



# THE RNA INSTITUTE

COLLEGE OF ARTS & SCIENCES UNIVERSITY AT ALBANY

## In the Loop

Fall 2022

### Collaborative Research Grant between SUNY Poly and UAlbany



Dean André Melendez from SUNY Poly (left) and Professor Thomas Begley from UAlbany (right)

Research teams led by Professor Thomas Begley (Associate Director of RNA Institute, Professor of Biological Sciences, UAlbany) and Dean André Melendez (Interim Dean of CNSE, Professor of Nanobioscience, SUNY Poly) were awarded with a \$459,000 grant from the National Cancer Institute. Their project focuses on chemical modifications to RNA due to selenium deficiency and how these changes promotes aging and cancer. Selenium is a chemopreventive compound that has the tendency to lower the risk of cancer. Using knowledge on the functionality of selenocysteine-containing tRNA from their previous works, these two researchers intend to reverse defects in selenocysteine utilization to protect cells from tumor growth.

*"I am excited to work with the students from both institutions to provide training in RNA technology and molecular-based research to better understand cancer and aging. Both Dr. Melendez and I are*

*thankful for all the hard work from past students and members of The RNA Institute. We think this research will provide new insights into ageing and help us develop RNA based modalities to promote healthy ageing."*

### Professor Igor Lednev receives the 2022 Charles Mann Award

The Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) name Dr. Igor Lednev as the recipient of 2022 Charles Mann Award. This award is given to individuals who has demonstrated significant advancements in the field of Applied Raman Spectroscopy. Lednev lab focuses on the application of novel laser spectroscopy for biochemistry research, medical diagnostics, and forensic analysis. His team have developed a universal method for differentiating human body fluid samples from animal samples using Raman Spectroscopy. He was presented with this award during the Great Scientific Exchange (SciX2022) conference. Three of his trainees were also recognized with various awards in the same meeting (*see page 3 for more information*).



Professor Igor Lednev (4<sup>th</sup> from the right) and his trainees at the SciX 2022 conference held in Covington, KY.

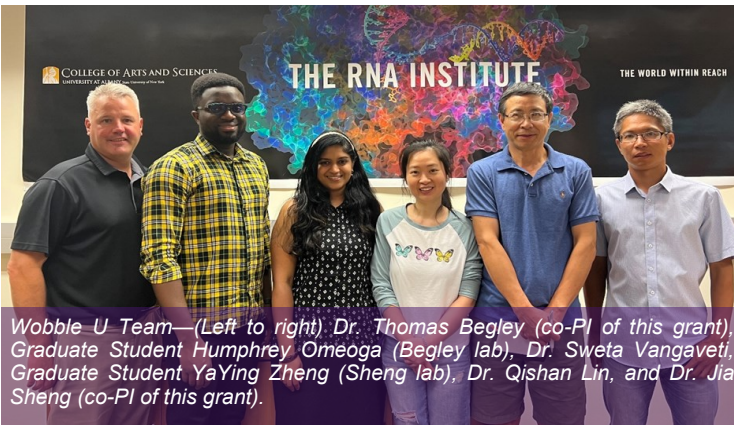
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## Faculty and Staff Highlights

### Wobble Uridine Modifications to Regulate Stress Response

An R01 grant by the National Institute of Health was awarded to Drs. Begley (Biology) and Sheng (Chemistry) for their collaborative research on how chemical modifications affect tRNA regulation. Wobble uridine modifications to tRNA influence gene expression and are linked to environmental stresses. In this collaborative work, the Sheng lab will synthesize wobble uridine modifications using chemical biology methods while the Begley lab focuses on understanding how these modified nucleosides regulate bacterial stress responses. The team will also work towards developing molecular tools to tag and visualize modified tRNA in cells. Understanding where the modified RNA is in the cell and stopping its associated stress response could mitigate harmful health outcomes in people. Additionally ligands that bind wobble uridines developed as part of this study can be used to mark cancer cells.



