FALL NEWSLETTER

CMP | Cellular & Molecular Pathology

2020

Faculty Trainers in the News

CMP Trainer news, from Fall 2019 to Fall 2020, as published in the UW-Madison School of Medicine and Public Health News

Add these local books to your 2020 reading list- Madison magazine

JANUARY 29, 2020
Josh Mezrech, MD

CMP Trainer Dr. Joshua D. Mezrich invites readers into his fascinating life as a transplant surgeon in When Death Becomes Life released in early 2019. Mezrich is an associate professor of surgery in the division of multiorgan transplantation at the University of Wisconsin School of Medicine and Public Health, where he heads an immunology lab. In the book, Dr. Mezrich weaves together the history of transplantation with his own patient stories, offering his perspective as the surgeon during moments that are tragic, beautiful, difficult and awe-inspiring. From the first few who dreamt it a possibility in the 1800s to its status still as science fiction through the 1940s, transplant surgery now happens on a daily basis in today's world.

Mezrich proves that it will never stop being a marvel of modern medicine while simultaneously revealing the very human side of the surgeons who help create life from death. He wraps his stories with appreciation for the human condition and how one death becomes meaningful and powerful through its ability to help others. Trainer Josh Mezrich was not gifted just with the hands and mind of a surgeon, but also the talent of a thoughtful storyteller.

RESEARCH UPDATES

McArdle researchers suggest that skin might be more important to metabolic diseases than we think- McArdle Laboratory for Cancer Research

SEPTEMBER 22, 2019
Caroline Alexander, PhD

Recent discoveries from Caroline Alexander and Ildiko Kasza suggest that skin might be a more important player in metabolism than previously understood. Loss of heat through skin, predominantly by evaporation, may throw a metabolic switch that determines whether mammals lay down body fat and become obese. Their paper was recently published in the Journal of Molecular Metabolism on July, 2019.

"Given that the skin is the most accessible and therefore druggable organ in the mammalian body, its potential for modifying health outcomes waits to be tapped," noted the authors.

To understand the physics of heat loss and its potential impact on energy balance, Kasza and Alexander drew expertise from all around the University of Wisconsin-Madison campus, including the engineers at the Space Science Engineering Center, who study surface heat images on a global scale.

"These are early days," said Alexander, adding, "our studies are turning to human subjects, who show dramatic differences in the amount of fat associated with their skins. We are testing whether this determines our susceptibility to becoming obese, or developing other diseases, including cancer."

With new study results, Stratatech to seek federal approval for its skin tissue for burn treatment- Wisconsin State Journal

SEPTEMBER 29, 2019
Lynn Allen-Hoffmann, PhD

Burn wounds treated in a clinical trial with skin tissue made by the Madison company Stratatech mostly healed well and rarely required patient skin grafts, findings that will spur an application for federal approval next year, the company said. Stratatech founder Lynn Allen-Hoffmann is senior vice president, regenerative medicine, for parent company Mallinckrodt Pharmaceuticals.

In a phase 3 study at 12 burn centers, 71 patients with deep second-degree burns received StrataGraft on one area of a burn injury and an autograft on a similarly burned site. After three months, 83% of burn wounds treated with StrataGraft tissue were closed, compared to 86% of wounds treated with autografts, Mallinckrodt said. Mallinckrodt plans to submit a biologics license application to the Food and Drug Administration during the first half of 2020, the company said.

The 12 study sites included UW Hospital. Stratatech, formed in 2000, is based on research from the UW-

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Madison lab of Lynn Allen-Hoffmann, a pathologist.

"The positive top-line results of the Phase 3 trial suggest that this investigational regenerative tissue, if approved, could provide burn surgeons with an alternative treatment option for deep partial-thickness burns," Dr. James H. Holmes IV, a leader of the study, said in a statement.

UW–Madison and UW Health quickly launch a number of COVID-19 clinical trials- UW Madison

JUNE 24, 2020
David Andes, MD

As the outbreak of the novel coronavirus that causes COVID-19 was deemed a pandemic, research institutions across the United States rapidly shifted focus to studies aimed at understanding the virus and finding treatments. The University of Wisconsin School of Medicine and Public Health is among them and has responded to the demand.

Among the latest clinical trials is a study conducted in partnership with the pharmaceutical company Novartis examining the potential for an existing drug called ruxolitinib to treat a serious and often deadly complication of a COVID-19 infection called cytokine storm. Locally, the study is being led by David Andes, professor of medicine in the infectious disease division at SMPH.

The Novartis trial, conducted in partnership with the pharmaceutical company Incyte, is a placebo-controlled treatment study with a drug that inhibits the JAK/STAT pathway, which is a channel of communication between proteins in a cell, Andes says.

"It is thought this treatment may prevent or treat the same syndrome that is linked to multisystem organ failure in a subset of patients with COVID-19," he says.

UW COVID-19 Research

Madison start-up testing tissue clusters for hormone treatments in pets, people- Wisconsin State Journal

FEBRUARY 21, 2020
Craig Atwood, PhD

A Fitchburg company based on research by a UW-Madison gerontologist has created three-dimensional tissue clusters derived from stem cells that can produce ovarian and testicular hormones. The development could help regenerate and replace hormone-producing tissues and reverse the natural decline of sex hormones from aging, the company, JangoBio, said in a statement. JangoBio is based on research by CMP Trainer Craig Atwood, an associate professor of medicine at UW-Madison. He is the company's CEO.

The company stated that human clinical trials could begin by next year. Though the organoids would be created from people's own cells, they would be modified in the lab, a process that requires approval by the Food and Drug Administration. If proven safe and effective in people, the hormones could help prevent menopause and male andropause, tied to unusually low testosterone levels, JangoBio said.

Plasma from recovered COVID-19 patients tested as therapy at UW Health- UW Madison

APRIL 13, 2020
Allan Brasier, MD

A COVID-19 patient at UW Hospital has received the first transfusion of plasma from a local patient who donated it since recovering from the disease.
Rapidly developing and launching the COVID-19 clinical trial required close collaboration between SMPH, UW Health, the UW Institute for Clinical and Translational

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Research, and local partners including Exact Sciences, which is providing the COVID-19 tests required of all potential plasma donors, and the local offices of the American Red Cross, which is extracting, processing and delivering the plasma to UW Hospital. Green Cab and Zerology will provide donors with free transportation for testing and plasma donation.

