



**THE RNA INSTITUTE**  
COLLEGE OF ARTS & SCIENCES UNIVERSITY AT ALBANY

# In the Loop

March 2021

## **RNA Institute leading the way in COVID surveillance and research**

The ongoing COVID-19 pandemic has had a dramatic impact on UAlbany and the broader capital region. The RNA Institute is helping UAlbany efforts to reduce this impact and safeguard the health and safety of the campus. In a short time, the Institute has built a SARS-CoV-2 surveillance testing facility that forms the basis for UAlbany pooled surveillance testing program.

The COVID surveillance testing team is run by Dr. Andy Berglund, the Director of the RNA Institute and headed by Tammy Reid, the Institute's research and development manager, and Dr. John Cleary, an Institute collaborative staff scientist. The facility forms one part of the surveillance program trio that includes the School of Public Health (SPH), which handles front-end logistics and data analysis, and the UAlbany Emergency

Management (EM) office, which handles the back-end notifications, student/staff interface and isolation/quarantine. This entire trio work in close contact with UAlbany's Student Health Services and the Albany County Department of Health, which handles all the results from any diagnostically confirmed cases that are initially identified by the UAlbany COVID surveillance program.

Dr. Berglund is an expert on the biology of RNA processing and his research program, which normally studies myotonic dystrophy, the leading cause of muscular dystrophy, frequently employs Next Generation Sequencing (NGS) techniques. While Dr. Berglund has dedicated staff to the testing program, the facility does not use graduate students or post-doctoral trainees so that regular Institute research can advance unhindered. This way the Institute's mission of "*training the next generation of RNA researchers*" continues even in the middle of a pandemic.

The Institute's existing experience with COVID-19 research (see *next page*) and expertise in RNA were prime reasons for the Institute to head up the testing facility. Using a non-diagnostic [PCR-based assay](#) modified from the Yale SalivaDirect and University of Illinois tests, the Institute team assay directly tests saliva for the presence of SARS-CoV-2 viral RNA. To date the RNA Institute testing facility has handled over 80,000 samples from UAlbany staff, students and faculty as well as external partners such as SEFCU and Siena College. Working together, the Institute is helping to keep UAlbany and the capital safe.



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# COVID-19 Research

Given the expertise and experience working on the frontier of RNA and its impact on human health, RNA Institute research faculty entered the fight against COVID early on in the pandemic with research projects focused on a number of areas. Institute faculty projects focused on COVID-19 research include:



**Dr. Ken Halvorsen** received a National Science Foundation RAPID Award for the development of a rapid SARS-CoV-2 Test. The lab is re-engineering their DNA nanoswitch assay to deliver COVID-19 test results within one hour without the need of a laboratory, an approach that has received lots of attention and press coverage.



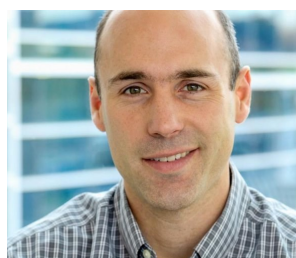
**Dr. Cara Pager** is collaborating with Dr. Berglund on the later stages of an Upstate COVID-19 investigation by examining the role of RNA modifications in SARS-CoV-2 biology. Dr. Pager specializes in understanding how RNA viruses subvert cellular RNA metabolism pathways and is interested in how epitranscriptomic marks modulate viral gene expression. Her work may provide clues to how this virus and others impact patient health and influence patterns of transmission.



**Dr. Alex Valm**, a human microbiome expert, received UAlbany SEED funding for his project "Novel Technology for Mapping the Spatial Structure of the COVID-19 Salivary microbiome." By comparing saliva from healthy and COVID-19 patients his research team hopes to understand how mouth microbial communities function to prevent infection.



**Dr. Scott Tenenbaum**, a leading expert on nanoscale science, was awarded funding by SUNY to fabricate a COVID-19 diagnostic test based on his innovative structurally interacting RNA (sxRNA). The project, which partners with Ciencia Inc and the Wadsworth Center, is aimed at detecting not only the infection but also patient immune response and disease status.



**Dr. Nathaniel Cady**, professor at the College of Nanoscale Science & Engineering, SUNY Polytechnic Institute, partnered with Ciencia Inc. and the New York State Department of Health, Wadsworth Center, to develop a COVID-19 antibody test that takes only 30 minutes. The work has been [published in Biosensors and Bioelectronics, January 2021.](#)



**Dr. Mehmet Yigit**, an expert in chemical bionanotechnology, received UAlbany SEED funding for his project "Visual Rapid Tests of COVID-19 Biomarkers for On-Site Diagnostics." This project seeks to create an ultrasensitive, cost-efficient, and programmable detection based on Yigit's team's nanoparticle technology.

# Supporting Myotonic Dystrophy Research

Myotonic Dystrophy (DM) is a multi-systemic inherited disease that affects at least 1 in 2,100 people. It is the most common cause of adult muscular dystrophy and one of the most variable and complicated disorders known. Research into DM at the Institute has recently received support from a number of organizations.



## The Marigold Foundation

Dr. Berglund and fellow Institute faculty Drs. Kaalak Reddy and John Cleary, have been awarded seed funding from [The Marigold Foundation](#) to help develop a Center for Myotonic Dystrophy in Upstate New York. [The Center](#), which is co-directed by Dr. Charles Thornton (University of Rochester Medical Center) is planned as a hub for academic, clinical and industrial collaborative partnerships to increase research, educational and clinical opportunities in DM.



**Myotonic  
Dystrophy  
FOUNDATION**

To date three trainees from the Berglund lab at the RNA Institute have been awarded Fellowships from the [Myotonic Dystrophy](#)

[Foundation](#) whose mission is to enhance the quality of life of people living with DM and accelerate research focused on finding treatments. Since 2009, the foundation has provided two-year pre- and postdoctoral research fellowships to support new and innovative studies relevant to DM.

*"It is wonderful that MDF continues to support our research efforts by selecting students and postdocs from the RNA Institute to receive one of their prestigious fellowships which helps to launch the careers of early stage investigators in the myotonic dystrophy field,"* said RNA Institute Director Andy Berglund.

### Carl Shotwell 2018 MDF Fellow



Carl's project *"Engineering Synthetic RNA Binding Proteins to Probe the Mechanisms of Myotonic Dystrophy and Development of Potential New Therapeutics"* is to design and identify synthetic proteins that displace

endogenous Muscleblind (MBNL) from binding to expanded CUG (DM1) and CCUG (DM2) repeats and thereby rescue splicing without off-target effects of some other putative treatment strategies. The first aim is to better understand the MBNL protein domains,

while the second aim aims to make synthetic MBNL proteins with therapeutic value.

