

WV-INBRE NEWSLETTER

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Dr. Kenneth Ramos was the keynote speaker at the 2019 WV-INBRE Summer Research Symposium



*Kenneth S. Ramos
MD, PhD*

Kenneth S. Ramos, MD, PhD, is a Professor of Medicine and Alkek Chair of Medical Genetics, Texas A&M University College of Medicine; Executive Director, Institute of Biosciences and Technology, Associate Vice President for Research, Texas A&M University

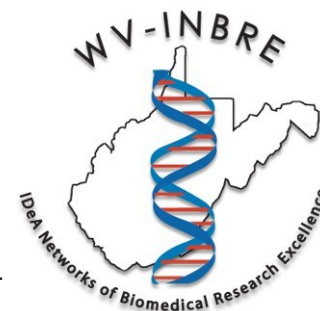
Health Science Center; Assistant Vice Chancellor for Health Services, Texas A&M University System.

Dr. Ramos is an accomplished physician-scientist and transformational leader, with designations in the prestigious National Academy of Sciences and National Academy of Medicine. He is recognized throughout the world for his scientific con-

tributions in the areas of genomics, precision medicine and toxicology.

Dr. Ramos' research integrates diverse approaches to elucidate genetic and genomic mechanisms of human disease. His work focuses on the study of repetitive sequences and their role in human disease. This work builds on seminal discoveries by his research group that defined epigenetic mechanisms of retrotransposon reactivation by biological, chemical and physical carcinogens. These early discoveries opened the door for groundbreaking research on LINE-1 retroelements and their role as jumping genes, chromatin remodeling agents and regulators of DNA repair. His group was among the first to establish the central role for retinoblastoma proteins as master regulators of epigenetic silencing and later to characterize novel targets for regulatory control of cells during development and differentiation and malignant progression. He is currently examining the utility of circulating LINE-1 mRNA and protein as prognostic and diagnostic biomarkers of lung disease, which in combination with imaging may improve the precision of early detection. This knowledge is being used to develop targeted therapies to prevent malignant progression of various cancer types.

With formal training in pharmaceutical sciences, chemistry, biochemistry, pharmacology, and medicine, Dr. Ramos is helping to steer the changing landscape of medicine, biotechnology and healthcare. He has published over 500 peer-reviewed manuscripts and abstracts in high impact journals such as Blood, Cancer Research, Circulation Research, Nature: Genomic Medicine, Molecular Oncology, Nucleic Acids Research, Oncogene and PNAS.



Network Partners of the WV-INBRE

Lead Universities

Marshall University
West Virginia University

Predominantly Undergraduate Institutions (PUIs)

Alderson Broaddus University
Bluefield State College
Concord University
Davis & Elkins College
Fairmont State University
Glennville State College
Shepherd University
University of Charleston
West Liberty University
West Virginia School of Osteopathic Medicine
West Virginia State University
West Virginia Wesleyan College
Wheeling University

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Message from the WV-INBRE Principal Investigator - Gary O. Rankin, Ph.D. -



As I am writing this message, 2019 is coming to an end and it is snowing! Tonight our area is getting record low temperatures for mid-November and thoughts of Thanksgiving and holiday season are on everyone's mind. At Thanksgiving, I always reflect on all the many things for which I am thankful and think about the year to come. This year in WV-INBRE has been a good one, as I think you will agree. Let's take a look at some of the good things that have happened.

Perhaps topping the list of good things is WV-INBRE being renewed for another five-year cycle, Y19 –Y23. Although we submitted our competitive renewal application and were reviewed in 2018, NIGMS Council did not meet until January 24 of this year to make funding decisions. Our renewal application had an outstanding impact score and we were awarded five more years of support. Because of some administrative delays, Y19 did not start until September 11, 2019 and will end July 31, 2020. The remainder of the yearly funding cycles will start on August 1 and end on July 31 of the next year, with the final day of this fourth cycle of funding to end on July 31, 2024. We also received an administrative supplement from NIH to fund a joint project between an INBRE investigator (Dr. Y.C. Chen, Alderson Broaddus University) and an IDeA-CTR investigator (Dr. Ivan Martinez, WVU) to study the role of long non-coding RNAs and microRNAs in the anticancer effects of a natural product in ovarian cancer. Speaking of funding, it was great news that Dr. Joseph Horzempa, West Liberty University, received an NIH R15 award for his research on *Francisella tularensis*.