The trial came together despite the fact that many of the people involved are now working off-site due to the pandemic, says Trainer Allan Brasier, executive director of ICTR. "We have been able to focus on rapidly enabling this study while ensuring the safety of our participants, providers and researchers remains paramount."

Teams from Wisconsin, New York search for molecular clues to defeat COVID-19- UW Madison

APRIL 27, 2020

Josh Coon, PhD

In the center of the COVID-19 pandemic, hospitals are racing to maintain quality care for patients with severe disease while facing a shortage of resources and limited understanding of the novel coronavirus.

One physician on the front lines — Ariel Jaitovich, a pulmonary and critical care physician at the Albany Medical Center in New York — sought out a collaboration with investigators at the Morgridge Institute for Research and the Department of Biomolecular Chemistry at the University of Wisconsin School of Medicine and Public Health (SMPH) to better understand the molecular profile of COVID-19 and provide insights that may improve treatment.

Jaitovich reached out to Morgridge investigator, SMPH professor, CMP Trainer, and mass spectrometry expert Josh Coon to help because, he says, "Josh runs one of the most sophisticated and advanced labs to investigate proteins."
Coon leads the Laboratory for Biomolecular Mass Spectrometry at UW–Madison and had been looking for a way to leverage his lab's technology to help with the pandemic.

The technology allows scientists to identify different compounds and better understand their properties. Coon says it may help them identify molecular signals that might distinguish a mild case from a severe case.
"Can we stratify those patients based on those molecular measurements and help predict what an outcome might be? I think those are the overall goals: to really try to understand what's happening at a molecular level," Coon says.

Ant armor may provide insight into mineral formation- UW Madison

JULY 8, 2020

Cameron Currie, PhD

A possible clue to how one common but hard-to-synthesize mineral forms has shown up in an unlikely place, thanks to collaboration between bacteriology and geoscience labs at UW–Madison.

Geoscience graduate student Yihang Fang studies how the mineral dolomite forms. The newest method that Fang will explore was inspired by a collaboration between CMP Trainer Cameron Currie's bacteriology lab at UW–Madison and professor Huifang Xu's geoscience research group. When researchers in the Currie lab noticed crystals growing on the leaf-cutter ants they study, they sent samples to Xu's research group to identify the mineral. It turned out to be high-magnesium calcite that could also provide insights on dolomite formation.

Pinning down the mechanisms that help dolomite form can aid geoscientists in learning more about the formation of Earth itself. For instance, areas with lots of dolomite formations could show where large amounts of surface water existed following an ice age if that dolomite formed through precipitation.

Getting personal with pancreatic cancer - Morgridge Institute for Research

APRIL 9, 2020

Dustin Deming, MD

Survival rates remain bleak for pancreatic cancer, which kills more than 90 percent of people within the first five years of diagnosis. Medical engineer Melissa Skala has teamed with UW-Madison cancer researcher and CMP Trainer Dr. Dustin Deming to devise more patient-specific and precise treatment improvements,

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by measuring a tumor's metabolic response to different drugs.

Cells carrying Parkinson's mutation could lead to new model for studying disease- UW Madison

FEBRUARY 27, 2020

Marina Emborg, MD, PhD

Parkinson's disease researchers have used gene-editing tools to introduce the disorder's most common genetic mutation into marmoset monkey stem cells and to successfully tamp down cellular chemistry that often goes awry in Parkinson's patients. The edited cells are a step toward studying the degenerative neurological disorder in a primate model, which has proven elusive.

The researchers used a version of the gene-editing technology CRISPR to change a single nucleotide — one molecule among more than 2.8 billion pairs of them found in a common marmoset's DNA — in the cells' genetic code and give them a mutation called G2019S.

"We know now how to insert a single mutation, a point mutation, into the marmoset stem cell," says CMP Trainer Marina Emborg, professor of medical physics and leader of University of Wisconsin–Madison scientists who published their findings Feb. 26 in the journal Scientific Reports. "This is an exquisite model of Parkinson's. For testing therapies, this is the perfect platform."

"We found no differences in viability between the cells with the truncated kinase and normal cells, which is a big thing. And when we made neurons from these cells, we actually found an increased number of branches," Emborg says. "This kinase gene target is a good candidate to explore as a potential Parkinson's therapy."

Deleting a gene prevents Type 1 diabetes in mice by disguising insulin-producing cells- UW Madison

MARCH 26, 2020

Feyza Engin PhD

Removing a gene from the cells that produce insulin prevents mice from developing Type 1 diabetes by sparing the cells an attack from their own immune system, a new UW–Madison study shows. People with Type 1 diabetes make little or no insulin, a hormone necessary to make energy from the sugar in their blood. At an early stage in the disease, their immune system's frontline soldiers, called T cells, incorrectly identify insulin-producing beta cells as a threat and kill them, leading to complete insulin deficiency. Type 1 diabetes afflicts as many as 20 million people around the world, contributing to glaucoma, nerve damage, high blood pressure and stroke. In the U.S., it shortens life expectancy by more than a decade.

Two drugs being tested in clinical trials for Type 1 diabetes target the stress response of beta cells — including a drug whose efficacy CMP Trainer Dr. Feyza Engin discovered in mice while working at Harvard University. Her lab's new findings could help guide the way candidate diabetes drugs in clinical trials are used or help create new therapies. And they may have a similar effect in other auto-immune disorders — like arthritis, lupus and multiple sclerosis — in which a particular cell type's activity draws dysfunctional immune attention.

"We've found a very important time point where de-differentiation helps greatly reduce the immune cells' diabetogenic activity," Engin says. "If you can determine an appropriate cell targeted by auto-immune response, and make those victim cells less functional, less mature in the beginning, maybe they can avoid their role in the progress of other diseases, too."

The new era of living with AIDS- Wisconsin National Primate Research Center

DECEMBER 1, 2019

David Evans, PhD

While AIDS is still lethal for those who cannot afford or are otherwise not receiving life-saving medicines, a rapidly growing number of people are finally able to describe their illness as a chronic condition versus a death sentence.

HIV scientists, including those at the Wisconsin National Primate Research Center (WNPRC), have spent their careers seeking major preclinical advances. Without three decades of basic research aimed at understanding the shapeshifting, complex, and insidious AIDS virus in humans, as well as in rhesus macaques, whose immune

systems are analogous to humans, we would not be where we are today.