*"This project allowed us to ask questions about previously overlooked regions of MBNL and make interesting discoveries to further our understanding of how MBNL regulates alternative splicing"* said Carl.

### Jana Jenquin, PhD 2020 MDF Fellow



Dr. Jenquin's study *"Improving the activity of diamidines for potential therapeutic use for patients with myotonic dystrophy types 1 and 2"* characterizes a lead small molecule by assessing how well, and by what

mechanism, it rescues DM-associated molecular markers in DM cell and animal models. Another aim is to synthesize additional compounds with an emphasis on compounds predicted to cross the blood brain barrier to potentially address DM cognitive symptoms. The goal of the study is to get the best in class of these compounds into clinical trials for DM1 and DM2 to help patients and their families.

*"Being awarded a MDF Fellowship allowed me to focus on finding the next generation of diamidine compounds with the potential to move towards the clinic. We have identified a new lead compound with 50-fold better efficacy and dramatically lower toxicity than our previous lead compound! I am so grateful for the opportunity to be able to study therapeutics that may have a positive impact for the DM community"*, said Dr. Jenquin.

### Subodh Mishra, PhD 2021 MDF Fellow



Awarded the MDF Fellowship this January, Dr. Mishra's project aims to study the therapeutic potential of a structurally diverse set of flavonoids - compounds that are naturally found in various plants, form part of our regular diet and are well tolerated

even in high doses. Dr. Mishra has already identified a number of promising candidates and will use this fellowship to characterize these compounds and determine their therapeutic potential in a number of DM model systems.

*"I am thankful to receive this award. Finding a natural dietary supplement as a therapeutic could change the life of DM patients by reversing the molecular hallmark of DM"*, said Dr. Mishra.

# Doctoral RNA Training Program

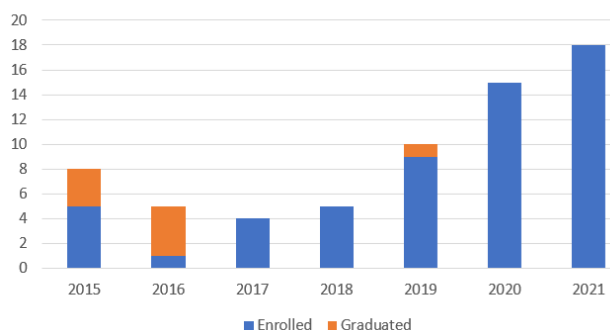
The [Doctoral RNA Training Program](#) is a novel PhD-level training program offered by the RNA Institute for current University at Albany and SUNY Polytechnic Institute students and provides a multi-disciplinary curriculum with a focus on RNA and its health relevance. The program, now in its 6<sup>th</sup> year, was founded in 2015 by Dr. Marlene Belfort, Senior Advisor of the RNA Institute, Distinguished Professor in the Department of Biological Sciences and director of the Life Sciences Research Initiative. The torch was passed in 2019 to Dr. Thomas Begley, Associate Director of the RNA Institute and Professor of Biological Sciences with Dr. Belfort assisting.



RNA Institute biological scientists Thomas Begley, principal investigator on the \$1.1 million T32 grant, and Marlene Belfort, co-PI and Distinguished Professor of Biology

*“We aim to develop our future science leaders by providing graduate students with a comprehensive access to faculty, techniques and collaborations within UAlbany and the RNA Institute,”* said Dr. Begley. *“We owe a deep debt of gratitude to Dr. Kevin Williams, the Dean of the Graduate School, who supported our RNA Fellows with student lines back in 2015, when the training program was a mere idea. It was this support and our early successes that proved compelling to the NIH, which eventually funded the training program. To this day, even in the face of our COVID-induced fiscal constraints, Kevin continues to support the program”*, said Dr. Belfort.

Doctoral RNA Training Program Cohorts



Over the past 6 years the program has been through quite an evolution. Thanks to an **NIH T32 training grant** of \$1.1 million, which the program received in 2019, the yearly cohort has been able to grow each year by increasing the number of student fellowships. By partnering with SUNY Polytechnic’s College of Nanoscale Sciences and Engineering, we added both students and faculty to our growing list of participating departments which include Biological Sciences, Biomedical Sciences and Chemistry.

New training tracks for Entrepreneurship and Communications were also added in 2019, with the goal of developing researchers that can transition to careers in science and technology companies,

science communication organizations, public service or academia, all of which provide important components that help ensure the public health.

The [RNA Fellows Science Communication Track](#) provides a unique training experience for RNA Fellows that focuses on written and oral scientific communication, through a collaboration with the acclaimed New York State (NYS) Writers Institute. The Communication Workshop is led by Dr. Anette Breindl, neurobiologist, senior editor at BioWorld and member of the National Association of Science Writers. In this workshop students improve their own and each other’s science communication skills, primarily by learning to tailor communications to both the writers’ goals and their intended audiences. They learn about different science writing opportunities and careers, with the expectation that each fellow produce a publication-worthy essay. This Newsletter includes two such publications by RNA Fellows from the 2020-2021 cohort (see pages 6 & 7).



The [RNA Fellows Entrepreneurship Track](#) provides students with insights into the commercialization process via small workshops, so that they might be better equipped in applying their skills amongst the business community. Biotechnology startups and technology-driven entrepreneurship account for a large part of the economy and help drive research innovation and drug development. *“We are not only training the next generation of RNA researchers, but we are training the next generation of business and technology leaders”*, said Dr. Begley.

# Doctoral RNA Training Program

The [Entrepreneur Workshop](#), newly led in 2020-2021 by Dr. Scott Tenenbaum, Associate Professor of Nanobioscience at SUNY Polytechnic Institute and entrepreneur himself, provides students with exposure to resources and tools used to train entrepreneurs and to identify organizations and people that could help them with future business ventures. Workshops focus on the patent process, when intellectual property should be protected, what constitutes inventorship and what gives a patent value.



From left to right: Ed Taroc , Dr. Scott Tenenbaum, Chris Smith, Pheonah Badu, Ryan Treen, Avinash Londhe, Sara Evke, Dana Woodstock

Most recently, the program is partnering with Rensselaer Polytechnic Institute and the NIH Office of Intramural Training and Education (OITE) for a pilot program in [Resilience Training](#). Sponsored by the NIH/NIGMS Division of Training, Workforce Development and Diversity, the goal of the workshop series is to help students develop the resilience needed to navigate challenging situations in school, work and life. Discussions highlight emotional intelligence competencies needed for academic success and for thriving in research and healthcare careers. *"There's been a real need during the pandemic to foster resilience among our trainees, many of whom are demoralized by distance learning and a sense of isolation. The program has proven so popular that we needed to turn away some students, so we will likely make the program available again in the Fall",* said Dr. Belfort.



