THE RNA INSTITUTE
COLLEGE OF ARTS & SCIENCES UNIVERSITY AT ALBANY

In the Loop

March 2019

Generous Gift from Interim Provost Wulfert

A major gift to the College of Arts & Sciences' RNA Institute will support students and faculty for years to come.

Edelgard Wulfert, Ph.D.
Dean College of Arts and Sciences

A gift totaling over $850,000 dollars, including $500,000 for the RNA Institute, will help ensure student success at the College of Arts and Sciences (CAS) far into the future, thanks to this transformative gift from the recently-named interim provost and former CAS Dean Edelgard Wulfert. She is committing these funds to support the CAS Dean's Fund for Excellence, the RNA Institute, and a scholarship for an undergraduate psychology major. Dr. Wulfert has also established a separate endowment to support Initiatives for Women. The donations alone are noteworthy, but the road that led Dr. Wulfert to her decision and the motivation to support these institutions also stands out. "I've been treated very well at UAlbany and have enjoyed a rewarding career here," Dr. Wulfert said. "The most important point to me is to give back to a place where I not only feel I have been treated well, but where I've seen firsthand the value of having access to resources."

The RNA Institute, established in the College of Arts and Sciences (CAS) under Dr. Wulfert's leadership as dean in 2009, holds special significance to Dr.Wulfert. "The work of the RNA Institute is near and dear to my heart, so it was undoubtedly important for me to support its work." Dr. Wulfert has presided over the evolution of the RNA Institute, which is training the next generation of RNA researchers in basic and translational science. The Institute is positioned to make significant contributions towards understanding the role of RNA in fundamental biological processes, developing RNA as a tool for science, and harnessing this knowledge to improve human health. Recently, under her tenure the Institute hired its new director Dr. Andrew Berglund.

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Generous Gift from Dean Wulfert

Speaking to her critical role, Dr. Berglund commented that "Elga's generous gift will help propel the Institute into its next phase by helping to support the work of young scientists and empower Institute faculty to advance their work towards the improvement of human health."

Provost Wulfert has always been a strong proponent of supporting graduate students and junior faculty with their research endeavors, something she stresses is particularly important at a Research 1 (R1 as designated by the Carnegie Classification) institution like UAlbany. Throughout her decades of holding administrative positions, she continued to conduct her own federally funded research while at the same time mentoring graduate students – something that is not often done by full-time administrators. "I am very proud of my doctoral students. Many of them have gone on to be very productive researchers. My last student is currently in a postdoctoral position at Yale University."

This commitment to student achievement and scientific progress can help explain Dr. Wulfert's generosity. She recalls when she was an untenured assistant professor without funding, the need to hire a graduate student assistant to support her research. Therefore, she set up an endowment for the University at Albany's *Initiatives for Women* which at the time provided her with enough money to pay a graduate student for a summer. "After that, I was able to attract my first research grant." Her generous gifts are now continuing this tradition and supporting students and faculty at the RNA Institute as well as throughout the College of Arts and Sciences.

Thank you, Dr. Wulfert, for continuing to support the future of RNA Research here in the RNA Institute at the University at Albany

UNIVERSITY AT ALBANY
State University of New York

Upcoming Events

RNA Café

The RNA Café is an invited seminar series exposing students and postdocs to non-traditional science careers by engaging in a roundtable discussion with credentialed scientists who have pursued careers outside of academia. 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.

RNA Café is proud to present these upcoming events:

Friday March 29th, 12-1:15PM
Christo Kyratsous, PhD
Regeneron, VP—Research

Tuesday April 30th, 2019
Christopher Danes, PhD
Executive Medical Science Liaison, Takeda Oncology. Title: "Medical Science Liaison: The bridge from the company to the clinic"

Hudson Valley RNA Club

The 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.
The Hudson Valley RNA Club meets the **third Tuesday of every month at 4:00 PM in the LSRB, room 1143.** See below for upcoming meetings.