The WNPRC AIDS research and vaccine development program, based at the UW–Madison AIDS Vaccine Research Laboratory for the past 15 years, has never been stronger according to WNPRC Associate Director of Research Services and CMP Trainer David Evans. One-third of the WNPRC total research portfolio is HIV/AIDS related grants, Evans shared in an October presentation at the center. He said this translates to current annual funding of $5.6 million, 16 investigators, and many more monkeys sticking around after test vaccine treatments due to the more effective therapies being researched.

David Evans's research is among key studies funded by the National Institutes of Health–National Institute for Allergy and Infectious Diseases (NIH-NIAID) and supported by core WNPRC resources and expertise. His study focuses on Fcgamma receptor-mediated suppression of immunodeficiency virus replication, KIR and MHC class immunogenetics in SIV infection.

UW researchers devise approach to treat rare, incurable form of blindness- UW Madison

AUGUST 5, 2020

David Gamm, MD, PhD

Best vitelliform macular degeneration, or Best disease, is an inherited eye condition that typically leads to blindness over the course of a few decades. The disease can be caused by more than two hundred mutations in the BEST1 gene. A paper chronicling the research, co-led by CMP Trainer David Gamm, MD, PhD, professor of ophthalmology and visual sciences in the School of Medicine and Public Health, was published online July 23 in the American Journal of Human Genetics.

"People with Best disease have a wide range of mutations that can affect different parts of the protein, all of which were thought to require complex, individualized gene therapies to fix them," Gamm said. "We found that many of these mutations were actually very sensitive to a broader gene therapy method that is already established for other retinal diseases."

"We were able to reverse the disease in all the cell lines using one method or the other," Gamm said. "We were also able to determine which mutations were likely to respond to the first-line gene augmentation strategy, and which would be better served with the second-line gene editing approach."

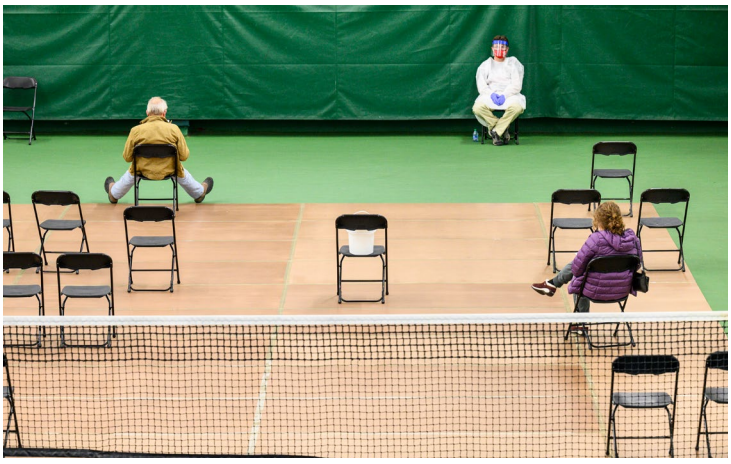
"Our findings also could be applicable to some dominant genetic mutations that affect tissues elsewhere in the body," he said. "It's very exciting."

Nanoparticle system captures heart-disease biomarker from blood form in-depth analysis- UW Madison

AUGUST 6, 2020

Ying Ge, PhD

Researchers at the University of Wisconsin–Madison have developed a method combining sticky nanoparticles with high-precision protein measurement to capture and analyze a common marker of heart disease to reveal details that were previously inaccessible. The new method, a system known as nanoproteomics, effectively captures and measures various forms of the protein



COVID-19 testing replaces tennis at Nielsen Tennis Stadium

cardiac troponin I, or cTnI, a biomarker of heart damage currently used to help diagnose heart attacks and other heart diseases. An effective test of cTnI variations could one day provide doctors with a better ability to diagnose heart disease, the leading cause of death in the U.S

CMP Trainer Ying Ge and her colleagues led the work, which was published Aug. 6 in the Journal Nature Communications. The researchers now plan to use their new method to associate the various forms of cTnI with specific heart diseases as a step toward developing a new diagnostic test.

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While this is still a proof-of-concept study and more research will be needed, it is this ability to associate a pattern of cTnI variations with heart health that the researchers hope could one day produce a new diagnostic tool to help when patients come to the hospital with suspected heart disease. The researchers have filed a patent application on the new technology through the Wisconsin Alumni Research Foundation.

Molds damage the lung's protective barrier to spur future asthma attacks- UW Madison

MARCH 16, 2020
Bruce Klein, MD

University of Wisconsin–Madison researchers have identified a new way that common Aspergillus molds can induce asthma, by first attacking the protective tissue barrier deep in the lungs.

CMP Trainer Dr. Bruce Klein and colleague Darin Wiesner published their findings March 3 in the journal Cell Host and Microbe. They collaborated with researchers at the University of Chicago, University of Minnesota and Harvard Medical School to complete the work.

"Aspergillus is ubiquitous, it's everywhere, and we're inhaling spores with every breath we take," says Klein. The team set out to understand how these otherwise harmless molds sensitize some individuals to develop a strong, asthmatic response to their spores.

"Previous drug trials have had disappointing results, but those have really been sledgehammer approaches where they just administer calcium channel blockers that would block every calcium channel in the airway," says Wiesner. "Here, we suggest that targeting those drugs to a specific cell could give the specificity needed to just target the detrimental over-response that leads to asthma."

Brain parasite may strip away rodents' fear of predators—not just of cats- American Association for the Advancement of Science

JANUARY 14, 2020
Laura Knoll, PhD

Toxoplasma gondii exerts a strange sort of mind control on rodents: Once infected with the brain parasite, they seem to lose their fear of cats and become more likely to get eaten. When ingested, the microbe can make its way into the host's intestine to reproduce. A new study argues that T. gondii's effects on rodents aren't cat specific; instead, the parasite simply makes mice more eager to explore and less fearful *of any* species that may eat them.

Sexual reproduction may depend on the cat, but the parasite is transmitted any time an animal eats infected prey. A generally bold, curious mouse is "more likely to be out and about and get eaten. And every time it's eaten—whether it's by a fox or a bobcat—*T. gondii* does get passed on.", says CMP Trainer Laura Knoll.