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The RNA Doctoral Training Program continues to sponsor talks from International experts in RNA and expose students to job paths outside academia through the RNA Café, a seminar series described in the Events section of the Newsletter. Unique to the RNA Café, it allows for the students to engage in a roundtable discussion with credentialed scientists outside academia. Students from the program have begun to graduate and land jobs in academic, government and industrial settings.

*"I am incredibly thankful to the RNA Fellows program for taking me in as a Chemistry student and showing me the exciting world of RNA biology. There are many new things that I have learned which I never would have, if not accepted into this program. The experience has been amazing, and I will be forever grateful to have had the opportunity to be involved in it",* said Nicole Ralbovsky, 2019-2020 cohort.

We are excited to announce that 14 students have been selected for the 2021-2022 cohort. Increasing the program's total size to 59 fellows. We have no doubt they will be an excellent addition to this outstanding, diverse group of RNA researchers.

## The next steps for our RNA Fellows

### 2015-2016 Cohort

Patrick Blatt - Scientist at Regeneron  
Alicia McCarthy - Scientist at 10xGenomics  
Neil Robertson - Postdoc at Precision Medicine at Michigan State  
Lauren Cooper - CPEP Fellowship at Indiana University

### 2016-2017 Cohort

Toro Botros - Data Analyst, Vironix, NY  
Justin Waldern - Post-doctoral fellow, University of North Carolina

### 2019-2020 Cohort

Nicole Ralbovsky - Scientist at Merck

# RNA Fellows Communication Workshop

## Genetically modified organisms and the media

by Noor Kotb

In June 2020, a Cornell study was published on farmers' use of Genetically modified organisms in Bangladesh. The study reported that farmers in Bangladesh recorded utmost satisfaction this year due to their generation of increased yields and higher profits upon using four different types of genetically modified eggplants that are mainly insect resistant.<sup>1</sup> The authors of the paper stated that farmers had 20% higher yields than previous years when they were not using the genetically modified eggplants which significantly increased their revenue.<sup>1,2</sup> This study is the first of its kind to explore the economical impact of using plant GMOs and from the farmers' perspective. When exploring a controversial territory, it is crucial to understand both perspectives. In the case of GMOs, the media tends to shed light on one side dimming the other intentionally.

When we hear or see the word GMO in the media, it is mostly associated with a negative connotation such as Monsanto exploiting poor farmers or companies not abiding by labelling laws of their GMO products. However, rarely have scientists come forward and simplified what GMOs mean and how it is done. The general public is automatically alarmed when they hear the word GMOs. But what exactly are GMOs?

According to the Non-GMO project, "A GMO, or genetically modified organism, is a plant, animal, micro-organism or other organism whose genetic makeup has been modified in a laboratory using genetic engineering or transgenic technology. This creates combinations of plant, animal, bacterial and virus genes that do not occur naturally or through traditional crossbreeding methods."<sup>3</sup> This modification can be as simple as adding a gene in a crop that confers resistance against bacteria, viruses and others.<sup>4-6</sup> Genetically engineered organisms not only consist of consumable goods or foods but also animals used in labs for drug tests and experiments and mosquitoes that are released into the environment that have the ability to compete against other mosquitoes.

Moreover genetic engineering has evolved over the years and became more specific to its gene targets, meaning that it has become very accurate, especially with the progress of CRISPR gene editing tool. Genetically modifying a gene does not mean that other genes in the organism will be altered.<sup>6</sup> A lot of non-GMO entities argue that GMOs do not occur naturally and hence have dangerous repercussions, however, if we use the same argument this would entail banning technology, Internet and other means that we are dependent on. Genetically modified plants are used to assist in increasing the yield, help farmers with their revenue and feed a population that is constantly growing. Companies that sell GMO grains are often found at fault for monopolizing the market and exploiting farmers. This should not be a battle against GMOs but against corporations.

### Citations:

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2. Bangladeshi eggplant farmers reap rewards via genetics. *Cornell Chronicle* <https://news.cornell.edu/stories/2020/05/bangladeshi-eggplant-farmers-reap-rewards-genetics>.
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4. How to Make a GMO. *Science in the News* <http://sitn.hms.harvard.edu/flash/2015/how-to-make-a-gmo/> (2015).
5. Devos, Y., Maesele, P., Reheul, D., Van Speybroeck, L. & De Waele, D. Ethics in the Societal Debate on Genetically Modified Organisms: A (Re)Quest for Sense and Sensibility. *J. Agric. Environ. Ethics* **21**, 29–61 (2008).
6. Maghari, B. M. & Ardekani, A. M. Genetically Modified Foods and Social Concerns. *Avicenna J. Med. Biotechnol.* **3**, 109–117 (2011).

### About the Author

**Doctoral RNA Training Program cohort:** 2020-2021

**Department:** Biomedical Sciences

**Mentor:** Dr. Prashanth Rangan

**Project:** Zfrp8, the homolog of a human tumor suppressor is required for germ cell to oocyte transition



# RNA Fellows Communication Workshop

## Regenerating Ourselves using Stem Cells

By Ed Zandro Taroc

Stem cell research is a growing research field that has many different applications like regenerative medicine. So, if you were wondering how to one day have the same regenerative powers as the popular X-Men Wolverine or Deadpool this would be the line of research you would want to follow. As fantastical or ridiculous as that may seem this is an over exemplified example of what they are actually trying to accomplish with regenerative medicine.

Currently one of the main goals is being able to re-grow specific tissues from cells of a patient, with the long term goal of growing whole organs. This would solve two main complications of trying to get an organ transplants that are 1) organ availability, and 2) tissue rejection of the transplanted organ by allowing doctors to grow the organ at any time they needed from cells gathered from the patient themselves. However, stem cell research is shrouded in an ethical controversy that is both politically and religiously charged. Though I feel politics and religion should have no place in science, the question for stem cell research becomes 'do the benefits of the research outweigh the ethical issue seen with what the cells you're using imply?'

First, what is a stem cell? A stem cell in the most basic definition is a cell that is dividing and can give rise to different types of tissues. Our human bodies are host to many different types of stem cells throughout our whole lives beginning from when we are embryo's to when we become adults. In fact, you see your stem cells at work if you've ever had a cut on your skin and watched it heal. The new skin cells that formed at the injury site came from a pool of "quiet" stem cells that became activated after the injury was sensed. It's this principle that actually leads how stem cell therapies work; we can't exactly grow whole organs yet but maybe one day! So, it's already known that other than particular organs such as the liver, skin and bone, there is very limited ability for the body to repair itself properly. So by applying stem cells to a damaged area and giving these stem cells the correct conditions they have the potential to repair/replace damaged tissues. This is a common method used today for treating injuries involving torn muscles or tendons. It has also been described to have helped patients with single gene disorders by replacing the malfunctioning cell types with new cells that have the mutation fixed. Stem cell research is still a relatively new field but the applications thus far seem promising.