I am always excited about our summer research program and the Summer Research Symposium. This year, we had 22 undergraduate students from 10 of the 13 partner institutions conducting research at Marshall University and West Virginia University. We again had four students from the SRIMS minority undergraduate research program and five students from the American Heart Association undergraduate program at Marshall University participate in many of the WV-INBRE activities, including presenting their work at the summer symposium. In addition, one partner institution faculty fellow and five Health Sciences and Technology Academy (HSTA) high school science teachers conducted research as part of the summer program this year. Dr. Ping Lu, Bluefield State College, worked with Dr. Michael Norton at Marshall University. The HSTA high school teachers worked in WV-INBRE funded laboratories at Marshall University, West Virginia University and West Liberty University. The summer symposium was held at Marshall University on July 30, 2019 with five oral and 79 poster research presentations being made. The keynote speaker was Dr. Kenneth Ramos, who is Assistant Vice Chancellor for Health Services, Texas A& M University System and Professor and Alkek Chair of Medical Genetics at the Texas A&M College of Medicine. Dr. Ramos gave an inspiring talk about his career pathway and how to achieve your goals in life. Overall, a great day with lots of new knowledge gained, food and fun!

Looking ahead to Phase IV of WV-INBRE, there are a number of changes and new opportunities for network members. First, partner institution faculty can now apply to the Faculty Research Development program for funds to help with pub-

lishing costs of no more than one publication per year. We have also started a new Cancer Biology Research Pilot Grant program that encourages investigators to utilize human tissues from tissue banks at Marshall and West Virginia Universities. With the exception of the Major PUI Research Awards, all developmental pilot project awards will be for two years rather than one year starting in Y20. Addiction has been added as an area of emphasis, along with other chronic diseases, and grant applications related to addiction research are encouraged. The Bioinformatics Core will also be holding the first Bioinformatics Summer Bootcamp for undergraduate and graduate students during the summer of Y19. The bootcamp will coincide with our regular summer program with participants also participating in the Summer Research Symposium. So, lots of new activities for WV-INBRE!

I would be remiss if I didn't remind everyone again that when you publish research or make a presentation based on WV-INBRE supported research or equipment purchased with WV-INBRE funds, please acknowledge support from NIH grant P20GM103434 awarded to West Virginia INBRE. These acknowledgements of WV-INBRE support are critical for our effort to demonstrate productivity in WV-INBRE and help get WV-INBRE renewed. If you have any questions about how to word the acknowledgement, please don't hesitate to contact me. Also, if you receive any honors, please let us know. We want to let NIH know that members of the WV-INBRE network are being recognized for what they are accomplishing.

Happy Holidays and may 2020 be your best year yet!



Fairmont State University Department of Natural Sciences receives WV-INBRE grant for new technology

Fairmont State University's Department of Natural Sciences received a \$50,000 grant from the West Virginia IDeA Network of Biomedical Research Excellence (WV-INBRE) with a \$15,000 match from the University for a genetic analyzer.

"The Natural Sciences department wants to expand the technology available to students and to enhance undergraduate research experiences in and out of the classroom," Dr. Mark Flood said. "This genetic analyzer allows our students the ability to separate amplified pieces of DNA using capillary electrophoresis."

In Forensic Science, this specific modern instrument is helping to identify an unknown DNA sample and compare it to known people, he said. It will allow students to do DNA sequencing, a technique that can be applied across multiple branches of science.

"Genotyping is used to convict or exonerate people by allowing forensic scientists to determine if a person left behind DNA at the scene of a crime," Flood said. "Our science students will be able to use this equipment in classes like Forensic Biology and Genetics as well as for undergraduate research projects. We believe that having this instrument will



allow our students to develop important biotechnology skills that employers want."

Flood noted that the Natural Science Department recognizes the challenge to promote science and to train students in their pursuit of science-based careers in West Virginia.



"We propose to engage and train interested and academically talented students in undergraduate research starting their second semester of college and throughout all of their remaining laboratory experiences," he said. "The majority of our majors plan on attending professional school with many remaining in the state upon graduation."

Students will conduct research and present at statewide, regional, or national scientific meetings. Flood said the genetic analyzer will allow faculty to focus on the science behind DNA analysis instead of simply discussing the application of the technology.

2019 WV-INBRE Summer Research Symposium



in the state. The summer program allows students enrolled in the Primarily Undergraduate Institutions (PUIs) in the WV-INBRE network research opportunities in labs at both Marshall University and West Virginia University. In addition to the formal research training they receive, students attend workshops and seminars aimed at helping them understand the research process and graduate education. The morning session of the symposium began with oral presentations by: Brian

Undergraduate college students, the majority from West Virginia, showcased their summer research projects on July 30th as part of the 18th Annual West Virginia IDeA Network for Biomedical Research (WV-INBRE) Summer Research Symposium. During the 2019 Summer Program, WV-INBRE supported twenty-two undergraduate interns, one faculty fellow, and five high school science teachers from the West Virginia HSTA program. Thirteen interns carried out their research at West Virginia University. Nine interns and one faculty fellow conducted their research at Marshall University. The high school science teachers conducted their research at West Liberty University, West Virginia University, and Marshall University. The research projects presented at the symposium were conducted under the direction of faculty mentors during an intensive 9-week period. The projects included studies on the effect of binge drinking in adolescent brain function, the effects of nutrition on reproduction, Alzheimer's disease, and the pathophysiology and treatment of infectious diseases among others. WV-INBRE, which is designed to support biomedical research in the state, is funded by a grant from the National Institutes of Health (NIH) to Marshall University, in cooperation with West Virginia University and fourteen other colleges and universities



