INNOVATEUPSTATE

A NEWSLETTER FROM THE OFFICE OF INDUSTRY RESEARCH

SUMMER 2023

UPSTATE
MEDICAL UNIVERSITY

CONTENTS

WELCOME TO INNOVATE UPSTATE

Quarterly, the Office of Industry Research will include updates, highlights, and activities from across the SUNY Upstate Medical University ecosystem. We are particularly focused on reporting on our expanding industry relationships.

Upstate Medical University's Office of Industry Research (typically known as technology transfer) supports Upstate's Research mission; "to create a world-class research enterprise that supports biomedical research innovation, development, and entrepreneurship." We provide personal and hands-on support to industry and Upstate faculty to advance innovation. The resources of the SUNY Research Foundation (RF) help guide Intellectual Property (IP) and commercialization activities.

FEATURED PHOTO:
An image of kidney tissue taken by the newly-developed Transmission Electron Microscopy (TEM) Core at Upstate. More about the new resource for CNY on page 6.

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DR. THANGAMANI'S PRE-CLINICAL TESTING LAB:

A Beacon of Expertise in Central New York

Driven by a commitment to excellence and with unparalleled expertise in tick-borne disease research, Saravanan Thangamani, PhD a professor of Microbiology and Immunology at Upstate serves as the director of the Upstate Vector Biocontainment Lab, a unique resource in central New York. Dr. Thangamani's laboratory is equipped with BSL-1, -2, and -3 capabilities, a human challenge room for natural disease transmission, and cutting-edge RNA extraction robots that have significantly reduced tick testing time. With these resources at their disposal, the lab plays a pivotal role in pre-clinical testing and can assist pharmaceutical companies in collecting essential data and identifying products that have the potential to progress to human trials.

"Only about 10% of pre-clinical studies will actually move forward [to human trials], but that 90% needs to be identified, right? And that's where we come into play," explains Dr. Thangamani. "I think that it's a niche opportunity. We are positioned in central New York as the only containment lab to offer these services."

Dr. Thangamani highlights his lab's critical role in assuring patients' safety. "I think as scientists, we need to do our due diligence before it goes to humans because, yes, the humans are volunteers at the beginning, but you need to make sure even the volunteers get a product that doesn't give them side effects or unintended effects." By meticulously testing the safety and efficacy of therapeutics and drugs in small animal models, Dr. Thangamani's lab ensures that potential risks and adverse effects are identified and addressed before human trials commence.

The Vector Biocontainment Laboratory's expertise encompasses evaluations of therapeutics and drugs designed to combat viruses, bacteria, and protozoal agents like malaria or babesia. Their capabilities include small animal models, in vitro models, and even arthropod models such as ticks and mosquitoes. This breadth of expertise enables the lab to address a wide range of industry needs and provide comprehensive testing solutions.

His lab's understanding of the intricate nuances of animal models and their ability to accurately mimic human conditions make them an attractive choice for industry partners seeking reliable and relevant pre-clinical testing. "For a particular type of virus, I know exactly what animal model I should give and what kind of dose I should give and where I should be injecting the virus in the animal so that they will mimic human conditions," he explains. "If it doesn't mimic human conditions, there is no point in working with it. That is one reason why people want to come to us, because of that expertise."

Saravanan Thangamani, PhD shows off the human challenge room in the Upstate Vector Biocontainment Laboratory.

Dr. Thangamani acknowledges the significance of their work in the broader context of pharmaceutical development. "We know that what we do is a small but important step for the pharmaceutical companies; we do that foundational decision making. We provide that data so that they can decide; will it be the 10% that goes to humans or is it one of the things that we don't want to waste our time and money on. They can then use their funding and resources in a more efficient way, focusing on what truly matters and triaging what is not essential." The Vector Containment Laboratory is a testament to Dr. Thangamani's expertise and dedication to disease research. With its unique capabilities, state-of-the-art facilities, and profound understanding of animal models, the lab has positioned itself as a prominent institution in Central New York. By offering essential pre-clinical testing services and enabling informed decision-making, Dr. Thangamani's lab plays a vital role in advancing medical science and ensuring the safety and efficacy of future pharmaceutical breakthroughs.