You are probably wondering how stem cells are retrieved so they can be studied in a petri dish or to be used in a stem cell therapy? Well, this is the more controversial part, as a big source of human embryonic stem cells actually come from aborted human embryos. This incites the moral dilemma of whether it is alright to be sacrificing potential human life to advance our scientific goal. However, it is possible to get stem cells from other means, as I mentioned earlier stem cells are still present within our bodies even in our adulthood, and it is possible to obtain these stem cells with some intrusive but non-life-threatening methods. It is also possible to make "synthetic" stem cells, or what we would call induced pluripotent stem cells. These are adult cells that have went through certain conditions that will allow them to revert to a stem cell like fate. However even the induced pluripotent stem cells have some controversy as it has been recently demonstrated that human brain tissues were formed from induced pluripotent stem cells, and was able to show active brain activity. This led many people to ask whether this formed brain tissue has the ability of human thought. This provoked the idea that this brain tissue in a dish might be human and whether it should also have the same rights as a human? Even with all of this controversy, it is legal in most countries for doctors and scientist to obtain stem cells to do research or procedures with.

Though I understand where people can have issues with this research based on where these stem cells are actually being derived from, I don't think it should be as highly debated. As long as the scientists and doctors obtain the stem cells with consent from the donors, and the donors are told the possibilities of what's going to happen with the donated stem cells there really shouldn't be an issue. I personally think stem cell research is going to be important for medical purposes of treating many different ailments, and hopefully making organ transplants more readily available and cheaper to the ones who need it most.

### About the Author

**Doctoral RNA Training Program**  
cohort: 2020-2021

**Department:** Biological  
Sciences

**Mentor:** Dr. Paolo Forni

**Project:** Islet-1 lineage of the developing nasal area



## ***In the Spotlight Justin Waldern, PhD***

This Spring, The RNA Institute turns its spotlight on Justin Waldern, the last PhD graduate of the Belfort Lab. On his way out the door, Justin published a paper in *Mobile DNA* entitled “Methylation of rRNA as a host defense against rampant group II intron retrotransposition”. Read on for his advice on navigating research and the current pandemic.

### **Q: What inspired you to pursue a PhD and join the Belfort lab?**

I spent a lot of time doing research during my undergrad and realized that it is something that brings me happiness. I remember learning about mobile genetic elements in an undergrad microbiology course and I thought they were the coolest things ever. I found Marlene’s work with mobile elements while I was searching for graduate programs. Her enthusiasm on the research topic had me hooked.



### **Q: When did you first learn about The RNA Institute?**

I learned about the RNA Institute when I first visited UAlbany. It was a strong selling point for me when I considered joining the Biology program. I think having a community of RNA researchers really helped frame the way I think about biology.

### **Q: What advice would you give to new graduate students who are just beginning their journey in research and in academia?**

For new graduate students – it’s scary but plan ahead. Begin with the end in mind, and if you don’t know what you want to do when you graduate, try to figure it out soon so that you can structure your graduate career toward that goal. I highly recommend applying for fellowships. Lastly, pay attention to the graduate students around you. Learn from each other’s mistakes and challenges so you can avoid going through them yourself!

### **Q: Can you share a short story about a difficult experiment and how you adapted to find a solution?**

I think the most important lesson I have learned is dealing with (and interpreting) a result when it’s not what you want or expect. For example, I had a result where it seemed ribosomes inhibited the ability of group II intron ribonuclear proteins (RNPs) to invade a small DNA oligonucleotide target site in vitro, but when I repeated it with proper controls, the result didn’t hold. However, I followed this up over many months with in vivo experiments showing how ribosome binding inhibits retrotransposition, specifically by interfering with DNA replication forks. I want to emphasize that the most important skill to have for a scientist is grit. You need to be able to fail, analyze that failure, make adjustments, and try again.

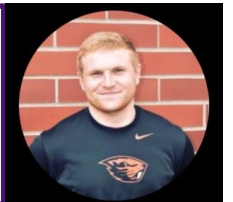
### **Q: How has the pandemic impacted your final year as a graduate student?**

The pandemic really ground my benchwork to a halt and delayed my graduation. I was just one or two experiments away from wrapping up a project when UAlbany closed its campus last year. I was fortunate enough to be able to get a lot of writing done in that time (both on my last paper and on my dissertation). When I was able to return to the lab and run those last few experiments I was glad I had most of the writing done. In terms of my goals, I think the pandemic really has encouraged me to be flexible and adaptable.

### **Q: What are you, your wife, and your puppy planning to do now that you both have graduated?**

I’m starting a post-doc position in the Laederach lab at University of North Carolina, Chapel Hill, while my wife has a full-time position as a biologist at the EPA in Research Triangle Park. I’ll still be working on retrotransposons (RNA mobile elements), but now in the context of human health and disease. We’ve recently relocated to Durham, North Carolina and are quite pleased with the warmer weather and the lack of snow.

**Article written by Sawyer Hicks** (PhD candidate in Dr. Andrew Berglund’s lab at the University at Albany)



# Presenting science to a general audience

*There are many opportunities for trainees to present their research within the RNA Institute, the UAlbany community and now with the number of online symposiums due to the pandemic, globally as well. Read on for some great tips by an experienced science presenter, RNA Institute Research Scientist Arun Richard Chandrasekaran.*

Communicating science is as important as performing the research. Conferences are great avenues for one to share their exciting research with their peers. With increasing multi-disciplinary collaborations in research, there is a need to present our work to scientists who are not experts in our field or to the general public. The Life Sciences Symposium organized at SUNY Albany every year is one of my favorite events for this reason. The departments of biological sciences, chemistry, physics, biomedical sciences and psychology come together to share their research. As an audience, the event is one of my favorites since it presents an opportunity to learn about the research undertaken by different disciplines, all in one place. As scientists, it is our responsibility to make our research comprehensible to those from the other disciplines. A typical presentation we prepared for our lab meeting or a departmental seminar would not suffice. One needs to add some extra flavor to reach those non-experts from the other departments, and sometimes, the general audience who don't perform research.

There are many [platforms](#) that discuss how to give a great scientific talk. Here, I share a few ideas on how to prepare a research presentation for a multi-disciplinary or a general audience.

## 1) Define the audience.

One of the most important steps in preparing a presentation for a multi-disciplinary audience is to gauge their expertise level. In an inter-disciplinary event, this becomes obvious. A biologist will not expect a physicist to know the norms of their field. If presenting to a general audience, the assumption is that the audience will have no technical knowledge of your field (don't dumb it down too much either). Look into the conference attendees and presentation lists to get an idea of the fields they come from, and tailor the introduction to your talk so that the audience can follow your science. In general, use of too many abbreviations in every slide might also lose the audience's attention.