Date: March 19, 2019
Speakers: Justin Waldern (Belfort Lab)
May Lee (Melendez Lab)
Affiliation: UAlbany

Date: April 16, 2019
Speakers: Casey Warszycki (McDonough Lab)
Affiliation: UAlbany
Xiaochun Long
Affiliation: Albany Medical Center

The RNA Institute Symposium

The Language of RNA in Disease and Development

Thursday March 21 and Friday March 22, 2019
https://www.rna.albany.edu/6th-annual-rna-symposium/

THE RNA INSTITUTE
COLLEGE OF ARTS & SCIENCES UNIVERSITY AT ALBANY

Training Opportunities and Support

Highlight on the NIH Research Supplements to Promote Diversity in Health Related Research (Administrative Supplement)

Funding Opportunity Announcement (FOA) is PA-18-586

For all details please go to: https://grants.nih.gov/grants/guide/pa-files/pa-18-586.html

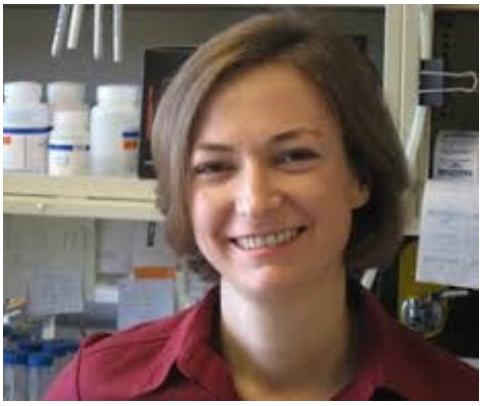
The NIH currently provides multiple opportunities to develop research careers and improve participation for individuals (from high school to the faculty level) from groups with low representation in the biomedical, behavioral, clinical and social sciences such as individuals from underrepresented racial and ethnic groups, individuals with disabilities, and individuals from socially, culturally, economically, or educationally disadvantaged backgrounds that have inhibited their ability to pursue a career in health-related research. This supplement opportunity is also available to PD(s)/PI(s) of research grants who become disabled and need additional support to accommodate their disability in order to continue to work on the research project. **Administrative supplements must support work within the scope of the original project.** Each parent grant/group will usually have additional FOAs so check carefully for the one related to the source of your original grant.

	High School Students	Undergrad Students	BSc and MSc Degree Holders	Graduate Students (Predoctoral)	Postdoctoral Training	Investigators Developing Independent Research Careers
Salary & Fringe Benefits	Minimum wage	Consistent with Institutional salary policies, rates that exceed $12.00/ hour must be justified	Cannot exceed **$35,000** of salary plus fringe benefits	Consistent with Institutional salary policies, cannot exceed zero level NIH postdoc stipend	Must be in accordance with the salary structure of the grantee institution and NIH stipend levels	Up to **$75,000** salary plus fringe benefits per year up to **$85,000** total direct costs
Supplies & Travel	N/A	**$200 per month**	**$3,000 per year**	**$4,000 per year**	**$6,000 per year**	**$10,000 per year**
Tuition	N/A	N/A	N/A	allowable (see PA-18-906)	N/A	N/A
Equipment	N/A	N/A	N/A	N/A	N/A	N/A
Period of Support	At least 3 months effort	At least 3 months of full time effort	One year -can be extended to two if candidate is pursuing entry into Grad school	Up to 3 years	Typically two years	Typically two years

Due Dates: Vary depending on the Component of the participating organizations. **Always check for the most recent FOA for your group and parent award. Some examples of program specific due dates are below:**

NCI: December 1st and March 30th
NHLBI: There is a submission date almost every month.
NINDS: February 15th (decided March), May 15th (decided June), November 15th (decided December),
NIAMS: Almost year round except for summer
NIAID: Oct 1st, Jan 1st, March 1st for summer work and April 1st
NIGMS: Various, depends on application type
NIA: Jan 7th, May 7th, and Sept 7th –verify this for your submission, can be dependent on original award dates
NIBIB: NIBIB grantees considering a diversity supplement application should contact Dr. Zeynep Erim (or program director) before preparing the application.
Application Instructions: Either the SF 424 or the PHS398 application guide (depending on parent grant and the instructions in the FOA). Always check for the most recent FOA for your group and parent award.