Knoll's team recently published a method to get *T. gondii* to reproduce in laboratory mice. Like that study, she says, this new one supports the idea that "there's nothing that special about the cat."

Study shines light on spread of *Candida auris*- ScienceDaily

MARCH 16, 2020
Jeniel Nett, MD, PhD

Candida auris is capable of forming high burden biofilms, which may help explain why this fungal pathogen is spreading in hospitals worldwide, according to a study published this week in an open-access journal of the American Society for Microbiology.

"With these findings, we are able to have new tools to examine how *Candida auris* forms biofilms and spreads in this setting. Understanding more about this process could help us develop new strategies to prevent biofilm formation," said CMP Trainer Jeniel Nett, MD, PhD, the study's principal investigator and assistant professor in the Departments of Medicine and Medical Microbiology & Immunology at the University of Wisconsin School of Medicine and Public Health. "Our tools can be used to determine how the biofilms are formed, which may lead to new strategies to prevent the transmission of or pharmaceutically target *Candida auris.*"

The researchers said their next steps are to further develop their model and examine *Candida auris* growth

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to determine some of the triggers for how *Candida* forms biofilms. "I was surprised that *Candida auris* formed such a condensed biofilm in this skin setting, as other species did not," said Dr. Nett. "We hypothesized that *Candida auris* may have a capacity to replicate in this environment, but we didn't expect it would be tenfold greater than the other *Candida* species."

Beauty sustains a pandemic world

Simpler COVID-19 test could provide results in hours from saliva- UW Madison

AUGUST 6, 2020

Thomas Friedrich, PhD & David O'Connor, PhD

Volunteers at four sites in Madison are being tested for the virus that causes COVID-19 by spitting in a vial, which may prove faster, cheaper and less complicated than other common tests, according to University of Wisconsin–Madison researchers.

With support from a National Institutes of Health grant program that hopes to expand testing in the United States by fall, the researchers have collected hundreds of samples from volunteers at three UW–Madison sites and a local elementary school. The tests were completed in hours, a stark contrast to common wait times of several days or even weeks for results from other kinds of COVID-19 tests.

"This sort of testing, if it is successful and can be expanded, offers hope that schools and workplaces could receive rapid turnaround testing to assist in the complex decision of managing education during the outbreak with a test that is still sensitive enough to catch the people who are contagious, but exceptional in terms of accessibility, cost, and turnaround time" says CMP Trainer David O'Connor, professor at the UW School of Medicine and Public Health.

"We're exactly envisioning this as a solution for schools or workplaces where you want to screen people for the potential that they are contagious," said CMP Trainer Thomas Friedrich. Friedrich says campuses across the country are working on different versions of these testing designs, with each racing to figure out whose test will be the most feasible and accurate. He's expecting the trials at UW to continue for the next few weeks, but if all goes well, there could be something widely available this fall. "That would be the goal," Friedrich said. "Hopefully we can roll this out more widely over the next few months if everything works out here."

The researchers have run more than 400 tests, finding two positive cases and one that may be a false positive. Each result — positive and negative, save the potential false positive — has been confirmed later by checking the saliva sample with the clinical-lab-standard PCR testing. Because this test (RT-LAMP) is not yet approved for clinical diagnosis of COVID-19 infection, the researchers have UW Hospital and Clinics doctors contact volunteers who tested positive and advise them to get a PCR test as soon as possible.

UW Study: Hmong people genetically more vulnerable to blastomycosis, a rare fungal disease- Wausau Daily Herald

SEPTEMBER 3, 2019

Caitlyn Pepperell, MD

A recent study from the University of Wisconsin-Madison School of Medicine and Public Health research team led by CMP Trainers Dr. Caitlin Pepperell and Dr. Bruce Klein, has found a specific genetic variation among Hmong people that makes them more likely than those of European heritage to get sick from blastomycosis.

Pepperell and the research team used algorithms to narrow down genetic differences between Hmong people and those from European descent that could explain Hmong susceptibility to blastomycosis. They weren't surprised when they found such differences, "but I think we were surprised by the clarity of the signal," Pepperell said, meaning the results were obvious and directly had an impact on the particular problem the team was studying. Sometimes, Pepperell said, the results of genome testing aren't so clear cut.

The discovery also was part of "research made possible by more affordable sequencing technologies," she said. "I think this whole line of research will allow us to provide much more precise disease prevention and treatment."

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Tiny capsules packed with gene-editing tools offer alternative to viral delivery of gene therapy- UW Madison

SEPTEMBER 9, 2019

Krishanu Saha, PhD & Masatoshi Suzuki, PhD, DVM

New tools for editing genetic code offer hope for new treatments for inherited diseases, some cancers, and even stubborn viral infections. But the typical method for delivering gene therapies to specific tissues in the body can be complicated and may cause troubling side effects.

Researchers at the University of Wisconsin–Madison have addressed many of those problems by packing a gene-editing payload into a tiny, customizable, synthetic nanocapsule. They described the delivery system and its cargo today (Sept. 9, 2019) in the journal *Nature Nanotechnology*.

"Editing the wrong tissue in the body after injecting gene therapies is of grave concern," says Trainer Krishanu Saha, also a UW–Madison biomedical engineering professor and steering committee co-chair for a nationwide consortium on genome editing with $190 million in support from the National Institutes of Health. "If reproductive organs are inadvertently edited, then the patient would pass on the gene edits to their children and every subsequent generation."

This project is a collaboration combining UW–Madison expertise in chemistry, engineering, biology and medicine. CMP Trainer and comparative biosciences professor Masatoshi Suzuki, pediatrics and ophthalmology professor Bikash R. Pattnaik, and their teams worked to demonstrate gene editing in mouse eyes and skeletal muscles, respectively, using the nanocapsules.

The team aims to further optimize the nanocapsules in ongoing research for efficient editing in the brain and the eye.

Memorial Union Terrace Spring 2020

National pandemic study includes state families- Wisconsin Public Radio

MAY 10, 2020

Christine Seroogy, MD & James Gern, MD

One of the many mysteries about the new Coronavirus is what role children play in the pandemic. A federal government study, which will include roughly 300 families from Wisconsin, hopes to answer questions about how many children get infected, whether they develop symptoms and how it affects those with asthma. It is part of the National Institutes for Health (NIH) which is funding the study announced Monday called the Human Epidemiology and Response to SARS-CoV-2 (HEROS) study.