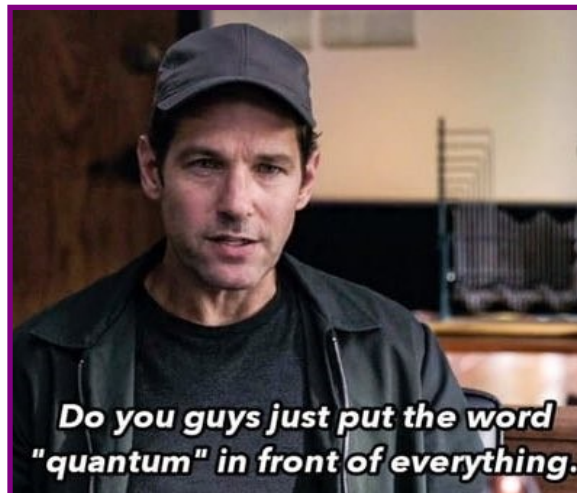


Image: Ant-Man and the Wasp, Walt Disney Studios.

## 2) Provide the big picture.

Very frequently, we present our research to our own lab or our department, and it is easy to talk about technical terms that everyone in our lab understands. This isn't true in a multi-disciplinary presentation. It is important to open the presentation with the purpose of your research, making sure the audience understand the big picture before getting lost in the details of that important research you've been working on for years. A biologist might study the importance of a specific set of proteins that regulate a gene or a chemist might study the influence of changing a bond in the chemical structure of a molecule. But what's the point? Provide your audience the big picture of WHY you are doing the research. Give the audience enough reason to care about your research. This is even more important when you present to the general public; placing your research in a societal context or in the context of a particular application is key to hooking your audience.

## 3) First, concepts. Then the research.

Regardless of the time slot you are given, spend enough time in the beginning of your presentation to discuss concepts involved in your research, the background and motivation for it before going into technical aspects. And remember, presentations are not similar to how you would write a research paper. Condense the information and present only highlights of your work so the audience can follow, instead of going through every piece of detail you worked on.

## 4) Engage the audience.

The point of a scientific presentation is not only to share what you've done, but also to ensure that your audience "gets it". A thoroughly detailed technical presentation is not useful when presenting to a general audience. If it

## Presenting Science cont'd

helps, you can imagine discussing your work with a family member or your friend who is in a completely different field. If you think they will not understand a particular slide in your talk, then it requires work. You can also use analogies to drive home your concepts. Pop-culture references, for example, have been shown to be useful tools in teaching STEM, and they are useful to [contextualize research in presentations and publications](#). Science is fun; scientific presentations should be, too.

### 5) Practice.

Presenting your work to a multi-disciplinary audience will help hone your speaking skills. With the onset of COVID, there has been a huge spike in the number of online seminar series that one can present in. This is especially useful for students and post-docs to practice presenting their research to peers from other fields (compared to one or two discipline-specific conferences per year if selected for a talk). Moreover, this is a great chance to connect to other scientists and non-scientists from around the world. As lab heads, the principal investigators could also stress the importance of (and guide their lab members in) creating presentations for a wider audience beyond the usual presentations to a thesis committee.

Article by:  
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Research Scientist in the  
Halvorsen Lab



## Events

### Mini Symposium

[The RNA Institute Symposium](#) is held yearly and provides a forum for faculty, students, and industry representatives to present their findings and network with colleagues. Due to the COVID-19 pandemic we are hosting a smaller virtual Mini Symposium on March 3<sup>rd</sup> and 4<sup>th</sup> 2021. The Mini Symposium will highlight Trainee research and feature Dr. Michael Rosbash, Nobel Laureate and distinguished Keynote speaker. Find the program and more details here:

<https://www.albany.edu/rna/news/2021-rna-institute-mini-symposium-march-3-4-2021>



## Events

### Life Sciences Research Symposium

[The Life Sciences Research Symposium](#) provides an opportunity for Graduate Students and Postdoctoral Fellows to present their research through oral and poster presentations, according to the general format of main scientific conferences. It is an important event to promote student excellence and collaboration among researchers across the Departments of Biology, Chemistry, Computer Science, Physics and Psychology. This year the symposium was held virtually on January 22<sup>nd</sup>, 2021.

### Life Sciences Research Symposium XII Awards



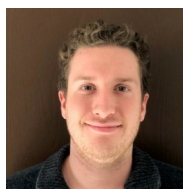
#### Best Flash Talk Session 1

Pearl DeVeer, Biology Department  
*'Effect of NF- $\kappa$ B on ATF3 Activation in ZIKV Infection'*



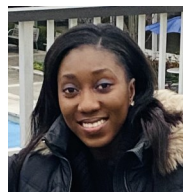
#### Best Flash Talk Session 2

Justin Waldern, Biology Department  
*'Ribosomal RNA Modification Limits Group II Intron Retrotransposition'*

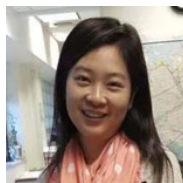


#### Best Flash Talk Session 3

Christopher Smith, Chemistry Department.  
*'Coupling RT-LAMP with CRISPRCas12a for Detection of Lyme Disease'*



**Best Selected Ten-Minute Talk 1 AND Scientista Best Selected Ten-Minute Talk**  
Pheonah Badu, Biology Department  
*'ATF3 Regulates Antiviral Response in ZIKVPR Infected Cells'*



#### Best Selected Ten-Minute Talk 2

Ya Ying Zheng, Chemistry Department  
*'Mapping and Functional Study of RNA Phosphorothioate Backbone'*



#### Scientista Best Flash Talk

Emmanuel Edem Adade, Biology Department.  
*'Understanding the Spatial Structure of the Gut Microbiome in Zebrafish (Danio rerio)'*



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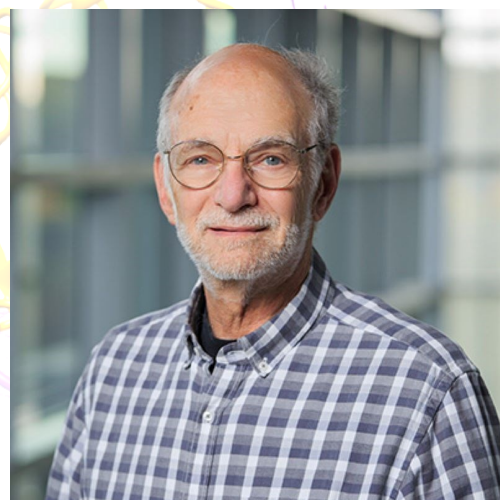
# The 2021 RNA Institute Mini Symposium

**March 3rd - 4th, 2021**

**Nobel Laureate and Distinguished  
Keynote Speaker**

**Michael Rosbash**

*Professor of Neuroscience at Brandeis  
University  
Investigator at Howard Hughes Medical  
Institute*



**40 Trainee presentations over two days  
Awards sponsored by**



Registration and Program can be found at

<https://www.albany.edu/rna/news/2021-rna-institute-mini-symposium-march-3-2021>

# Upcoming Events

## RNA Café

The RNA Café is an invited seminar series for students and postdocs to explore non-traditional science careers by engaging in a roundtable discussion with credentialed scientists who have pursued careers outside of academia. The RNA Café exposes students across the science disciplines to careers away from the bench, in industry or non-traditional research and development. To be included in the invitation list, or if you would like to be an invited speaker or suggest a speaker, please contact us at [rna@albany.edu](mailto:rna@albany.edu).