McNeel, High School Science Teacher at Cabell Midland High School in Ona, WV; WV-INBRE/HSTA Summer Research Fellow-Caleb Duncan (University of Charleston), Brittani Greene (West Virginia Wesleyan College), Rhiannon Maccom (West Liberty University), Emily Rainey (Alderson Broaddus University); Summer Research Program Interns. The featured speaker for this year's summer re-

search symposium was Kenneth S. Ramos, MD, PhD. Professor of Medicine and Alkek Chair of Medical Genetics, Texas A&M University College of Medicine; Executive Director, Institute of Biosciences and Technology, Associate Vice President for Research, Texas A&M University Health Science Center; Assistant Vice Chancellor for Health Services, Texas A&M University System. His presentation was entitled: "A Story of LINES, Discovery and Self-Realization". Dr. Ramos' talk was highly inspirational, entertaining, and very well received by everybody in attendance. Following a luncheon, the symposium continued with poster presentations by students and faculty. There were a total of 79 posters. Participants presenting posters included summer undergraduate interns and faculty fellows from the PUI's who conducted research at West Virginia University and Marshall University during the 9-week summer research program, and students and faculty conducting research at their home institutions. The high school science teachers supported by the WV-INBRE/HSTA initiative also presented posters.



WV-INBRE Interns at Marshall University



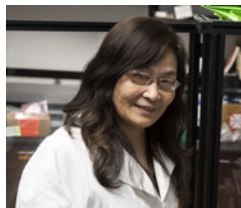
(Pictured Left to Right) Front Row: Chere Davis (Glennville State College), Jessica Adams-Duffield (Fairmont State University), Kassey Wagner (West Virginia Wesleyan College) and Heather Connery (University of Charleston); Back Row: Matthew Chapman (Davis & Elkins College), Brittani Green (West Virginia Wesleyan College), Katie Preece (University of Charleston), Caleb Duncan (University of Charleston) and Rebecca Lee (Bethany College).

WV-INBRE Interns at West Virginia University



(Pictured Left to Right) First row: Kelsey Matusic (University of Charleston), Rhiannon Macom (West Liberty University), Jessica Johnson (Fairmont State University), Julia Ivey (Shepherd University), Megan Haller (Fairmont State University) Second Row: Emily Rainey (Alderson Broaddus University), Lindsey LaNeve (Fairmont State University), Julia Harman (Fairmont State University), Yumi Tze (Concord University) and Kayla Ratcliff (Alderson Broaddus University). Third Row: Heather Kiblinger (Alderson Broaddus University), Michael Watcher (Shepherd University), and Tom McIntosh (West Virginia Wesleyan College)

WV-INBRE 2019 Summer Fellow



WV-INBRE sponsors a Summer Research Fellowship Program for faculty members from the PUIs in the network. This year's summer fellow was Dr. Ping Lu.

Dr. Lu is an Assistant Professor of Physics at Bluefield State College. She conducted her summer research in the laboratory of Dr. Michael Norton at the Joan C. Edwards School of Medicine at Marshall University.

WV-INBRE Core Directors Visit West Liberty University Campus

Drs. Don Primerano and Jim Denvir of the West Virginia Idea Network of Biomedical Research Excellence (WV-INBRE) visited West Liberty University and met with faculty and administration to discuss biomedical research opportunities in West Virginia. Dr. Primerano is the Director of the Marshall University Genomics Core and Dr. Denvir is the Bioinformatics Core Director. During the visit, they conducted two workshops and held a session to inform faculty in the area about funding opportunities through WV-INBRE (faculty from West Liberty University and Bethany were in attendance). In the afternoon, they met individually with faculty who were

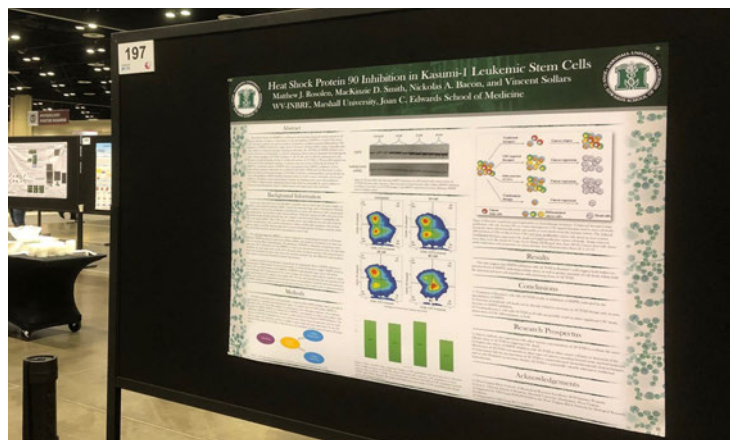
interested in seeking funding for biomedical research, equipment, or to form research collaborations.