ON THE RISE:

Zetagen is a CNY Biotech Accelerator (CNYBAC) success story; over the last six years as a tenant, they've developed four products and have received two breakthrough device designations from the Food and Drug Administration.

Chief Executive Officer Joe Loy (left) and Chief Scientific Officer Bryan Margulies (right) have been building Zetagen's suite of projects to help patients suffering from metastatic cancers.

"There are advantages to not only the CNYBAC but the location in Syracuse in general," explains Bryan Margulies, PhD and Chief Scientific Officer. "Being in a university area, there's always a lot more access to technologies and to collaborations that wouldn't exist elsewhere."

Founded in 2015, Zetagen Therapeutics, Inc. is a private, clinical-stage, biopharmaceutical company focused on driving breakthrough innovation in the treatment of metastatic cancers to bone and other organs as well as osteologic interventions. Zetagen is focused on helping the more than 620,000 people in the United States, and more globally, living with metastatic cancers. This number is expected to reach more than 690,000 by the year 2025.

Zetagen's ZetaMet™ technology is a first-of-its kind molecular pathway designed to suspend cancer, inhibit pain, and regenerate bone. This novel therapy, a drug delivered by a proprietary carrier to the tumor site, is being developed to resolve metastatic bone lesions, while inhibiting future tumor growth and regenerating bone. ZetaMet™ has successfully passed its preclinical trials and is being prepared for its first human clinical trial.

"We are appreciative of our relationship with CNYBAC. We've expanded within the Accelerator, and they've supported us in defining the space we needed to meet our needs." CEO Joe C. Loy credits the CNYBAC with helping allow Zetagen to continue their growth as they have expanded their company and continued their innovative work in Central New York.

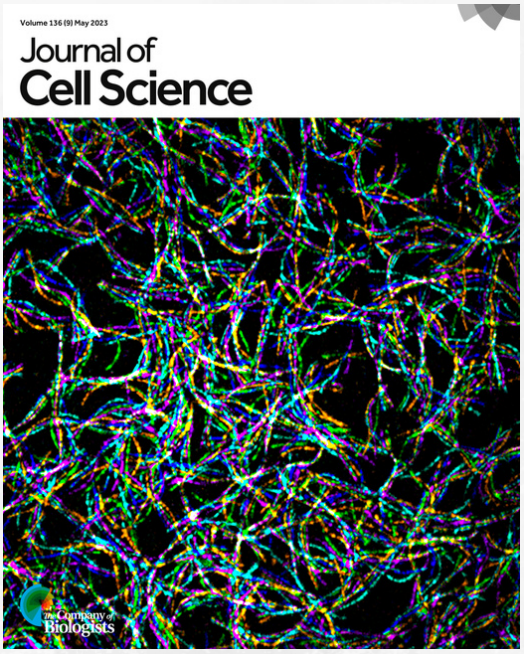
Not only does Zetagen appreciate the flexibility CNYBAC provides, but Loy also says they find their association comes with other benefits. "I feel sincerely that we're borrowing SUNY's credibility. Hopefully, as we earn our own, we can be a positive reflection back to SUNY. I can't wait to pay forward what Kathy Durdon and Mantosh Dewan, MD [President of Upstate Medical University] have done for Zetagen."

What advice would they give to other startups who may be where they were 5 years ago?

1. Pick your advisors carefully, says Margulies. "We routinely get 3-5 quotes to give us feedback before we make a decision because that way, we're less likely to go down a dead-end and then have to backtrack and redo something."
2. Keep everyone on a friendly basis. "There are a lot of people that we interacted with, couldn't work with, then we came back a couple of years later when situations and goals were different and we could work together and they've become some really great partners," explains Margulies.
3. Be frugal, but strategically so. Says Loy; "We just brought on a new doctor, (Morakot Likhitpanichkul, PhD) last month and we have three other strategic hires planned for the balance of this year, but they're timed based upon achievement of key milestones."
4. Know your regulatory path. Says Loy; "Plan ahead and secure your regulatory designation, be familiar with the guidance documents, and carefully plan for the associated costs and timelines."