The research aims to rapidly enroll 6,000 families across the United States. Two of the 11 cities involved are Marshfield and Madison. The others are Nashville, New York, Boston, Baltimore, Washington, D.C., Cincinnati, Denver, Detroit and St. Louis.

The HEROS coronavirus study builds on the research from the Wisconsin Infant Study Cohort (WISC), co-investigated by CMP Trainers Drs. Christine Seroogy and James Gern, by trying to find out whether kids with asthma have a different risk than those who don't if they come down with COVID-19.

UW begins plasma transfusion treatments for COVID-19 patients- The Badger Herald

APRIL 28, 2020

Marulasiddappa Suresh, DVM, MVSc, PhD

A COVID-19 patient at the University of Wisconsin Health University Hospital received plasma transfusions from an individual who recovered earlier this month as part of an ongoing nationwide effort to explore treatment options while doctors await the discovery and mass-production of a vaccine.

UW professor of immunology, viral infections expert, and CMP Trainer Dr. Marulasiddappa Suresh said significant health risks are associated with blood transfusions if done improperly, including the development of a condition which renders plasma recipients more susceptible to coronavirus infections.

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"One major risk is the possibility of acquiring other infections from the donor plasma," Suresh said. "Other risks are possible reactions of the patient to the transferred plasma. Another possibility is that antibodies might enhance virus infection by a phenomenon called antibody-dependent enhancement."

Suresh said in conjunction with widespread efforts to implement plasma transfusions, medical experts are exploring medicinal remedies for the potentially lethal symptoms of COVID-19, including Hydroxychloroquine.

"Hydroxychloroquine and Remdesivir are used as antivirals to help patients fight the infection," Suresh said. "Recent promising evidence suggests that the anti-viral drug Remdesivir might be helpful in treating COVID-19."

UW Researchers study COVID-19 coronavirus to try to develop treatments, vaccines- Wisconsin State Journal

MARCH 23, 2020

Adel Talaat, MVSc, PhD

In his UW-Madison lab, Adel Talaat developed an experimental vaccine to protect chickens from coronavirus. When the pandemic of a different strain arose in people late last year, Talaat used his technique to create a vaccine candidate for humans.

Talaat's human vaccine, for which tests began last month in mice, is a long way from approval. Several types of studies would be needed to get approval, and many vaccine candidates don't make it. But Talaat is optimistic his approach might help with the COVID-19 pandemic, which health officials say could continue for quite a while.

"Hopefully, we'll be able to get a good vaccine so we can help with this outbreak," he said.

Parasitic worms use their keen senses to wriggle through their hosts- UW Madison

JULY 10, 2020

Mostafa Zamanian, PhD

Parasitic filarial nematodes infect hundreds of millions of people, causing diseases such as river blindness and lymphatic filariasis, which can lead to elephantiasis, a severe swelling of the limbs. In new research, University of Wisconsin–Madison scientists provide the first look at the genetic underpinnings of the worms' migration through their hosts.

"We're hopeful that a better understanding of how worms are transmitted between hosts and move within them may lead to new approaches for parasite treatment and control," says CMP Trainer Mostafa Zamanian, a professor of pathobiological sciences in the UW–Madison School of Veterinary Medicine and senior author of the report. The work was published in June in the journal PLOS Biology.

There are effective treatments against filarial parasites, but the complex drug regimens have potentially severe side effects, and the nematodes have developed drug resistance. There is also growing evidence that sensory systems play an important role in how parasites respond to existing antiparasitic drugs. A better understanding of how the worms detect chemical signatures and find their way within hosts could one day help researchers disrupt these critical migrations, potentially bolstering treatment.

"This is a starting point." says a Zamanian Lab team representative.

UW staff working to protect our campus

Congratulations to Faculty Trainers

CONGRATULATIONS TO FACULTY TRAINERS:

Faculty receive WARF, Kellett, Romnes awards- UW Madison

MAY 12, 2020

Emery Bresnick, PhD, Anna Huttenlocher, MD & Wei Xu, PhD

Thirty-two members of the University of Wisconsin–Madison faculty have been awarded faculty fellowships for 2020-2021. CMP Trainers Emery Bresnick and Anna Huttenlocher were among the eleven faculty appointed to WARF Named Professorships. The awards, which come with $100,000, honor faculty who have made major contributions to the advancement of knowledge, primarily through their research endeavors, but also as a result of their teaching and service activities.

Emery H. Bresnick is director of UW¬–Madison Blood Research Program and co-director of the Cancer Genetic/Epigenetic Mechanisms Program of the Carbone Cancer Center. His research led to the discovery of new paradigms of blood stem- and progenitor-cell development and function, as well as human disease diagnostic strategies.

Anna Huttenlocher conducts research at the interface of cell biology and immunology. Her recent work centers on understanding innate immune inflammation, how cell migration is regulated during tissue damage and repair, and how it's altered in human disease. Her lab has pioneered approaches to see cells in motion within live organisms and discovered previously unknown mechanisms underlying inflammation.

CMP Trainer Wei Xu, professor of oncology in the McArdle Laboratory for Cancer Research, is noted for uncovering the functions of arginine methyltransferases and hormone receptors in regulating aberrant gene expression in cancer cells. Xu was one of eleven faculty awarded the H.I Romnes Faculty fellowship, which awards faculty (up to six years past their first promotion to a tenured position) $60,000 that may be spent over five years. Her research provides critical insights into how breast cancer develops and approaches to treating it.

24 faculty honored with Vilas professorships and awards- UW Madison

JULY 12, 2020

CMP Trainers Mark Burkand, MD, PhD, Thaddeus Golos, MS, PhD, Dudley Lamming, PhD, Peter Lewis, PhD, & Rupa Sridharan , PhD

Extraordinary members of the University of Wisconsin–Madison faculty have been honored during the last year with awards supported by the estate of professor, U.S. senator and UW Regent William F. Vilas (1840-1908).

CMP trainers Dr. Mark Burkand and Rupa Sridharan were selected to receive the Vilas Faculty Mid-Career Investigator Award, recognizing research and teaching excellence. The award provides flexible research funding for three years.