WV-INBRE has provided millions of dollars of funding to West Liberty University over the past decade and a half. This funding primarily supports student-driven research, but has also allowed for improvement of infrastructure by providing capital to purchase important equipment. Moreover, WV-INBRE will be funding a \$250,000 renovation of Arnett Hall that will likely begin this coming summer.

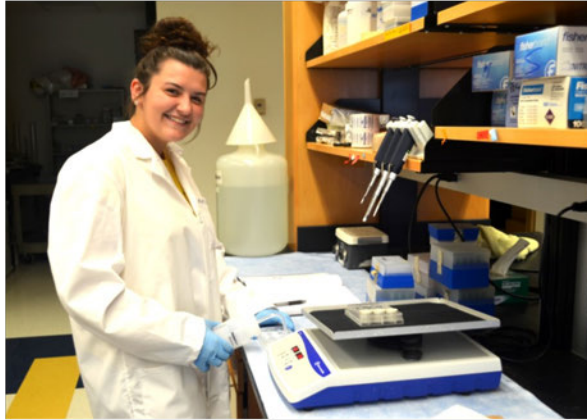
Rosolen presents research at the Experimental Biology Meeting

Matthew Rosolen, a 2018 WV-INBRE Summer Research Intern, presented his research project at the Experimental Biology Meeting in Orlando, Florida.

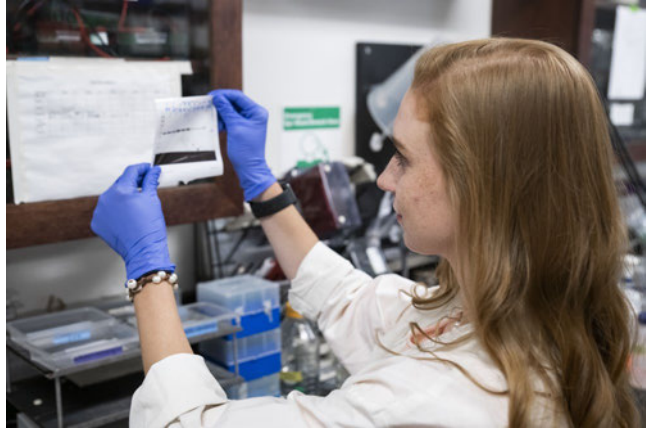
Matthew reports: "I had a wonderful time at the Experimental Biology 2019 conference in Orlando! It was a very rewarding experience. I was able to expand my networking skills by having the opportunity to meet scientists and physicians from all over the world, with some of which I hope to remain in contact."



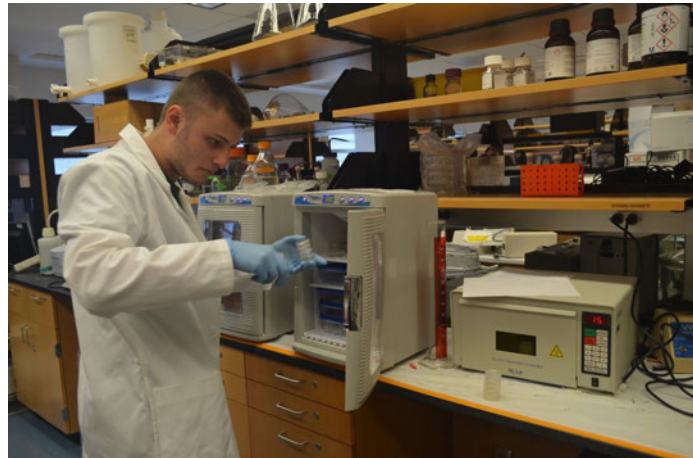
WV-INBRE participants working in the labs



Megan Haller, Fairmont State University, worked with Dr. Robert Goodman at West Virginia University.



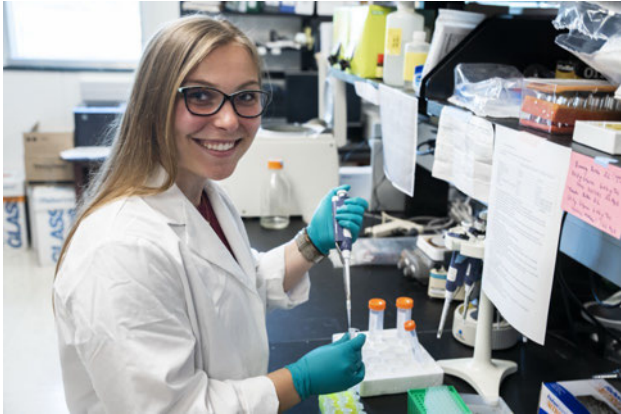
Rebecca Lee, Bethany College, worked with Dr. Richard Egleton at Marshall University.



