevented severe disease in animal subjects, even when confronted with multiple variants of concern (or VOCs).

The monoclonal antibody research relied on a similar model. In the paper, researchers found the treatment "demonstrates a promising approach to increase prophylactic coverage against SARS-CoV-2 and variants of concern that may arise."



While the immediate focus of WRAIR's advances is on the novel coronavirus, the platform could also be used for other infections—or even pandemics that haven't emerged yet. In theory, the components of the vaccine and treatment that defend against COVID could be replaced with a mechanism that targets MERS, SARS and other coronaviruses instead.

"We're working on pandemic preparedness," Reiley said. "In the early stages of this, we weren't where we needed to be. Because we hadn't had a pandemic in 100 years. With these vaccines and therapeutics, the testing we're doing now lets us know that we're not only effective against this virus, but future ones."

Trudeau Institute has been involved with efforts to fight the novel coronavirus since its earliest days—starting with efforts to work with local healthcare institutions to conduct testing and disinfect protective gear, and progressing toward research on vaccines and therapeutics. Those efforts are squarely in line with our longstanding commitment to tackle the greatest threats to global health. Increasingly, we're working on those challenges with others—because we can accomplish more together. Our relationship with WRAIR, for example, goes back to 2018, when Walter Reed officials realized our capabilities in the lab could assist their efforts to introduce a Zika vaccine. That work ultimately led to our relationship on COVID-19.

For Reiley, both projects demonstrate the value Trudeau brings to other organizations. "This is a partnership, and the partnership allows research to get done," he said. "When we conduct testing for our partners, it allows them do things they don't have the capacity to do themselves, or it frees them up to do other work."

Read the papers here:

Low-dose in vivo protection and neutralization across SARS-CoV-2 variants by monoclonal antibody combinations: https://www.nature.com/articles/s41590-021-01068-z

SARS-CoV-2 ferritin nanoparticle vaccines elicit broad SARS coronavirus immunogenicity: https://www.sciencedirect.com/science/article/pii/S2211124721016399

LETTER FROM THE CHAIR

I'm honored to write to you, for the first time, as chair of Trudeau Institute's Board of Trustees.

I was elected chair in August 2021, succeeding Dr. Dorothy Federman, who retired from our board after a remarkable 40 years of service. From serving in medical practice with Frank Trudeau to her current role as an honorary trustee, she's been fundamental to the Institute's evolution and key objectives.

We're devoted to finding solutions to some of the world's most challenging public health threats—both ancient diseases and emerging pathogens. Simultaneously, we preserve, honor and extend the Trudeau family legacy of dedication to the health and vitality of our Adirondack community and economy.

Since Dr. Atsuo Kuki arrived in 2016, we've redoubled our efforts on those fronts. Our small but intensely focused team is making inroads on SARS-CoV-2 and Zika, which commonly causes severe damage to fetuses. And, as ever, we seek to ease the perennial pandemic of tuberculosis. According to the World Health Organization, 1.5 million people died from TB in 2020—for the first time in a decade, an increase over the year before. Developing a short-course treatment option for drug-susceptible TB is particularly important because the people at greatest risk for the disease come from impoverished communities, often beyond the reach of routine health care.

When the novel coronavirus took hold, our team leaped into action. In addition to decontaminating masks and producing testing fluid for Adirondack Medical Center, we spearheaded efforts to bring rapid response testing capability to the region. Trudeau scientists identified the most accurate and flexible equipment capable of up to 1,000 tests daily, delivering definitive results in 24 to 48 hours, providing the kind of clarity needed by health care providers, hospitals, nursing homes, schools, colleges and businesses to keep their doors open and the community safe. Thanks to Adirondack Health and generous local donors, the investment continues to serve our community.

We're deploying our expertise in immunology, virology and microbiology on our own translational research portfolio and on behalf of other world-class organizations. Trudeau is thriving through deepening relationships with organizations such as the Walter Reed Army Institute of Research (a partnership featured on page 14), SUNY Upstate Medical University, and the Icahn School of Medicine at Mount Sinai.

As we grow, we bring a highly educated workforce to the Adirondacks. These scientists, postdoctoral fellows, lab technicians and facilities support team members live in the Tri-Lakes area. They are homeowners and consumers with families involved in area schools, clubs and activities. We aspire to be a hub around which new biotech firms can grow. Our work with students at Clarkson University and other area schools is developing a STEM-ready workforce. By doing so, companies can take advantage of local talent, rather than locating elsewhere.