Trainer Thaddeus Golos, of Comparative Biosciences, was one of seven professors to be named to Vilas Distinguished Achievement Professorships, an award recognizing distinguished scholarship as well as standout efforts in teaching and service. The professorship provides five years of flexible funding — two-thirds of which is provided by the Office of the Provost through the generosity of the Vilas trustees and one-third provided by the school or college whose dean nominated the winner.

CMP Trainers Dr. Dudley Lamming and Peter Lewis were two of six faculty to receive the Vilas Faculty Early Career Investigator Award, which recognizes research and teaching excellence in faculty who are relatively early in their careers. The award provides flexible research funding for three years.

UW Health: The Wisconsin Lions, Lions Clubs International and MACC Fund donate $200,000 to American Family Children's Hospital- Wisbusiness

FEBRUARY 10, 2020

Christian Capitini, MD, Mario Otto, MD, PhD, and Paul Sondel, MD, PhD

The Lions Club of Wisconsin, Lions Clubs International Foundation and Midwest Athletes Against Childhood Cancer, Inc. donated $200,000 to the American Family Children's Hospital to purchase a Flow Cytometer—a

Congratulations to Faculty Trainers

machine used to analyze cells for cancer immunotherapy and other forms of cancer treatment. Immunotherapy is a cancer treatment that uses the immune system to help fight cancer.

The University of Wisconsin Carbone Cancer Center has a Flow Cytometer available for all researchers in the core facility, but now pediatric cancer researchers have their own equipment available machine, which is located in their own lab space.

UW's pediatric cancer program is known for its innovative clinical trials and applied anti-cancer immunotherapies for children with cancer. The University of Wisconsin Carbone Cancer Center and American Family Children's Hospital dream team members are Dr. Ken DeSantes and CMP Trainers Christian Capitini, Paul Sondel, and Mario Otto. All are pediatric cancer physician researchers.

UW cancer researchers awarded more than $400,000 from 'The Ride"- NBC 15

JANUARY 29, 2020
Evie Carchman, MD & Deric Wheeler, PhD

More than $400,000 was awarded to scholars and their labs for cancer research months after The Ride concluded in Southern Wisconsin. The cycling event benefits cancer research and programs at UW-Madison.

"It's gratifying to see how invested the community is in our mission of advancing cancer research and to see consistent growth of this event in terms of dollars raised and the number of riders, donors, and volunteers," says CMP Trainer Dr. Deric Wheeler, Director of The Ride and Associate Professor of Human Oncology at the UW School of Medicine and Public Health.
The Ride's Scholar Class of 2019 includes CMP Trainer Evie Carchman, MD, FACS, who is studying the use of HIV drugs to prevent or treat HPV-associated cancers.

Disinfecting tables, now a routine duty

"These efforts are having a real impact," said Wheeler. "Funding from The Ride is enabling UW researchers to launch projects that might not have been possible otherwise. All these projects have the potential to lead to novel approaches in cancer therapy."

Wisconsin partnership program announces $2.7 million in grants in response to COVID-19- UW Madison

MAY 1, 2020
Miriam Shelef, MD, PhD

The Wisconsin Partnership Program at the UW School of Medicine and Public Health has announced 22 new awards totaling $2.7 million to researchers and community organizations across Wisconsin for their efforts to lessen the impact of COVID-19.

CMP Trainer Miriam Shelef was awarded $150,000 by Wisconsin Partnership Program's Partnership Education and Research Committee.

Her project is to create infrastructure to study, test for and track the COVID-19 virus in Wisconsin. She is working to establish a COVID-19 convalescent tissue biorepository for blood and nasal samples from individuals who have recovered from COVID-19. This will be used in research and to track the prevalence of the coronavirus in south central Wisconsin by collecting discarded plasma from blood donated by patients with no symptoms of COVID-19.

Dr. Judith Smith recognized for immunology research- Department of Pediatrics at University of Wisconsin School of Medicine and Public Health

FEBRUARY 6, 2020
Judith Smith, MD, PhD

CMP Trainer Judith Smith, MD, PhD (Associate Professor, Division of Allergy, Immunology & Rheumatology)

Congratulations to Faculty Trainers

was recently recognized for her ongoing research in immunology and selected for the highly competitive Vilas Associates Award by the University of Wisconsin Office of the Vice Chancellor for Research and Graduate Education. Recipients of the award are chosen by divisional Research Committees and granted a flexible research fund for each of two fiscal years.

CMT Association Grants $335K to Research Projects that Advance Therapy Development- Charcot Marie Tooth News

SEPTEMBER 19, 2019
John Svaren, PhD

The Charcot–Marie–Tooth Association has granted $335,000 to two research projects focused on the development of new therapies for Charcot–Marie–Tooth (CMT) disease type 1A, type 1B, and other demyelinating forms of CMT, including type 4. A grant totaling $154,000 was awarded to a collaboration project between three leading CMT experts, including CMP Trainer Dr. John Svaren.
Their project will focus on the development of two different types of gene therapies. One therapy is designed to shut down the PMP22 gene, which is overactive in people with CMT1A. The second treatment candidate is designed to replace the defective genes responsible for the different forms of CMT4 and CMT1X. The scientists will attempt to come up with safe viral vectors to deliver the modified versions of these genes to Schwann cells — specialized cells that produce the fatty substance (myelin) protecting nerve cells — which are defective in CMT.

The team is planning to test the efficacy of four different types of adeno-associated viruses (AAVs), developed by Gray, to determine the one that could better deliver the modified genes to Schwann cells in cases of CMT1A and CMT1X. The researchers will also test the efficacy of two AAVs in a mouse model of CMT1A.

Research Core Revitalization Program funds upgrades to shared resources on campus- UW Madison

JULY 21, 2020
Xinyu Zhao, PhD

The Research Core Revitalization Program has funded 17 projects that will strengthen campus research core capacities by supporting the upgrade, replacement or duplication of heavily used shared research resources. The funded projects range from upgrading video recording capabilities for intellectual and developmental disabilities research to delivering increased computational speed for the analysis of large biomedical data sets. These projects were among 37 proposals submitted from across campus.

The pilot Research Core Revitalization Program is supported by an investment from the Office of the Vice Chancellor for Research and Graduate Education and the Wisconsin Alumni Research Foundation. Awards range from $20,000 to $300,000.