Michael Watcher, Shepherd University, worked with Dr. Werner Goldenhuys at West Virginia University.

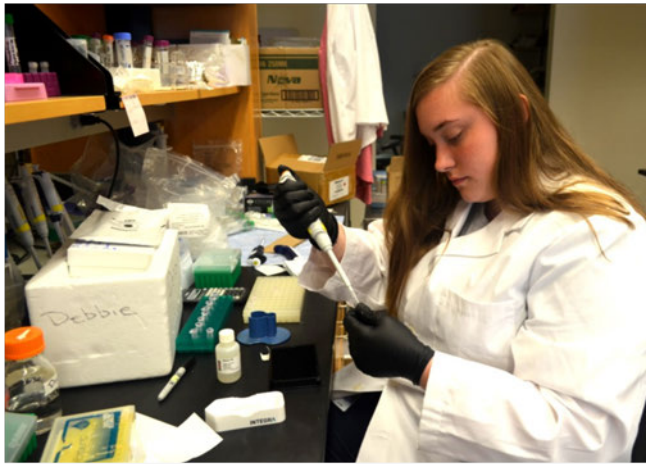


Chere Davis, Glenville State College, worked with Dr. Monica Valentovic at Marshall University.



Jessica Adams-Duffield, Fairmont State University, worked with Dr. Jung Han Kim at Marshall University.





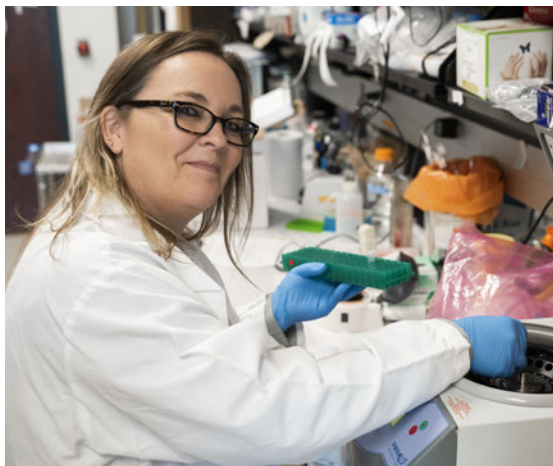
Heather Kiblinger, Alderson Broaddus University, worked with Dr. Elizabeth Engler-Chiurazzi at West Virginia University.



Caleb Duncan, University of Charleston, worked with Dr. Vincent Sollars at Marshall University.



Kayla Ratcliff, Alderson Broaddus University, worked with Dr. Julie Brefczynski-Lewis at West Virginia University.



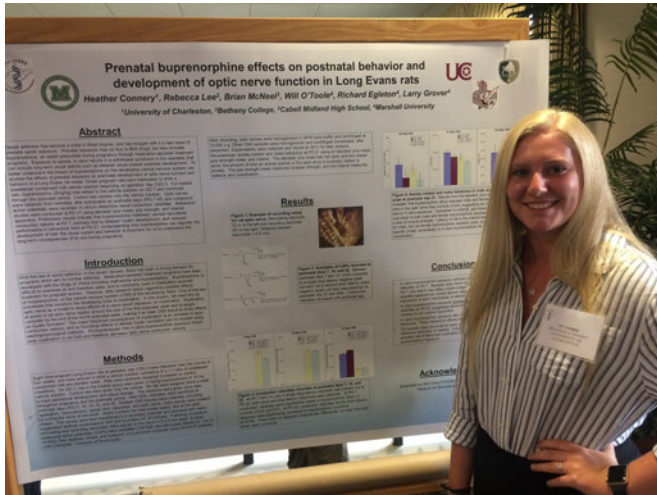
Julie Blaylock, HS Science Educator as part of the INBRE/HSTA program, worked with Dr. Nalini Santanam at Marshall University.



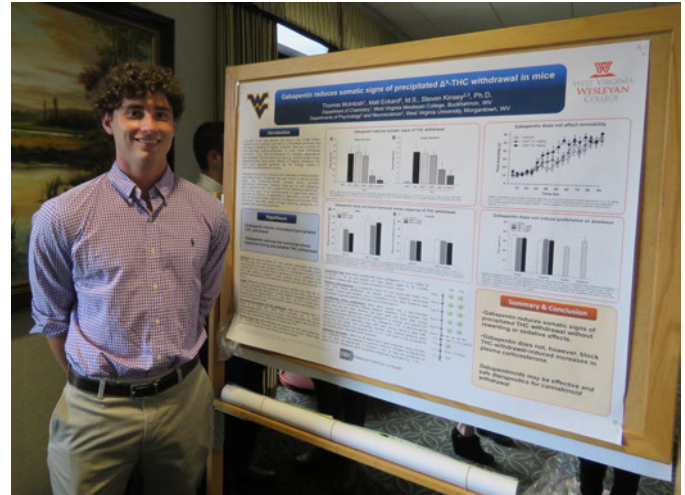
Samantha Young, High School Educator as part of the INBRE/HSTA program, worked with Dr. Werner Geldenhuys at West Virginia University.