Interested in learning more about Zetagen?
You can reach the team at zetagen.com

New Process for Isolating Actin from Yeast Opens Doors for Protein Studies



Upstate research on isolating actin made the May 2023 cover of the Journal of Cell Science

*Provides easily accessible and relatively abundant sources of human **β**- or **γ**-actin.*

Actin, a crucial protein involved in various cellular functions, has predominantly been studied using actin synthesized from muscle cells. However, this approach neglects the diversity of actin present in different (non-muscle) cell types. Understanding the potential variations in actin behavior is essential for unraveling cellular processes and diseases. To address this challenge, a team of researchers at Upstate developed a novel process for isolating actin from budding yeast, a widely-used model organism in the field of actin research.

"We've been studying actin for a long time," says Brian Haarer, PhD, who is the lead author of the paper. He has been working for years on this research with Dave Amberg, PhD; who is currently the Vice President for Research at Upstate. "We were concerned that everybody is using rabbit muscle actin because we knew that yeast proteins didn't interact with muscle actin well." He and Amberg worked for a while creating a tool to extract different strains of actin from yeast; putting the project on hold for a while during COVID. "Jess [Henty-Ridilla] is responsible for encouraging us to publish this work by providing so many beautiful tools to validate the actin that we made, and I think that was critical."

ADVANTAGES:

- High yield.
- No special growth requirements.
- Requires only conventional purification reagents and protocols.
- No additional post-purification processing.
- No concern over the removal of contaminating "host" actin.

APPLICATIONS:

- The primary application for this technology is to evaluate and determine the activities of actin regulatory proteins.

LICENSING POTENTIAL:

This technology would be of interest to anyone involved in biochemical studies of human actin and its binding partners, including:

- Pharmaceutical companies.
- Medical research laboratories.
- Universities and other educational facilities.

LICENSING STATUS:

- This technology is available for licensing.

For more info, reach out to:
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Stay updated on the latest from Upstate Research and InnovateUpstate on social media:

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NOW OPEN

Upstate TEM Core

Providing simplified access to electron microscopy, filing critical gap in research capabilities

Now open; Upstate is home to a new core facility offering electron microscopy services. The TEM core not only houses a transmission electron microscope, but preparation equipment and facilities to make sure samples are prepared correctly and efficiently.

Iwona Koenig, PhD says this is a facility she found was missing from central New York when she arrived at SUNY Upstate. "I decided I needed electron microscopy so much that if a core didn't exist, I needed to make one happen." Koening is currently an assistant professor of Microbiology and Immunology, whose lab focuses on how the activation and potential dysregulation of the innate immune system contributes to the onset and progression of autoimmune diseases.

Koenig has teamed up with co-director William Spencer, PhD, who recently joined the Center for Vision Research as an assistant professor and has previous experience with electron microscopy. Rounding out the team is Benjamin Zink, who will serve as the facility's technical director and brings a wealth of experience.

Upstate TEM core Co-directors of the TEM core William Spencer, PhD (far left) and Iwona Koenig, PhD (far right) with technical manager Benjamin Zink.

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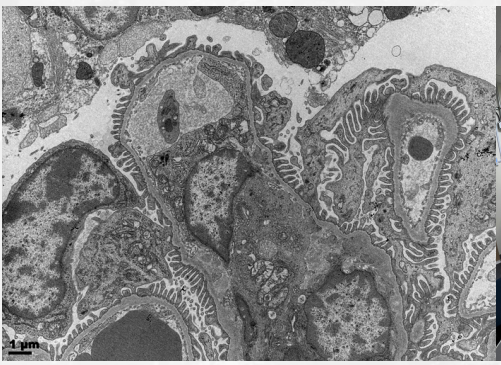
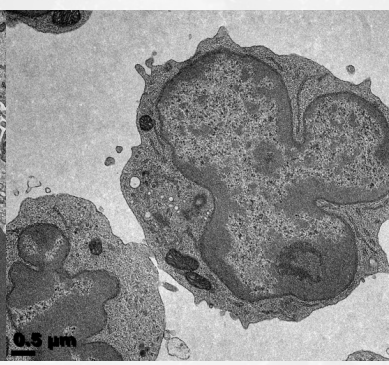
Creating an electron microscopy facility was one of the priorities outlined in the Research Strategic Plan in 2021. "It's always a great day when we get to open a new, impactful research core," says Vice President for Research Dave Amberg. "This is another priority of the Research Strategic Plan that is now completed, thanks to the hard work of Dr. Iwona Koenig."