## Hudson Valley RNA Club

**Hudson Valley RNA Club (HVRC)** seeks to create a community and a scientific forum for students, postdocs, and scientists engaged in RNA-related research in the Hudson Valley region and beyond. One way the HVRC creates said community is by hosting a monthly RNA Salon, supported by [The RNA Society](#) and organized locally by Dr. Gaby Fuchs. **We are happy to announce that the HVRC RNA Salon has been awarded funding from the RNA Society and Lexogen for the 5th year in a row.** Funding supports RNA science-based activities held at academic institutions throughout the world with the aim of promoting engagement and interaction among RNA scientists with a focus on junior trainees. The HVRC RNA Salon is held the third Tuesday of the month.



**Speaker:** Shane Breznak, RNA Fellow Rangan Lab  
**Title:** H/ACA box complex promotes meiosis by regulating RNAs that code for polyQ containing proteins

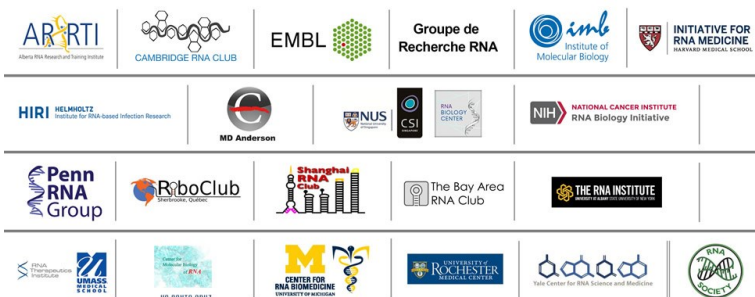


**Speaker:** Dr. Blanton S. Tolbert, Professor  
**Affiliation:** Dept. of Chemistry, Case Western Reserve University  
**Title:** Structural Biophysics of RNA Interactions that Contribute to Viral Replication



## RNA Collaborative Seminar Series

The [RNA Collaborative Seminar Series](#) is a grassroots effort comprised of 20 RNA research centers worldwide to provide an on-line seminar series during and beyond the institutional shut-down caused by COVID-19. The goal of the program is to promote and disseminate emerging RNA research and to establish and strengthen connections within the international RNA scientific community. Scientists are welcome to present all RNA-related research spanning from foundational discoveries to potential therapeutic applications. The RNA Institute has hosted two seminars since its inception in the spring of 2020. Past seminars can be viewed on our collaborative [YouTube channel](#). The Seminars take place every other Wednesday at 4:00pm.



## Capital District Postdoctoral association (CDPA)

The Capital District postdoctoral association (CDPA) is a recently rebooted association for postdocs across the capital region including RPI, Albany Medical College, University at Albany, SUNY Poly, the Neural Stem Cell Institute and NYS Department of Health/ Wadsworth. CDPA is a peer run organization designed to generate a network with opportunities for personal and professional development, discussions and seminars on postdoc relevant topics and current research, and a forum for sharing relevant resources. After re-establishing the organization in 2020, we have hosted several online networking and social events and recently had our first in person social event – tubing! It was great to meet everyone who came and for those who would like to get involved in the society and meet postdocs from across the capital region please reach out to Dr. Hannah Shorrock ([hshorrock@albany.edu](mailto:hshorrock@albany.edu)). Keep an eye out for our emails with upcoming events including a Scientific Writing Seminar cohosted with Scientista!

# Upcoming Events



## Women In Science and Health (WISH)

WISH is an organization of women faculty at the University at Albany, SUNY that fosters scientific networking and provides skill-building opportunities for students, postdocs, and faculty in the STEM fields to promote gender equality and work-life balance. WISH was established in 2014 by Elga Wulfert, Professor of Psychology and Dean of the College of Arts and Sciences, and Marlene Belfort, Senior Advisor of the RNA Institute, Professor of Biology and Scientific Director of the interdisciplinary Life Sciences Initiative. Women in Science and Health (WISH) has exciting programs planned for the Spring 2021 semester.

### January 21, **Picture A Scientist, Movie Discussion.**

Discussion leaders: Profs. Mindy Larsen and Elga Wulfert



### March 4, **Academic Stressors and Mental Health**

Discussion leaders: Profs. Julia Hormes and Elga Wulfert

### March 25, **Women Collaborating for Inclusion**

Discussion leaders: Profs. Marlene Belfort and Janice Pata

### April 16, **Male Ambassadors**

Discussion leaders: Profs. Kristen Corbosiero and Janice Pata

### May 6, **Student and Postdoc Awards: Excellence at the interface of Science and Life**

Discussion leaders: Profs. Kristen Corbosiero and Julia Hormes

## Scientista

The University at Albany chapter of Scientista is a group dedicated to supporting and aiding women in STEM. Originally founded in the spring of 2019 by a group of students who wanted to build up their own professional skills, networks, and confidence, the chapter is now just under 2 years old and growing in size. The Scientistas have been working hard to keep students and postdocs connected and engaged with a series of virtual events over the past year, including a unique careers in science panel, an elevator pitch workshop, and various social events. The group is looking forward to continuing their work in creating a connected, supportive community of women in science in the capital district in the coming months. Upcoming events include a discussion of obstacles faced by women in science with guest speaker Dr. Bethany Moore, PhD of the University of Michigan at the Eastern NY student chapter of ASM's annual Trainee Symposium as well as a scientific writing workshop hosted in collaboration with the Capital District Postdoctoral Association.



*"I wanted to help establish this group so that we could form a larger, stronger local community of women in STEM that could help support each other and provide more opportunities for everyone to grow", said Lindsey Tolman, co-founder and president of UAlbany local chapter.*

## Life at the Interface of Science and Engineering (LISE)

Established through the generosity of UAlbany Distinguished Professor Marlene Belfort and RPI Institute Professor Georges Belfort, the Life at the Interface of Science and Engineering Endowed Lecture Series is designed to address fundamental questions that require the expertise of both Life Sciences and Engineering to answer. This collaborative lecture series brings world renowned experts to speak to the campus communities at both UAlbany and RPI.