Summer Participants Presented Posters at WV-INBRE Symposium



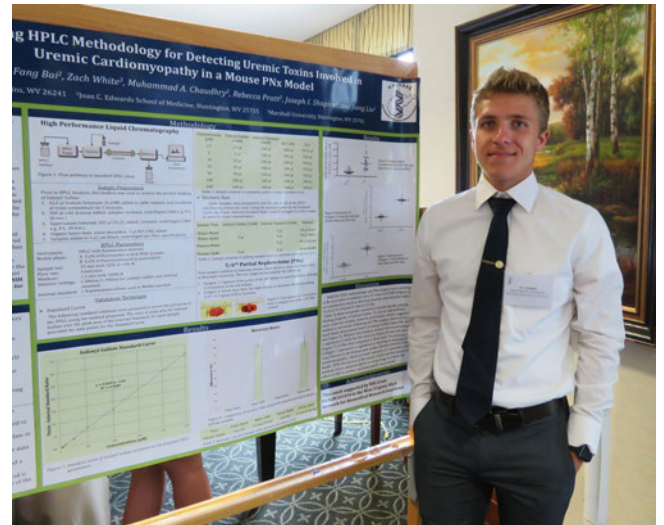
Heather Connery, University of Charleston, presented her poster entitled “Prenatal buprenorphine effects on postnatal behavior and development of optic nerve function in Long Evans rats.” Heather worked in Dr. Larry Grover’s lab at Marshall University.



Thomas McIntosh, West Virginia Wesleyan College, presented his poster entitled “Gabapentin reduces somatic signs of precipitated Δ⁹-THC withdrawal in Mice.” Thomas worked in Dr. Steven Kinsey’s lab at West Virginia University.



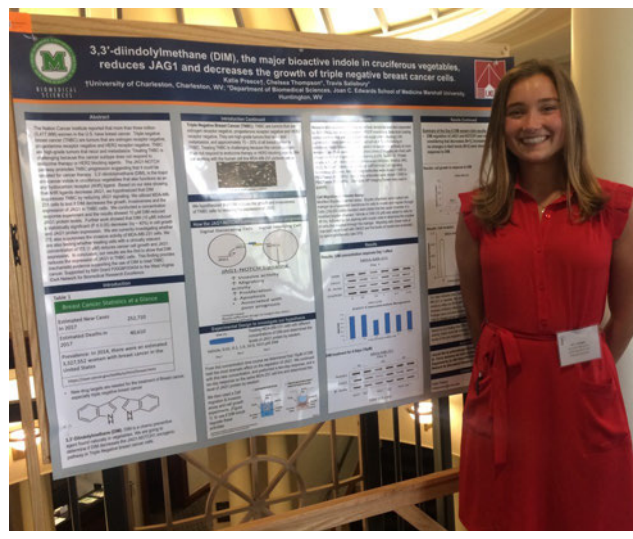
Julia Harman, Fairmont State University, and her mentor, Dr. Mark Olfert of West Virginia University, stand beside her poster entitled “The Effects of Maternal E-Cigarette Exposure on the Cerebral Microvessels of Offspring.”



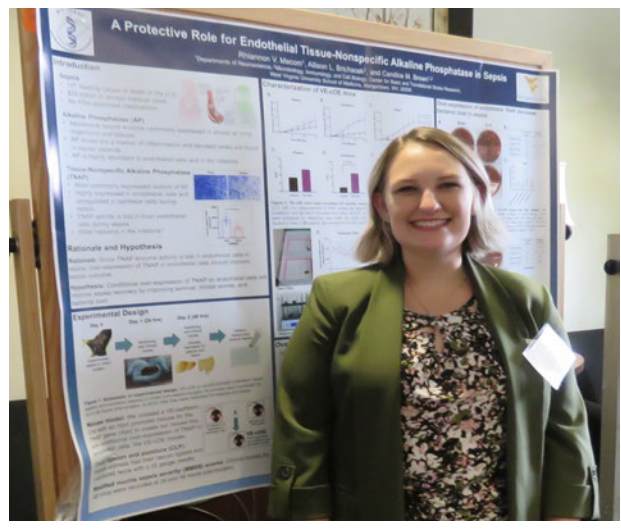
Matthew Chapman, Davis & Ekins College presented his poster entitled “Validating HPLC Methodology for Detecting Uremic Toxins Involved in Uremic Cardiomyopathy in a Mouse PNx Model.” Matthew worked in Dr. Jiang Liu’s lab at Marshall University.