We're on an exciting upward trajectory at Trudeau and your generous contributions accelerate our progress. I'm energized by this extraordinary opportunity to help shape our next phase of growth and look forward to having you with us for Trudeau's new era of discovery.

Sincerely,

Kip Testwuide
Chair, Trudeau Institute Board of Trustees

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We gratefully acknowledge all the federal employees who contributed through the Combined Federal Campaign.

The Trudeau Institute acknowledges the National Institutes of Health for its vital ongoing support. As the nation's primary federal agency for conducting and supporting medical research, the NIH shares the Institute's mission to make medical discoveries that improve health and save lives.

Dorothy Federman (right) **with** (L–R) **her husband Jay and children Andrew, Adam and Sara.**

When Dorothy Federman retired from Trudeau's Board of Trustees last summer after a remarkable 40-year tenure, we celebrated her service by dedicating a terrace in her honor and attaching her name to our program for early-career researchers. The Dorothy Swern Federman Postdoctoral Fellowship—for which we are raising $100,000 annually—is particularly dear to her: Her father, himself a scientist, held particular regard for the young scientists in his lab. "The postdoc position is a necessary rite of passage for a scientist, and they perform essential work senior scientists need," Federman said. "It is a pivotal time, when mentors are critical to one's learning and growth."

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ON A HEALING JOURNEY

In Cameroon, where Gaelle Guiewi grew up, tuberculosis is a fact of life. Her own aunt suffered with it. But even after she began studying TB as a graduate student there, she didn't fully comprehend the devastation it could cause until a mentor urged her to leave the lab and work in a hospital.

There, she saw grandmothers racked with violent coughing fits, yet sent home to wait weeks or months for test results. Sometimes, patients left the hospital before finishing treatment because they couldn't afford to forgo a month of work; others dropped the regimen because the side effects were so draining.

That's when Guiewi decided to spend her career working on a way to shorten the course of tuberculosis treatment, and to make the drugs themselves less toxic.

Guiewi is continuing that quest at the Trudeau Institute, where she is a fellow in the Dorothy Swern Federman Postdoctoral Fellowship. Since 2019, she has worked in the lab of Brian Weinrick, seeking new drugs that may be effective in curing TB.

"My job is to understand how the drug works," she says. "I need to learn how it kills the bacteria and what is going on when it enters the cell."

Postdoctoral fellows play a vital role in labs, serving as trusted lieutenants to principal investigators. At a small institute like Trudeau, Guiewi has the freedom to move forward with "crazy ideas" for experiments. "If it doesn't work, it doesn't work," she says. "But you never know where you can get."

And while the process can be slow, even failures build knowledge that ultimately lead to breakthroughs. "The joy that you get when the in vivo results reflect what you have in your head? It's so great. We have a celebration dance," she says.

Guiewi's goal, she said, is to someday bring new treatments to Cameroon. "That will be so great—to go home and talk to people and say, instead of taking six pills per day, you can take these two," she said. "And not for six months, or 12 months, or 20 months, but only for two or four."

She's confident she can achieve that. "If you don't have hope, why are you getting up every morning?" she asks.