In the Spotlight — Cara Pager's Lab, University at Albany



Dr. Cara Pager obtained her Ph.D. from the University of Kentucky in Lexington, KY. In the laboratory of Dr. Rebecca Dutch, she identified the enzyme responsible for the unusual proteolytic processing of the Henipavirus fusion proteins. Her Ph.D. studies were supported by a fellowship from the American Heart Foundation. She was a Damon Runyon postdoctoral fellow in Dr. Peter Sarnow's laboratory at Stanford University where she studied hepatitis C virus (HCV)-host interactions and showed that HCV subverts numerous cellular RNA-binding proteins associated with RNA granules to stabilize the viral RNA and promote assembly of new viral particles.

Dr. Pager started her own research group in 2012 as an Assistant Professor in the Department of Biological Sciences and The RNA Institute at the University at Albany-SUNY. The overarching theme in her lab is to elucidate the interactions and mechanisms by which single-stranded positive-sense RNA viruses subvert host RNA metabolism pathways. The Pager Lab research has shown that RNA-binding proteins localized in processing bodies and stress granules function to promote and limit Zika virus gene expression. More recently her lab identified a plethora of epitranscriptomic marks on cellular RNAs and the genomes of single-stranded positive-sense RNA viruses. Her recent published work showed that Zika virus, Dengue virus, HCV, poliovirus and HIV-1 modulate not just the methylome but the whole epitranscriptome. Her lab is currently focused on deciphering the regulatory importance of RNA modifications to cellular and viral RNAs following viral infection. Dr. Pager was a Liver Scholars Early Stage Investigator and her current research is supported by the National Institutes of Allery and Infectious Diseases and General Medical Sciences.

Most recently Dr. Pager and Dr. Daniele Fabris of Chemistry — both faculty affiliated with The RNA Institute — were awarded a $1.9 million National Institutes of Health (NIH) grant to study how adding different chemical groups on RNA affects the infectious cycle of a virus.

Research supported by the grant will build upon the established findings of the two researchers that RNA in cells and RNA isolated from different viruses such as HIV-1, hepatitis C, Zika, Dengue and polioviruses, are coated with chemical groups. When the chemical groups are added onto RNA, the original characteristic and shape of the RNA changes which can give the RNA a completely new function. "This project will transform our view of the genetic material of RNA viruses from a simple string of letters or nucleotides that is used to make viral proteins and new viral genetic material to master-regulators of the infectious cycle," said Pager.

More information about the Pager Lab can be found here: https://www.pagerlab.com/.

Current members of the Pager Lab include (L to R): Gaston Bonenfant, Cara Pager, Marissa Louis, Rachel Netzband, Deniece Brown, and Emma Kahlke (not pictured).