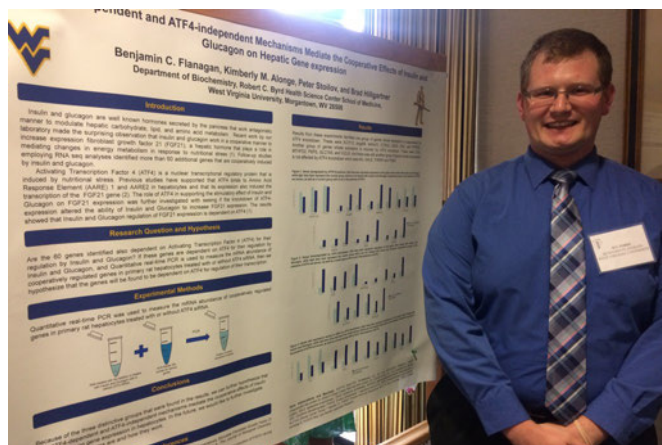
Summer Participants Presenting Posters at WV-INBRE Symposium



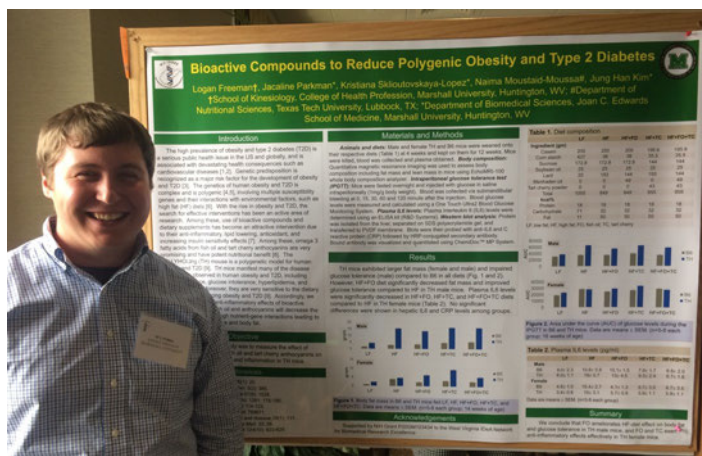
Katie Preece, University of Charleston, presented her poster entitled “3,3'-diindolylmethane (DIM), the major bioactive indole in cruciferous vegetables, reduces JAG1 and decreases the growth of triple negative breast cancer cells.” Katie worked in Dr. Travis Salisbury’s lab at Marshall University.



Riannon Macom, West Liberty University, presented her poster entitled “A Protective Role for Endothelial Tissue-Nonspecific Alkaline Phosphatase in Sepsis.” Riannon worked in Dr. Candice Brown’s lab at West Virginia University.



Benjamin Flanagan, HSTA Scholar, presented his poster entitled “Both ATF4-dependent and ATF4-independent Mechanisms Mediate the Cooperative Effects of Insulin and Glucagon on Hepatic Gene expression.” Benjamin worked in Dr. Brad Hillgartner’s lab at West Virginia University.



Logan Freeman, HSTA Scholar, presented his poster entitled “Bioactive Compounds to Reduce Polygenic Obesity and Type 2 Diabetes.” Logan worked in Dr. Jung Han Kim’s lab at Marshall University.



WV-INBRE Provides Biomedical Research Opportunities to HSTA Scholars During the Academic School Year

The partnership between WV-INBRE and the Health Sciences & Technology Academy (HSTA) program is focused on encouraging undergraduate students to pursue biomedical research opportunities. Those who have demonstrated an interest in biomedical research through their participation in the HSTA program while in high school are eligible to participate in this program. WV-INBRE selects students to further develop their interest in biomedical research once they enroll at West Virginia University, Marshall University or one of the Primarily Undergraduate Institutions (PUIs).

During the 2018-2019 academic year, 15 HSTA scholars were selected to participate in this program as WV-INBRE student interns. Nine student interns participated at the PUIs, 4 interns at West Virginia University, and 2 interns at Marshall University.

Goldenhuys; Keshawn Merritt-Pannell working with Dr. Paul Chantler; Benjamin Flanagan working with Dr. Brad Hillgartner; and Danielle Norman working with Dr. David Klinke.

Two student interns, Logan Freeman working with Dr. Juan Han Kim, and JaQualla Smith working with Dr. Monica Valentovic, were at Marshall University.

All student interns presented the results of their research projects at the 18th Annual WV-INBRE Summer Research Symposium in Huntington WV on July 30, 2019.