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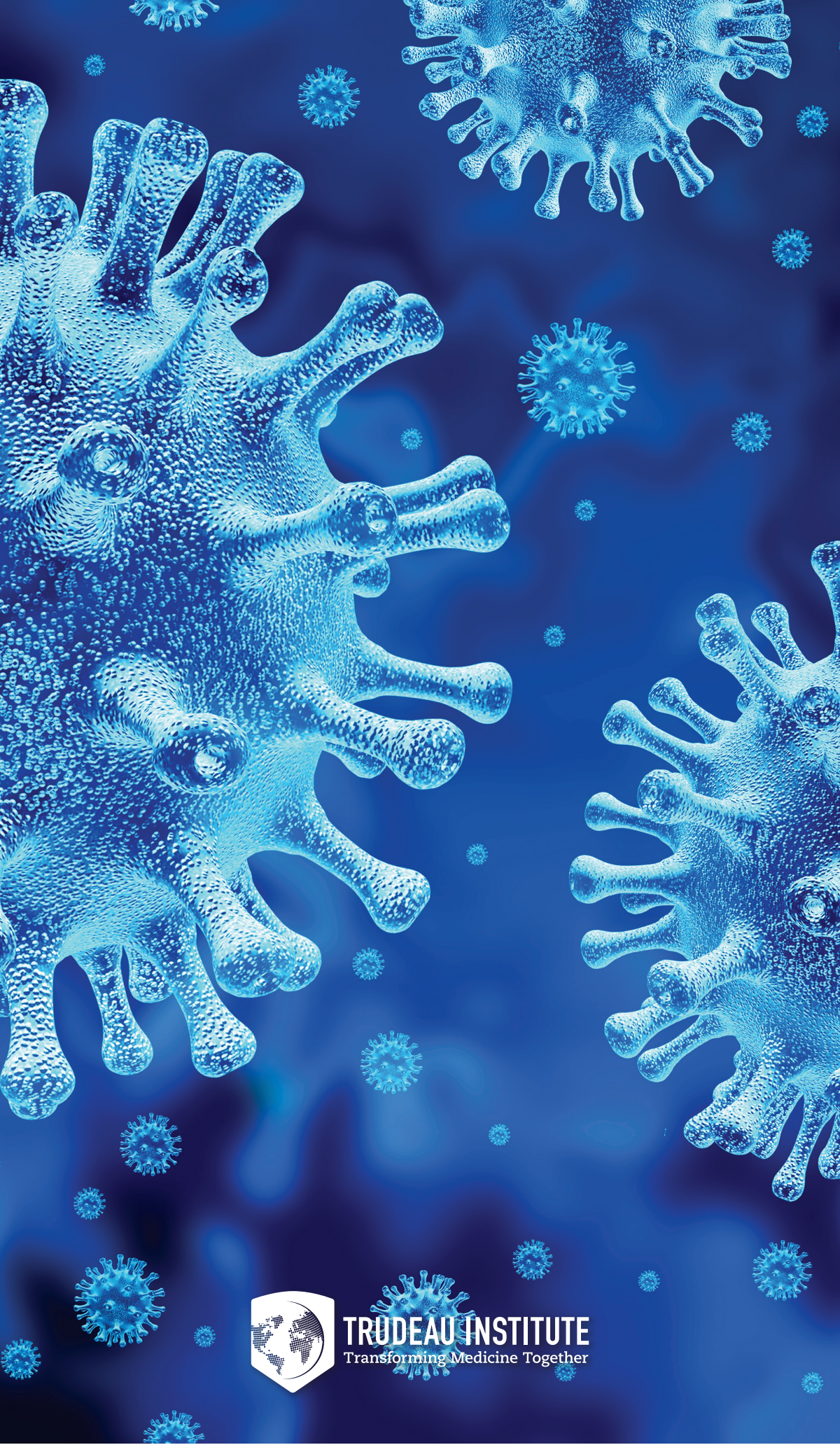
STATEMENT OF FINANCIAL POSITION

FISCAL YEARS ENDED DECEMBER 31

ASSETS	**2021**	**2020**
Cash & cash equivalents	$921,255	900,004
Investments, at fair value	12,664,496	12,191,384
Grants receivable	1,001,011	1,510,786
Other assets	695,122	843,348
Property, plant and equipment, net	13,378,267	14,050,607
Funds held in trusts	4,252,470	3,989,250
TOTAL ASSETS	**32,912,621**	**33,485,379**
LIABILITIES		
Accounts payable and accrued expenses	$344,575	343,223
Deferred revenue	20,036	22,156
TOTAL LIABILITIES	**364,611**	**365,379**
NET ASSETS		
Unrestricted:		
Available for operations	$21,503,505	22,177,631
Designated by the Board for Edward C. Brewster Fund	4,000,000	4,000,000
Total unrestricted	25,503,505	26,177,631
Temporarily restricted	243,108	404,192
Permanently restricted:		
Endowments	1,444,261	1,444,261
Funds held in trusts	4,252,470	3,989,250
Francis B. Trudeau Chair	1,104,666	1,104,666
Total permanently restricted	6,801,397	6,538,177
TOTAL NET ASSETS	**32,548,010**	**33,120,000**
TOTAL LIABILITIES AND NET ASSETS	**32,912,621**	**33,485,379**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