Stephen Quake, Ph.D.

Established through the generosity of UAlbany Distinguished Professor Marlene Belfort and RPI Institute Professor Georges Belfort, the Life at the Interface of Science and Engineering Endowed Lecture Series is designed to address fundamental questions that require the expertise of both Life Sciences and Engineering to answer. This collaborative lecture series will bring world renowned experts to speak to the campus communities at both UAlbany and RPI.

To support this or other initiatives, please visit [www.albany.edu/giving](http://www.albany.edu/giving) or [www.giving.rpi.edu](http://www.giving.rpi.edu)

## LIFE AT THE INTERFACE OF SCIENCE+ ENGINEERING lecture series

These lectures are part of a collaboration between the University at Albany and Rensselaer Polytechnic Institute (RPI). This is the fifth speaker in the series. Previous speakers include: Nobel laureate Thomas Cech (University of Colorado); Nobel laureate Frances Arnold (Caltech); Karl Deisseroth (Stanford University) and David R. Liu (Harvard University).

Featuring Stephen Quake, Ph.D.

Lee Otterson Professor  
Professor of Bioengineering, Applied Physics and Physics  
Stanford University and the Chan Zuckerberg Biohub

Tuesday, April 6, 2021

University at Albany

"The Cell is a Bag of RNA"

3:00 p.m.

Zoom ID:

Password:

Friday, April 9, 2021

Rensselaer Polytechnic Institute

"Molecular Counting and Liquid Biopsies: A Path to Creating Health Equity in the Genomic Revolution"

3:00 p.m.

WebEx ID:

Password:



# ***RNA Institute Donors***

## ***A special thanks to our important Institute donors***

Research at the RNA Institute is supported by grants and awards from Federal funding agencies, such as the National Institute of Health (NIH) and National Science Foundation (NSF), and from the State University of New York (SUNY). However, individual donors also make an important contribution to our efforts at the RNA Institute and without their support many of our outreach and educational efforts would not occur. We would like to take this opportunity to personally thank the following individuals and organizations for their past and present donations to the RNA Institute, our faculty, events and research.

### ***Major Donors***

*Edelgard Wulfert*

*Neil Eisenband*

*Jeffrey S. Sherman*

*The Baldwin Family*

*The Gorman Family*

*Herb and AnnMarie Ellis*

*Ken Ellis*

*The Marigold Foundation*

*The Ledduke Family*

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### ***Donors***

Berglund Family, Gabriele Fuchs, Sarah Drazek, Laura Staff, Sarah Newkirk, John Blackburn, Mark F. Jarocki, Jennifer Oberting, Michael A. Boots, Claudia Carroll, Willard Anderson, Michael Garry, Thomas Begley, Nancy M. Liotta, Cynthia L. Lyons, Carrie Hoffman, Rafael Papaleo.

# THANK YOU!

To contribute to research at The RNA Institute

Click [DONATE](#)



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## New Staff & Positions



**Dr. Cheryl Andam** joined the RNA Institute in Fall 2020 and is an **Assistant Professor in the Department of Biological Sciences**. She has her Ph.D. from the University of Connecticut and Postdocs from both Harvard School of Public Health and Cornell

University. Cheryl's research focuses on microbial genomics and evolution as they apply to infectious diseases and public health. She was recently honored by UAlbany's Division for Research at a Recognition of Junior Faculty event for winning a National Science Foundation CAREER Award. Congratulations Cheryl and welcome to the RNA Institute!

*"I am absolutely delighted to be at UAlbany and in upstate NY! I am looking forward to meeting everyone (hopefully in person soon!) and to building exciting collaborations with faculty, scientists and students at UAlbany, CAS and the RNA Institute",* said Dr. Andam.



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**Dr. Prashanth Rangan** was appointed **Director of Innovation and Research for The RNA Institute** in Fall 2020. This new role involves scouting and bringing new technologies into the RNA Institute to increase the vibrancy of research programs as well as

coordinating the purchase, advertisement, and promotion of newly adopted technology. *"We are specifically looking into single cell sequencing technologies to begin with",* said Dr. Rangan.

## Recent Awards

### Dr. Andrew Berglund

Awarded Marigold SEED Funding for the development of a New York Center for Myotonic Dystrophy Research.

### Drs. Andrew Berglund and Melinda Larsen

Received a SAMRI grant.

### Dr. Cheryl Andam

Received an NFS Career Award for her project titled "Unraveling the origins of genomic heterogeneity in microbial species and populations".

### Dr. Gabriele Fuchs

Received an NFS award for her project titled "Mechanism and Regulation of noncanonical translation initiation".

### Dr. Li Niu

Received an award from the National Institute on Aging for his study titled "RNA-Based Potentiators for AMPA and Kainate Receptors".

### Dr. Prashanth Rangan

Received an award from the National Institute of General Medical Sciences for his project titled "The Role of RNA degradation in germline stem cell to oocyte transition".

### Dr. Morgan Sammons

Awarded a grant from the National Institute of General Medical Sciences for his project title "Defining cis-regulatory networks controlling a core stress response".

### Dr. Alex Valm

Received an award from @3M for his study titled "Oral microbiome structure and assembly at the micron scale".

### Dr. Subodh Mishra

Awarded a fellowship from the Myotonic Dystrophy Foundation UK to support his study titled Discovery of dietary natural compounds as potential therapeutics for DM.

### Amber Altrieth

Awarded the Ruth L. Kirschstein National Research Service Award (NRSA) for Individual Predoctoral Fellows (F31). Her project was titled "Angiocrine Factors in Salivary Gland Regeneration".

### Jesus Frias

Awarded a 3-year Diversity Supplement from NIH entitled "Mechanism of action of small molecule therapeutics for myotonic dystrophy type 1".

### Ewelina Mistek-Morabito

Awarded the Barbara Stull Graduate Student Award 2020 for outstanding research in spectroscopy.

### Justin Waldern

Successfully defended his PhD titled "Host factors affecting group II intron retrotransposition".

# Recent Publications

Our researchers are on the forefront of multiple fields of science, discovering new roles for RNA in biology and chemical processes, and developing RNA as a tool for science and human health. These advances cover the gambit of research from advanced nanostructures, computational processes that improve biological modeling, improved understanding of disease biology and new chemical processes and applications. Recent publications by Institute faculty are listed below but please [visit our website to see the full depth of publications](#).