If you're interested in learning more about what the facility offers or getting in touch about utilizing their services, reach out to Benjamin Zink at ZinkB@upstate.edu, and visit their website: upstateresearch.org/core-research-facilities/institutional-core-research-facilities/upstate-tem-core/





LATEST IN UPSTATE TECH
AVAILABLE FOR LICENSING

With world-changing intellectual property such as the most sensitive saliva test for SARS-CoV2, SUNY Upstate Medical University is an outstanding source of biomedical research innovation, development, and entrepreneurship. Congratulations to the following faculty members who have disclosed new inventions and patented novel technologies that offer pioneering solutions to today's problems.

Elucidate

ELUCIDATE
UPSTATE PORTFOLIO MANAGEMENT SYSTEM
Everything Insight

Mark Zeman, Mary DeGroat, and Upstate IMT's Web Applications Team

In Upstate's workforce of over 10,000 employees, information is power--but only when it's directly from the source, timely, and relevant! In large organizations, information doesn't always flow quickly enough and remains in the silo where it was created. Before LUCI, going to the source often meant calling, emailing, messaging...until you (a stakeholder, interested party, leadership) were able to track down an update. ELUCIDATE is an informational portal that aggregates all updates from organization projects, recurring meetings, and channels. Information providers supply concise, timely status updates to information consumers via a desktop or mobile app. You couldn't possibly join every Microsoft Teams channel, or attend every meeting, but now Upstate users can follow exactly what interests them, via ELUCIDATE.

MARKET NEED

- Currently, various project management platforms introduce silos between project owners and managers which can introduce duplicative efforts.
- The current market also lacks the ability to provide curated information to stakeholders outside the project in a form that is easily understandable, meaningful, and timely, and provide it for all projects they have an interest in.

SOLUTION

- With LUCI, you can follow the projects you have an interest in and whenever there is a TRIGGERING EVENT on the project, you receive the associated update in your newsfeed, same for anyone else following the project. This benefits project leads because rather than provide weekly reports and participate in program reviews where information is shared that is often outdated, they take on the role of a reporter and report "the news" as it occurs – in real-time.

Telodendrimer Nanoparticles for Protein Delivery

Juntao Luo, Xu Wang, Changying Shi, Alexa Bodman, Walter Hall

- A nanoparticle-based method for enhanced delivery of protein/peptide therapeutics.
- The favorable physical properties and biocompatibility of the telodendrimer nanoparticles make them highly suitable as nanocarriers for protein-based therapies, such as antibodies and insulin for cancer and diabetes treatments.

ADVANTAGES:

- In situ protein loading.
- No organic solvent and adjuvant free.
- High loading capabilities.
- Enhanced bioavailability with reduced cytotoxicity.
- Size, capacity, and cell penetration can be adjusted.
- Improved in vivo stability.
- Better control over protein release.
- Well-defined chemical structure.
- Improved passive tumor targeting.

Luminescent Biosensor for Detection of Specific Nucleotide Sequences, Small Molecules, and Proteins at Point-of-Care

- *Stewart Loh, Harsimranjit Sekhon*
- Platelet serotonin release assay (SRA) is a widely-used clinical assay for diagnosing heparin-induced thrombocytopenia (HIT), a life-threatening complication of heparin treatment. This biosensor cuts down results turnaround from days to hours, and allows detection with a cell phone camera.
- The mortality of HIT increases significantly with each passing day. As a result, quicker SRA turnaround time could save lives.

ADVANTAGES:

- Produces results within hours.
- Requires no special training or expensive equipment.
- Can be easily adapted to recognize a variety of targets.