CMP Trainer Xinyu Zhao, professor of neuroscience and director of the Waisman Center Rodent Behavioral Testing Service, was provided with funding to modernize 6 Key Resources of the Waisman Center Rodent Behavioral Testing Service.

Ying Ge, PhD, receives Biemann Medal, named to Top 100 Analytical Scientist Power List

Dr. Ge's lab studies how cardiovascular diseases affect the modifications of proteins that function as signaling pathways in the body. She views collaboration with other SMPH researchers as essential to success. "In order to achieve precision medicine, it is critical to have an interdisciplinary effort. Fortunately, our lab is located in the highly interdisciplinary WIMR 8th floor cardiovascular center, adjacent to the labs of many cardiovascular investigators - [this] environment stimulates collaborations and cultivates new systems biology approaches for precision medicine."

CMP Welcomes New Trainers

CMP WELCOMES NEW TRAINERS:

Evie Carchman, MD, FACS
Department of Surgery

Research focus: *Anal cancer prevention and treatment. The lab utilizes several preclinical models including spheroid culture and various mouse models of anal cancer to dissect the mechanisms for anal cancer development and progression*

Timothy Kamp, MD, PhD
Department of Medicine

Research focus: *Ion channel proteins in the heart, the coupling of cardiac electrical activity to mechanical contraction, and the molecular mechanisms underlying heart failure*

Anita Bhattacharyya, PhD
Department of Cell and Regenerative Biology

Research focus: *Modeling altered development of the cerebral cortex in neurodevelopmental disorders with human stem cells*

Freya Mowat, PhD, BVSc.
Department of Surgical Sciences

Research Focus: *Outer retinal cell-specific metabolism; Mitochondrial function and morphology in aging; retinal structure and function in response to aging and toxicant exposure*

Huy Dinh, PhD
Department of Oncology

Research Focus: *How does the tumor immune microenvironment (TIME) influence immunotherapy? Can we predict treatment outcomes based on blood-based biomarkers? What is the role of neutrophils in cancer?*

Mariana Pehar, PhD
Department of Medicine

Research Focus: *Understand the molecular mechanisms linking aging to the development of neurodegeneration, with the aim to identify new therapeutic targets for the prevention and treatment of neurodegenerative diseases*

Dhanansayan Shanmuganayagam, PhD
Department of Surgery

Research Focus: *The development and utilization of pigs as homologous models to close the translational gap in human disease research, taking advantage of the overwhelming similarities between pigs and humans in terms of genetics, anatomy, physiology, and immunology*

CMP Student News

REGIONAL, NATIONAL & INTERNATIONAL CONFERENCE ATTENDANCE; AWARDS & PRESENTATIONS, IN THE COVID-19 PANDEMIC YEAR OF 2020

Anil Chokkalla:
Oral presentation at the International Stroke Conference (ISC) held at the LA convention center between 02/18 to 02/21

Caleb Dillingham:
Attended the 2020 Cold Spring Harbor "Germ Cells" Virtual Meeting held from Sept 29th-October 2nd

Phu Duong:
$900 award from The University of Washington to attend a virtual bioinformatic workshop at U Washington's Summer Institutes 2020

Kim Edwards:
Attended the SCRMC Fall Virtual Conference 2020 on September 11th, 2020

Phillip Emmerich:
Presented at Annual AACR Meeting, 2020. June 22-24
Annual ASCO meeting, 2020. May 29-31

Evan Flietner:
Awarded an ASH Abstract Achievement Award for upcoming December 2020 presentation

Olivia Harwood:
Session Convener at Wisc-e-Sota on October 22 & 23, 2020

Margo Heston:
Presented 1 poster, co-authored 1 poster, Alzheimer's Association International Conference (virtual Jul 27-31, 2020
Presented 1 poster, co-authored 1 poster, Trials in Alzheimer's Disease (virtual Nov 4-7, 2020
Attended: Aging and Sleep Conference (Nov 9-12; attended virtually)
Presented 1 poster, Local conference: Alzheimer's Disease and Related Diseases Research Day (Wisconsin Institute for Discovery Mar 5, 2020)

Anna Hoefges:
Attended the advanced immunology course from AAI virtually as well as the story form science course, and used CMP travel competition funds toward the story form science tuition
Presented a poster virtually at the Society for immunotherapy of cancer conference, November 2020

CMP Student News

Rebecca Hutcheson:
Oral presentation "Development of a safe derivative of SARS-CoV-2"
Wisc-E-Sota Symposium 2020
Oct 22-23, 2020
Virtual conference

Andrew Lynch:
Poster presentation: 5th Annual Research Training and Career Development Meeting, March 30-31, 2020
Poster presentation: The Biology of Genomes, May 5-28, 2020. Poster
Poster presentation: ASCB|EMBO CELL BIO Virtual 2020, December 2-16, 2020

Morgan Mann:
Presented a poster "An Integrated Top-Down and Bottom-Up Strategy for Analysis of Bromodomain-containing Protein 4 (BRD4) Mediated Histone Post-Translation Modifications", at the ASMS Reboot 2020 (June 1-12, 2020 virtual conference

Steven Mayerl:
Participated in organization of the Fall 2020 UW Stem Cell and Regenerative Medicine Center Conference

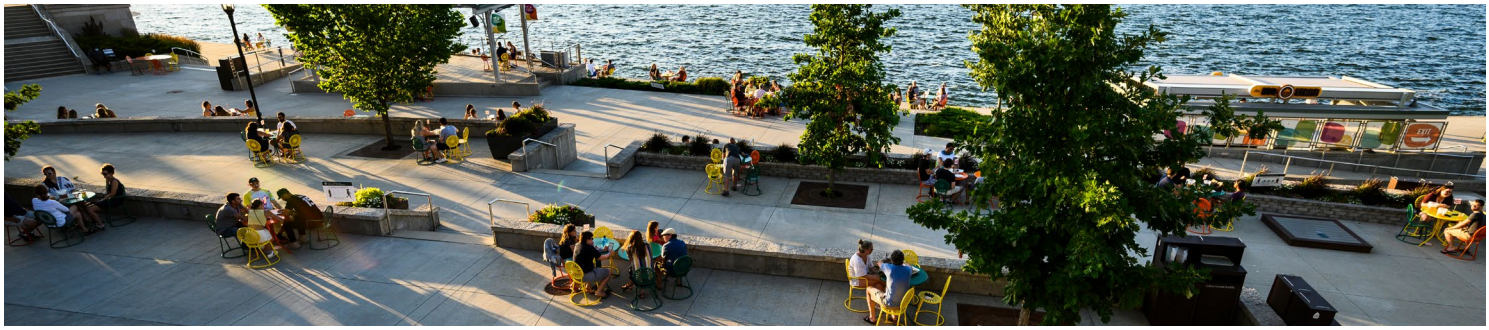
Aisha Mergaert:
Attended American College of Rheumatology conference (ACR) November, 2020. Virtual