Wobble-U Team—(Left to right) Dr. Thomas Begley (co-PI of this grant), Graduate Student Humphrey Omega (Begley lab), Dr. Sweta Vangaveti, Graduate Student YaYing Zheng (Sheng lab), Dr. Qishan Lin, and Dr. Jia Sheng (co-PI of this grant).

### Microbiome of Gum Disease

Dr. Alex Valm, Assistant Professor in the Department of Biological Sciences and RNA Institute faculty has received a \$2.3 million dollar grant from the National Institute of Dental and Craniofacial Research to study the human gum microbiome.

Bacterial growth on the gum tissues can cause periodontal disease a common but serious medical condition. Even with healthy periodontal care, gum disease can result due to microorganisms found in dental plaque. Some of these microbes are long filament-like structures that extend from tens to hundreds of microns through the biofilm. Targeting these organisms could be vital for developing therapeutics to fight periodontal disease. This

grant involves collaborative research by Dr. Valm (Biological Sciences, UAlbany) and co-investigators, Dr. Yunlong Feng, (Assistant Professor of Mathematics & Statistics, UAlbany) and Dr. Loreto Abusleme (College of Dentistry, University of Chile).



(Left) Multispectral image of dental plaque, (Right) Dr. Alex Valm.

### RNA rescue in the fight against DM

Drs. Andy Berglund, John Cleary and Kaalak Reddy were awarded a \$2.5 million dollar NIH grant to work on Myotonic Dystrophy (DM), the leading cause of adult-onset muscular dystrophy. DM is caused by a repeat expansion in the human genome that when expressed as RNA results in “toxic RNA”. This toxic RNA binds to key proteins in the cell preventing them from functioning. DM affects all organs in the body, is one of the most complex human diseases and currently lacks approved treatments. Dr. Reddy shared that “DM, being so complex, can take almost a decade for patient’s to be properly diagnosed”. The RNA Institute team’s research focuses on designing and screening new small molecules that target the toxic RNA and help to reduce the pathological effects of the repeat expansion.

This award is part of the RNA Institute’s ongoing research, training, and awareness programs focused on DM— a disease with significant impacts in the New York region. These efforts include the promotion in the capital region of September 15<sup>th</sup> as International DM Awareness Day.

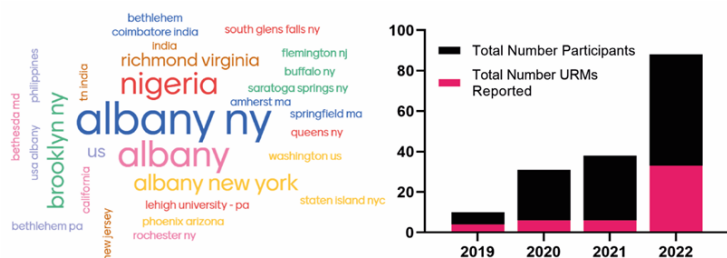


(Left) Berglund lab graduate students (Jesus Frias & Sawyer Hicks) at the UAlbany Campus Center on International DM Awareness Day September 15, 2022. (Right) NYS Plaza lit up green in support of DM Awareness Day.

## Trainee Highlights

### 2022 RNA Institute Summer Fellowship Program

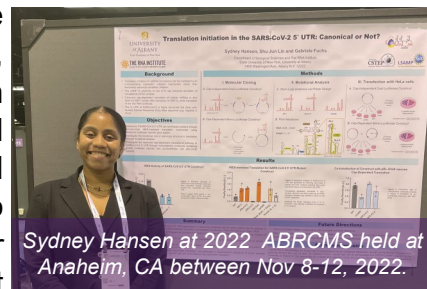
In 2022, the RNA Institute Summer Fellowship, led by Dr. Hannah Shorrock, offered both in-person laboratory research and virtual bioinformatics training. This program, over a period of 9 weeks in the summer, also provided professional development workshops, science lectures and educational seminars to the participants. This summer, the RNA Institute hosted over 85 participants from seven countries made up of mostly undergraduate students but also including graduate students, post-doctoral fellows and high-school students.