For more info, reach out to:
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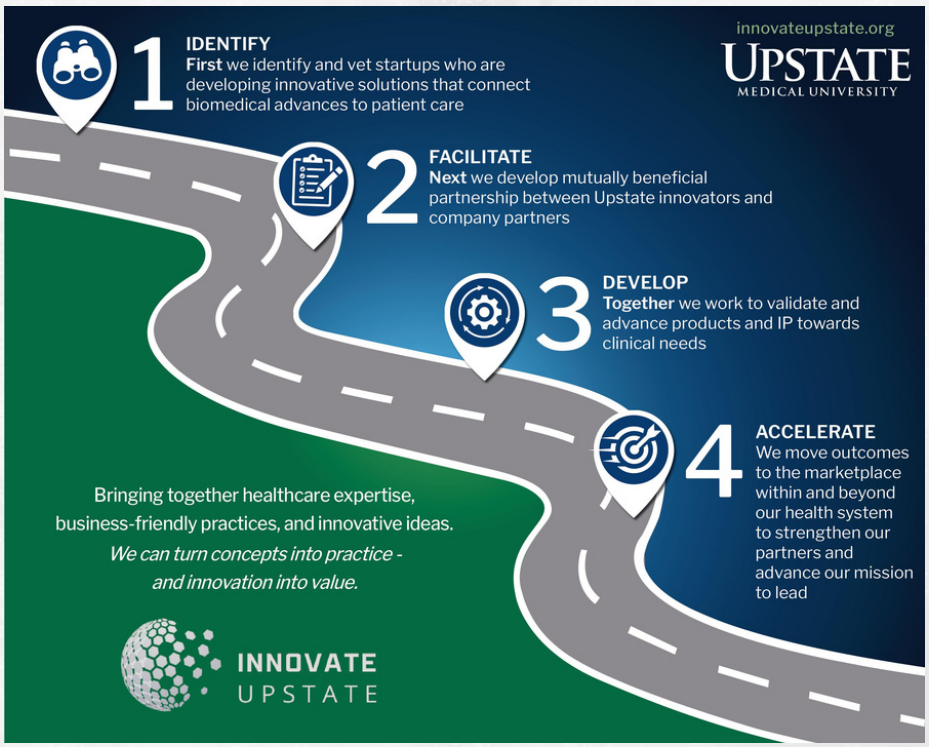
Visit suny.technologypublisher.com to see all available tech from SUNY Upstate

"InnovateUpstate" is the new home of the Upstate Clinical Trials Office, Industry Research Office, & CNY biotech Accelerator!

INNOVATEUPSTATE is a one-stop shop to support moving ideas to solutions.

- *Upstate Clinical Trials Office:* Manages all aspects of clinical trial execution to efficiently move medical innovation toward market.
- *Upstate Industry Research Office (IRO):* Dedicated to developing long-term growth of innovation on the Upstate campus.
- *CNY Biotechnology Accelerator (CNYBAC):* The place to grow your start-up business with a focus on mentorship and growth.



UPCOMING VIRTUAL EVENTS

HOSTED BY THE CNY BIOTECH ACCELERATOR

JULY 12, 9 AM

MACNY PRESENTS: CONSOLIDATED FUNDING APPLICATION (CFA) STATE FUNDING WORKSHOP

OVERVIEW OF THE $1B IN ECONOMIC AND COMMUNITY DEVELOPMENT FUNDING AVAILABLE

JULY 25TH, 2 PM

INNOVATION THROUGH LAW:

THE IMPORTANCE OF EARLY-STAGE IP, REGULATORY, AND MARKET RESEARCH

AUG. 17TH, 3 PM

FEDERAL FUNDING FOR EARLY-STAGE STARTUPS:

SMALL BUSINESS FUNDING FROM THE NATIONAL CANCER INSTITUTE

SEPT. 13, 3 PM

START-UP COMPANY INVESTMENT READINESS

WITH RICHARD E. HONEN, PARTNER, PHILLIPS LYTLE, LLP

More info on events @ https://cnybac.com/education

LOOKING TO EXPLORE PARTNERING WITH US?

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INNOVATE UPSTATE

WANT TO BE FEATURED IN THE NEXT EDITION?

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