Gage Moreno:
Presented a poster at the IAS COVID-19 Conference, July 2020
Published a paper in Nature Communications (https://www.nature.com/articles/s41467-020-19346-z)

Hemanth Potluri:
Poster presentation: AACR (American Association for Cancer Research) June 22-24
Poster presentation: SITC (Society for Immunotherapy of Cancer) November 9-14

Nick Van Sciver:
Oral presentation at the 2020 Wisc-E-Sota virtual symposium

Szu-Tsen Yeh:
Received the Young Innovator Award at the Cutting Edge of Transplantation (CEoT), March 2020
Attended the American Transplant Congress (ATC) 2020 virtually in June



Social distance dining on the terrace

Congratulations to CMP Graduates

Congratulations to CMP Graduates!

Congratulations to our 2020 Graduates as their predoctoral careers come to a successful conclusion. We say goodbye to you virtually in year unlike any we've known - you will be missed. Onward and Upward!

Eli Wallace: Postdoctoral fellow at Tufts University, Boston, MA

Phil Emmerich: Postdoctoral fellow in Dustin Deming Lab, UW Madison

Emily Lynch: Postdoctoral fellow at Washington University, St. Louis, MO

Caitlin Herndon: Postdoctoral fellow at University of Michigan, Dept. of Pathology

John Kernien: Postdoctoral fellow Pepperell Lab, UW Madison

Bryce Wolfe: Research Analyst, Surveillance and Outbreak Support at the Wisconsin Division of Public Health, Bureau of Communicable Disease

Nellie Black: Recently completed postdoctoral fellowship in Dr. Deric Wheeler's lab. – taking some COVID-19 family time

Nicole Lane: Postdoctoral fellow in Lindsay Kalan's lab, UW-Madison. Funded by WiscART T32

CMP Student Awards

- **Kim Edwards**: Randy Wheelock Research Award from the Choroideremia Research Foundation
- **Billy Erazo**: Cellular and Molecular Pathology T32
- **Julia Gambardella**: ICTR TL2 Predoctoral Training Award
- **Margo Heston**: Funding award: ISTAART Student Volunteer Fellowship
- **Michelle Koenig**: Cellular and Molecular Pathology T32
- **Andrew Lynch**: UW Genomic Sciences Training Program T32
- **Steven Mayerl**: SCRMC Graduate Student Training Award/McPherson ERI/David G. Walsh Research Travel Award
- **Ivy McDermott**: Cellular and Molecular Pathology T32
- **Aisha Mergaert**: Hematology T32 Award
- **Gage Moreno**: CIBM T15 training grant
- **Trent Prall**: Cellular and Molecular Pathology T32
- **Kate Ryan**: Cellular and Molecular Pathology T32
- **Kjell Sandstrom**: Cellular and Molecular Pathology T32
- **Ben Wancewicz:** NIH F31 award

CMP T32 Award

Beginning July 1, 2020, the Cellular and Molecular Pathology T32 Grant was funded, under the new NIGMS Molecular Medicine Graduate Training Program with increased slot numbers. We would like to thank all of you for contributing to the renewal and helping CMP. We will continue our work to provide excellence in graduate training and mentoring.

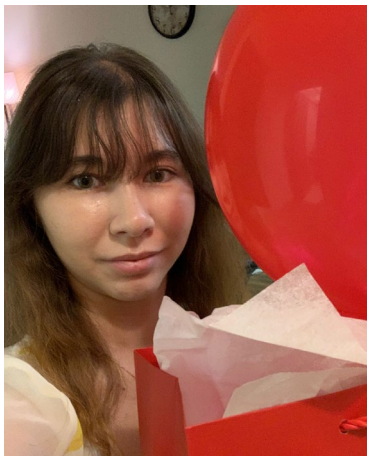
CMP Program News

A HEARTFELT VIRTUAL WELCOME TO OUR 2020 NEW CMP STUDENTS!

New CMP Students receive a delivery during a Pandemic Welcome Week!

***Billy Erazo BS**, Industrial Microbiology, University of Puerto Rico, May 2019*

Interest focus:
Microbial Pathogenesis



***Ivy McDermott, BS**, Molecular/Cellular/Developmental Biology, University of Colorado Boulder, May 2016*

Interest focus:
Immunology

***Joshua Brand BS**, Biology, SUNY Geneseo, December 2017*

Interest focus:
immunology: Infectious Disease/Bioinformatics

***Kaetlyn Ryan, BS**, Biochemistry/Chemical Engineering/Human Biology, North Carolina State University, May 2020*

Interest focus:
Infectious Disease

***Kjell Sandstrom, BS**, Biochemistry, University of Minnesota-Twin Cities, May 2020*
Interest focus: Host/ Pathogen Immunology

***Lauren Sarko, BS**, Biological Sciences, Pennsylvania State University, 2020*
Interest Focus: Stem Cell Development and Regenerative Medicine

***Phoenix Shepherd, BS**, Biology, UW Madison May 2018*

Interest Focus:
Viral Pathogenesis

***Trent Prall, BS**, Genetics, UW Madison December 2014*

Direct Admission:
David O'Connor Lab

CMP Program News

Current students chat with incoming students over Zoom

CMP PROGRAM NEWS

After March 2020 CMP, like all UW Programs, had to rely on virtual formats and email to keep in touch. This August, CMP orientation was held over the course of a week, incorporating online faculty talks, student discussions, independent activities incoming students could do on their own time, and organized graduate school activities. Although this new format wasn't ideal or our preferred method of introduction to the UW and the CMP program, there were aspects that will be utilized in (fingers crossed) 2021 FACE TO FACE new student orientation. We all anxiously await the return of the "normal" academic year and all of our CMP Program activities and friends!