Another component of this joint program is to provide opportunities for high school science educators to participate in biomedical research for up to nine weeks during the summer with a mentor at West Virginia University, Marshall University, or one of the WV-INBRE funded PUI laboratories. Participation is open to high school science educators who teach in the state of West Virginia during the previous academic school year. The goal of this part of the program is to provide research opportunities to interested science teachers with the expectation they will take their research experience back into their classrooms and inspire their students to pursue biomedical research opportunities once they enter college. Additionally, it is anticipated that the techniques they learn from the research will enhance the scientific teaching experience in the classroom.

For summer 2019, 5 high school science educators were awarded 7 to 9-week research internships: Julie Blaylock from South Charleston High School worked with Dr. Nalini Santanam; Brian

McNeel of Cabell Midland High School worked with Dr. Richard Egleton; and Peter Starnes of Cabell Midland High School worked with Dr. Louise Risher, all at Marshall University; Samantha Young of University High School worked with Dr. Werner Goldenhuys at West Virginia University; Jill Stephens of Wheeling Park High School worked with Dr. Joseph Horzempa at West Liberty University. All interns presented their research at the 18th Annual WV-INBRE Summer Research Symposium in Huntington WV on July 30, 2019.



The 9 student interns at the PUIs were: Raenel Crenshaw, Maya Patterson, Shomonique Hankins, and Gezelle Brown working with Dr. Tesfaye Belay at Bluefield State College; Jesse Orell, working with Dr. James Walters at Bluefield State College; Brielle Taylor, Jada Voellinger, and Wyatt Wingrove working with Dr. Joseph Horzempa at West Liberty University; and Brittany Graham, working with Dr. Gerald Hankins at West Virginia State University.

The 4 student interns at West Virginia University were: Marqus Creavalle working with Dr. Werner

HIGHLIGHT: Alderson Broaddus University student aims to empower women through research



One Alderson Broaddus University junior satisfied her curiosity for research by interning through the WV-INBRE program, a federally funded opportunity available to students enrolled at WV-INBRE partner institutions interested in biomedical research with an emphasis on chronic diseases.

Emily Rainey, a dual biology and chemistry major from Beckley, West Virginia,

executed her research at the Robert C. Byrd Health Sciences Center of West Virginia University. Her project was completed under the guidance of Dr. Stan Hileman, Professor of Physiology and Pharmacology.

“One of the biggest things I wanted going into this was to really see what it’s like to do research,” Rainey said. “I didn’t know if I wanted to eventually do an MD or an MD/PHD program, so I wanted to see what it was like.”

Rainey’s project studied the communication between NKB neurons, which deal with reproduction and puberty, and POMC neurons, which regulate nutrition, in order to better understand the onset of puberty in women. Tissue was taken from the hypothalamus of ewes to determine whether NK3R, a receptor for NKB, existed within POMC neurons. They then examined how estrogen and age influenced NK3R expression within these neurons.

“Women, especially in developed countries, are experiencing puberty onset at much younger ages,” Rainey said. “That has a lot of negative effects, but if we can understand why that’s happening and what’s affecting it, we can start to counteract negative things that happen when puberty onset is altered.”

Some of the adverse outcomes related to early puberty onset include obesity, osteoporosis, and eating disorders. Working on this research held personal significance for Rainey, as one of her primary goals is to help empower young women. However, Rainey explains that early puberty does not affect everyone negatively. In the agricultural world, this can produce the opposite effect.

“The earlier you can get ewes, swine, and cattle to mature, the greater their lifetime productivity,” Rainey said. Rainey showcased her research findings at the 2018 WV-INBRE Summer Research Symposium and recently at the Undergraduate Research Day at the State Capitol. She hopes to pursue additional re-

search in the future, and has been invited back to Dr. Hileman’s lab to work on similar projects.

“I honestly enjoyed every second of it,” Rainey said. “The first-hand experience with research was incredible, but it’s also just amazing to have your own research that no one has ever done before.”

Emily also visited Washington, D.C., May 21-23. She was one of only 9 students from throughout the country to participate in a highly competitive nationally funded program that helps new generations of young researchers communicate the importance of research.

Emily earned this experience through the IDEa Networks of Biomedical Research Excellence (INBRE), funded through Congress and designed to help student researchers share the importance of research by having them travel to Washington to meet with key staffers from their state’s congressional offices and be trained by members of the Van Scoyoc Associates (VSA), a Washington-based government affairs firm, about the IDEa program, its funding, and how to perfect an “elevator speech” to help them educate their state’s governmental servants on why research opportunities are so important.

Besides meeting with the nine other students from around the country, Emily met with the president of the National Association of IDEa Principle Investigators (NAIPI), the executive director of the Established Program to Stimulate Competitive Research (EPSCoR)/IDEa Foundation, and the president of VSA. She also spent all of one afternoon visiting members of Congress.



Pictured above are the nine participants. Emily is third from the right. Congratulations Emily!