[A genetic program boosts mitochondrial function to power macrophage tissue invasion](#)

Emtenani et al. *bioRxiv*. February 18, 2021. [Learn more about the Rangan lab](#)

[SQ3370 Activates Cytotoxic Drug via Click Chemistry at Tumor and Elicits Sustained Responses in Injected and Non-Injected Lesions](#)

Srinivasan et al.

*Advanced Therapeutics*. January 20, 2021. [Learn more about the Royzen lab](#)

[Orthogonal Control of DNA Nanoswitches with Mixed Physical and Biochemical Cues](#)

Forrest et al. *Biochemistry*. January 19, 2021. [Learn more about the Halvorsen lab](#)

[Computationally reconstructing cotranscriptional RNA folding pathways from experimental data reveals rearrangement of non-native folding intermediates](#)

Yu et al. *Molecular Cell*. January 15, 2021. [Learn more about the Chen lab](#)

[Small-molecule inhibitors for the Prp8 intein as antifungal agents](#)

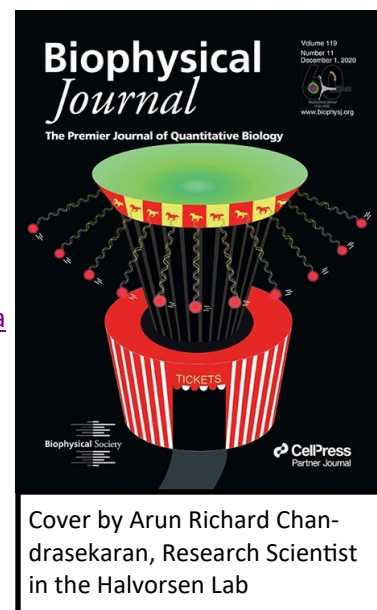
Li et al. *PNAS*. January 12, 2021. [Learn more about the Belfort lab](#)

[Reprogrammable Gel Electrophoresis Detection Assay Using CRISPR-Cas12a and Hybridization Chain Reaction](#)

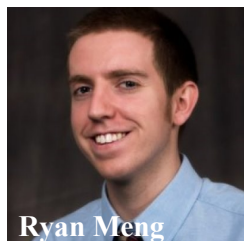
Kachwala et al. *Anal. Chem.* January 6, 2021. [Learn more about the Yigit lab](#)

[Wi-Fi Live-Streaming Centrifuge Force Microscope for Benchtop Single-Molecule Experiments](#)

Punnoose et al. *Biophysical Journal* [see cover image]. December 2020. [Learn more about the Halvorsen lab](#)



## Summer Bioinformatics Program



Ryan Meng

Cancelled classes, remote learning, building restrictions – the 2020 summer fellowship program looked in jeopardy in late fall of last year. However Ryan Meng, RNA Institute bioinformatics support specialist, and Institute Director Dr. Andy Berglund turned a remote possibility into a remote learning experience. Within weeks they quickly transformed

the in-person course into remote bioinformatics program. In doing so, 20 students from across the country (California, Colorado, New Mexico and New York) were able to learn computational skills to analyze large sets of digital biological data.

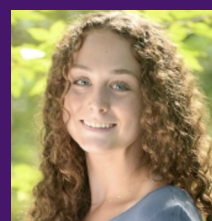
*“Several of these students sought us out when other programs across the country canceled their summer research programs.”* explained Dr. Andy Berglund, Director of the RNA Institute.

After learning the basics of remote data processing, the undergraduate fellows put their new knowledge to the test by analyzing ongoing [COVID-19 RNA Institute/Upstate collaboration](#).

*“This type of bioinformatics analysis is ideally suited for the current social distancing crisis, as all the work is done remotely over the internet with massive supercomputers processing the data”* Ryan Meng noted.

By the end of the summer, these students had acquired the computational skills that are increasingly becoming a vital component for many advanced degrees and careers in any STEM field.

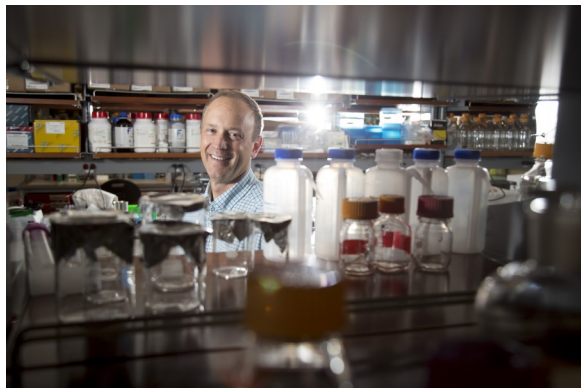
### Next Generation RNA Researcher



One of the youngest members of the Summer Bioinformatics program,

Cristina DeMeo, a local high school student has taken the skills she learned and created an award winning science project. Her work, entitled *“A Differential Gene Expression and Alternative Splicing Analysis of ALS-Causing Mutations”* won first place in the Biomedical 1 section of the Junior Science and Humanities Symposium (JSHS). Cristina will now be moving on to the state level to represent upstate New York. We couldn’t be more proud of Cristina and her work!

# Message from the Director



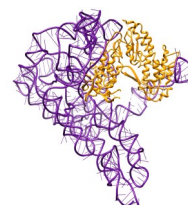
*The 2020-21 year has presented many challenges for the RNA Institute and the larger UAlbany campus and I am pleased by how our faculty, staff and trainees have risen to meet the challenges. Despite restrictions and ongoing issues related to COVID-19, our researchers have maintained a level of research effort and professionalism that is to be commended. It has been a pleasure and a privilege to be able to come to work and, from a safe distance, watch our teams steadfastly tackle the next generation of RNA challenges. While a number of our faculty, myself included, have quickly shifted gears to use our training in RNA science to tackle SARS-CoV-2 and COVID-19, I firmly believe*

*once this current crisis is over, the lessons we have learned will strengthen our research programs and the Institute. Likewise while the RNA Institute has devoted considerable resources and efforts towards the SARS-CoV-2 saliva surveillance program, that effort has enabled our own teams and the larger UAlbany community to remain safe and continue the mission of the University during a time in which many other institutions have been forced to go remote for long periods of time. Many of us may have seen enough remote meetings to last a life time but we also must admit these technologies have enabled us to reach more people, as exemplified by the wonderful level of participation in our 2020 summer bioinformatics program and upcoming RNA symposium. As a silver lining to this crisis, the rapid development of an RNA-based vaccine to tackle an RNA-based virus has hopefully shown the world around us what we already know about the amazing promise and practicality of RNA. In closing this newsletter, I hope that in the near future we can gather together again in person and help to continue to show the world the power of RNA to tackle the world's technological, scientific and health problems.*

*AJ BLF*



Thanks for being  
In the Loop!



Qu et. al. 2016  
Group II  
intron

## Contact Details

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