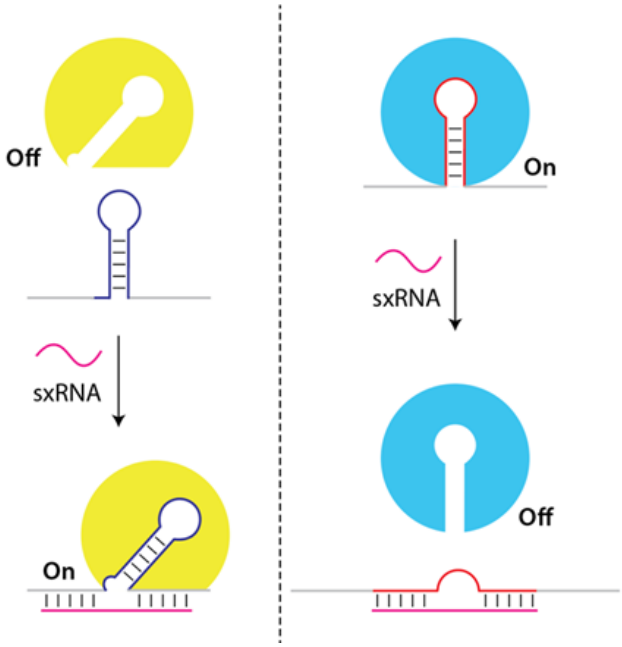
UNIVERSITY AT ALBANY

State University of New York

In the Spotlight—Scott Tenenbaum's Lab—SUNY Polytechnic Institute

From junk RNA to regulatory code: Research in the Tenenbaum Lab

You get a feeling of 'science meets technology' when you speak to Scott Tenenbaum, as he enthusiastically describes his lab's research. Prof. Tenenbaum, Head of Nanobioscience at SUNY Polytechnic Institute, is also an affiliated member of The RNA Institute. A major focus of his team's research is on structurally interacting RNAs, or as they call it, sxRNA. A large number of RNAs do not code for proteins, and were once considered junk RNA. Recent research efforts, however, have found new roles for such non-coding RNAs. MicroRNAs belong to this category: they are short, non-coding RNAs involved in gene regulation and play a role in developmental and disease processes. Tenenbaum's research focuses on how microRNAs influence biological processes by being a structural element. The group started working on this area when posed with the question "what if RNA-binding proteins and non-coding RNAs are both competing transactors for the same code?". To explore this, they engineered structure switching RNA molecules that can bind to specific portions of the gene and regulate protein binding (see Figure). "The regulatory code is yet to be discovered, and it's all RNA", says Tenenbaum, and adds that this research is "phenomenally exciting".



The Tenenbaum lab is also moving toward commercializing their research. Scott's first spin-out company *HocusLocus* (http://hocuslocus.com) was started in 2006, with work funded from multiple federal grants. The company has since changed directions and now focuses on biomanufacturing. The sxRNA they work on are "regulatory codes" involved in structural mechanisms of biological processes, a code that can be used in diagnostics and therapeutics. With Francis Doyle, a bioinformatic technician in his lab, Scott co-started the spin-out company *sxRNA technologies*. sxRNA is a "platform technology" with many potential applications. According to Scott, sxRNA technologies is a "holding company" that works to de-risk potential applications. Once the science is optimized for specific purposes, they plan to sublicense the technology to spin-out companies for different applications.

Some immediate applications of sxRNA are in imaging (for example, to study the RNA profile of a cell), in diagnostics to monitor microRNA signatures in urine and blood (together with Prof. Igor Lednev of SUNY Albany), and in therapeutics (with RNA therapeutic company Moderna). Their lab also works on single molecule analysis of RNA structures using optical tweezers, an area he collaborates with Prof. Pan Li of SUNY Albany's biology department. Other research include nanoparticle-based drug delivery, where the cargo is a long piece of RNA such as messenger RNA delivered into cells. On his lab doing both science and technology development, Scott says "we love technology… that's what is commercially viable, and that's what my grant is all about".

More information about the Tenenbaum Lab can be found here:
http://sxrna.sunycnse.com/nanobio/tenenbaum/

Recent Publications and Awards

Publications

AR Chandrasekaran and **K Halvorsen**. Controlled disassembly of a DNA tetrahedron using strand displacement. 2019 Nanoscale Advances. DOI: 10.1039/C8NA00340H

AR Chandrasekaran, M MacIsaac, P Dey, O Levchenko, L Zhou, M Andres, **BK Dey** and **K Halvorsen**, Cellular microRNA detection with miRacles: microRNA activated conditional looping of engineered switches. 2018 Science Advances. DOI: 10.1126/sciadv.aau9443 (In press).

BR Madhanagopal, S Zhang, E Demirel, H Wady and **AR Chandrasekaran**. DNA nanocarriers: Programmed to deliver. 2018 Trends Biochem. Sci. 43: 997-1013.

Czuban M., Srinivasan S., Yee NA, Agustin E., Koliszak A., Miller E., Khan I., Quinones I., Noory H., Motola C., Volkmer R.,Di Luca M., Trampuz A., **Royzen M.**, and Mejia Oneto JM. Bio-Orthogonal Chemistry and Reloadable Biomaterial Enable Local Activation of Antibiotic Prodrugs and Enhance Treatments against Staphylococcus aureus Infections. 2018 ACS Cent. Sci., 4 (12), pp 1624–1632

Debnath, I., Stringer, A. M., Smith, S. N., Bae, E., Mobley, H. L. T., **Wade, J.** T. and Pearson, M. M. MrpJ Directly Regulates Proteus mirabilis Virulence Factors, Including Fimbriae and Type VI Secretion, during Urinary Tract Infection. 2018*Infect. Immun.*, 86, e00388-18.

Wade, J. T. High-throughput determination of in vivo DNA sequence preferences for Cas protein binding using Library-ChIP. 2019 *Methods in Enzymology*. 616, 117-132.