*“Bioinformatics, the ability to sift through massive datasets to uncover important answers on biology and human disease, is increasingly becoming a must have skill for researchers. This program is a valuable learning tool for students at all levels for an introduction to bioinformatics and the complexities of RNA and RNA-based research.” - Dr. Hannah Shorrock*

### UASRP trainees from the RNA Institute

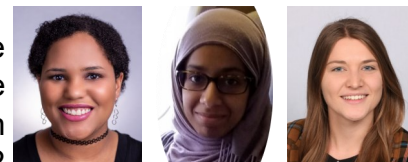
Two RNA Institute summer fellows, Sydney Hanson (Fuchs Lab) and Jose Velez (Berglund Lab) were selected to present their research work at



2022 Annual Biomedical Research Conference for Minoritized Scientists in Anaheim, California in November. This honor and the associated travel award speaks highly of research by Sydney and Jose. Congratulations to the both of these

### Lednev Lab Graduate students

hardworking trainees. Three members of the Lednev lab were recognized with awards at the 2022 SciX conference.



(Left to Right) Alexis Weber, Lamyaa Almeahmadi, Anna Wójtowicz

Alexis Weber received the FACSS Graduate Student Award and the SAS Barbra Stull Graduate Student Award; Lamyaa Almeahmadi received the 2022 Coblentz Student Award; and Anna Wójtowicz received the FACSS Graduate Student Award. Congratulations to these

### In the Spotlight—Cécilia Légaré



Dr. Cécilia Légaré

Cécilia Légaré is a postdoctoral fellow in a joint appointment with the Berglund lab at the RNA Institute and the Duchesne Lab at the University of Quebec at Chicoutimi. After completing her doctoral degree earlier this year, she joined both labs as a postdoctoral fellow to work closely with myotonic dystrophy (DM) patients. Dr. Légaré finds it important to work on DM, which has a higher prevalence in Quebec than anywhere else in the world. This year Dr. Légaré have received two fellowships to support her research, including a prestigious Fonds de recherche du Québec – Santé (Quebec Research Fund-Health) fellowship that runs for two years. Her

research will employ Next-Generation Sequencing to investigate the mis-regulation of alternative splicing and gene expression in DM patients and their response to exercise programs. She has also received a 1-year fellowship by the AFM-Téléthon, a patient organization fighting against neuromuscular diseases and rare muscular disorders. Dr. Légaré shares that *“Being a collaborative postdoc fellow between two labs is a very good experience as I have access to the expertise of both Dr. Duchesne and Dr. Berglund and their labs”*. Scan the QR code to read more about her research.

Read More



# 2023 RNA Institute Symposium

## 2023 RNA INSTITUTE ANNUAL SYMPOSIUM

Featuring speakers from  
NY Biotech & Pharma Industries

SAVE THE DATE  
March 15-17, 2023

Hosted by



in collaboration with



miR Scientific



## Message from the Associate Director

We are excited that in 2022 over twenty of The RNA Institute's trainees and faculty were awarded new federal and foundation awards (see highlights on pages 2 & 3). The continued grant success highlights our continued excellence in advancing RNA research and our ability to drive research progress and innovation at UAlbany. Many of these awards were shared between faculty, highlighting the collaborative and interdisciplinary research at the RNA Institute. We look forward to further exploring and exploiting the biology and chemistry of RNA, developing new tools for RNA discovery, and applying them to human health. The awards and research grants exemplify our pillar of excellence in RNA-based research. Further it highlights that RNA research spans different scientific disciplines. Together we are making contributions to the scientific community and society in general, which makes me proud!

I would like to personally extend an invitation to attend our upcoming 9<sup>th</sup> Annual RNA Institute Symposium from March 15 - 17, 2023. This year we are focusing on many of the exciting biotechnology and pharmaceutical companies that are based in New York. Many of these companies are strong institutional partners with the RNA Institute and help to support our research and workforce development programs, as well as help push the boundaries of RNA science. Our work with these partners is another example of how the RNA Institute is helping to lead scientific discoveries that have a significant impact on the University at Albany, the capital region and the state of New York. We would be happy for you to join us on our journey.

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Thanks for being  
In the Loop!

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