Priscilla R, **Szaro BG.** Comparisons of SOCS mRNA and protein levels in Xenopus provide insights into optic nerve regenerative success. 2019 Brain Res. Feb 1;1704:150-160. doi: 10.1016/j.brainres.2018.10.012. Epub 2018 Oct 10.

Endres L, Fasullo M, Rose R. tRNA modification and cancer: potential for therapeutic prevention and intervention. 2019 Future Med Chem. Feb 12. doi: 10.4155/fmc-2018-0404. [Epub ahead of print] PMID:30744422

Worley BL, Kim YS, Mardini J, Zaman R, Leon KE, Vallur PG, Nduwumwami A, Warrick JI, Timmins PF, Kesterson JP, Phaëton R, Lee NY, Walter V, **Endres L**, Mythreye K, Aird KM, Hempel N. GPx3 supports ovarian cancer progression by manipulating the extracellular redox environment. 2018 Redox Biol. Nov 17. pii: S2213-2317(18)30891-7. doi: 10.1016/j.redox.2018.11.009.

Kelley DS, Lennon CW, Li Z, Miller MR, Banavali N, **Li HM**, **Belfort M**, Mycobacterial DnaB helicase intein as oxidative stress sensor. 2018 *Nat Comm.* 9:4363 | DOI: 10.1038/s41467-018 06554-x.

Pearson SC, Nemati R, Liu B, Zhang J, Scalabrin M, Li Z, **Li HM**, Fabris D, **Belfort M**, Belfort G. 2018 Structure of an Engineered Intein Reveals Thiazoline Ring and Provides Mechanistic Insight as a Splicing Switch. *Biotechnology and Bioengineering. Apr;116(4):709-721. doi: 10.1002/bit.26875. Epub 2019 Jan 8*

Cho JJ, Mansouri S, Drashansky TT, Helm EY, Zuniga AN, Xu Z, Parthasarathy U, Lorentsen KJ, Uddin MN, Duong DM, Edelmann MJ, Gehring T, Krappmann D, Califano D, **Li HM**, Wang RL, Cho JY, Jin L, Zhou L, Avram D. 2019 E3 ubiquitin ligase Hectd3 promotes pathogenic Th17 lineage through Stat3activation and Malt1 signaling, *Nat Comm*, 10, 701

Flora P, Wong-Deyrup SW, Martin ET, Palumbo RJ, Nasrallah M, Oligney A, Blatt P, Patel D, **Fuchs G**, **Rangan P**. Sequential Regulation of Maternal mRNAs through a Conserved cis-Acting Element in Their 3' UTRs. 2018 *Cell Rep.* Dec 26;25 (13):3828-3843.e9. doi: 10.1016/j.celrep.2018.12.007.

Avanzino BC, Jue H, Miller CM, Cheung E, **Fuchs G**, Fraser CS. Molecular mechanism of poliovirus Sabin vaccine strain attenuation. 2018 *J Biol Chem.* Oct 5;293(40):15471-15482. doi: 10.1074/jbc.RA118.004913. Epub 2018 Aug 20.

McCarthy A., Deiulio A., Martin ET, Upadhyay M., **Rangan P.**, Montell D. Tip60 complex promotes expression of a differentiation factor to regulate germline differentiation in female *Drosophila*. 2018 Mol. Biol Cell Nov 26;29(24):2933-2945. doi: 10.1091/mbc.E18-06-0385. Epub 2018 Sep 19

Flora P., Wong-Deyrup SW., Martin ET., Palumbo RJ, Nasrallah M., Oligney A., Blatt P., Patel D., **Fuchs G.**, **Rangan P.**. Sequential Regulation of Maternal mRNAs through a Conserved *cis*-Acting Element in Their 3' UTRs. 2018 December 26

Stauft CB, Shen SH, Song Y, Gorbatsevych O, Asare E, Futcher B, Mueller S, Payne A, Brecher M, **Kramer LD**, Wimmer E. Extensive recoding of dengue virus type 2 specifically educes replication in primate cells without gain-of-function in *Aedes aegypti* mosquitoes. 2018. PLoS One. 2018 Sep 7;13(9):e0198303. doi:10.1371/journal.pone.0198303. eCollection 2018

Marcinkiewicz AL, Dupuis AP 2nd, Zamba-Campero M, Nowak N, Kraiczy P, Ram S, **Kramer LD**, Lin YP. Blood-treatment of Lyme borreliae demonstrates the mechanism of CspZ-mediated complement evasion to promote systemic infection in vertebrate hosts. 2018 Cell Microbiol. Dec 20:e12998. doi: 10.1111/cmi.12998.

Gutiérrez-López R, Bialosuknia SM, Ciota AT, Montalvo T, Martínez-de la Puente J, Gangoso L, Figuerola J, **Kramer LD**. Vector Competence of Aedes caspius and Ae. albopictus mosquitoes for Zika virus, Spain. 2019 Emerg Infect Dis. Feb; 25 (2):346, 348. doi: 10.3201/eid2502.171123.

Awards

Gabriele Fuchs

Student name: Hesan Waly, Award amount: $250, Award type: travel award, Conference information: 2019 Scientista Symposium "Science Without Borders"; March 29th-31st; Joseph B. Martin Conference Center at Harvard Medical School; Boston, MA.

Laura Kramer

Richard M Taylor award from the American Society of Tropical Medicine and Hygiene, American Committee on Arboviruses. The Richard M. Taylor Award is given every three years to a person who has made outstanding contributions to arbovirology throughout his or her career.

Melinda Larsen

R01DE027953 04/01/19-06/30/24
NIH/NIDCR "Nanofiber Scaffolds for Salivary Gland Regeneration"
This proposal is to determine if endogenous tissue-resident mesenchymal stem cells are a source of tissue fibrosis and if modulation of that cell type can remediate fibrosis.

Hongmin Li

R01 AI140726-01A1 12/1/2018-11/30/2024
NIH "High throughput screening of the Prp8 intein splicing inhibitors for pathogenic fungi"
The proposal is to develop high throughput screening assays to identify and characterize inhibitors for the Prp8 intein of pathogenic fungi.

R21/R33 AI141178-01 2/1/2019-1/31/2021
NIGMS, NIH "Discovery of therapeutics against Cryptococcosis by Repurposing Pharmaceutical Libraries"
The proposal is to discover therapeutics against cryptococcosis by repurposing pharmaceutical libraries

Congratulations to all

THE RNA INSTITUTE
COLLEGE OF ARTS & SCIENCES UNIVERSITY AT ALBANY

Message from the Director

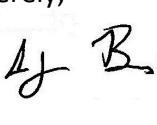
I'm pleased to report on the progress that has been made over the course of the past few months and announce some exiting developments in The RNA Institute. First and foremost, I'd like to take this opportunity to thank the Interim Provost, Elga Wulfert, for her generous estate gift to The RNA Institute, which will be recognized with an Institute lab named in her honor. It is this kind of generosity that provides the resources to make transformative change for our undergraduate and graduate trainees. With this gift, Elga is enabling the Institute to multiply its impact upon the affiliated faculty and trainees that form the backbone of our work.

I'm also happy to report that the T32 training grant continues to move forward in the funding process and while we await final word from NIH, all indications suggest the grant will start this summer. This grant will allow us to rigorously train science and engineering graduate students from four departments and two Universities in the principles of RNA and RNA related technologies, with applications in human health and disease. It will complement our existing RNA fellows program and fund 20 graduate students over 5 years.

Beginning this semester we are launching the **RNA Institute Undergraduate Summer Fellows Program**. This program will offer competitive summer fellowships for undergraduate students interested in pursuing interdisciplinary research within the lab of one of our Institute faculty. Students will receive a minimum scholarship of $3,000 and will be expected to pursue research full time for a significant portion of the summer. At the end of the summer, students will present their research to their peers, donors and members of the Institute. Interested students should contact one of the Institute faculty to discuss the opportunities available in their lab of choice. This opportunity is open to undergraduate students already in RNA Institute labs.

Also a reminder that the 6th Annual RNA Symposium will be held March 21 and 22 at the Performing Arts Center. We have lined up a world class group of scientists and hope that we will see you all there!

Sincerely,



Qu et. al. 2016 Group II intron ribonucleoprotein

Thanks for being In the Loop!

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