BIG IDEAS!

Ever wonder about the deep thoughts and eureka moments percolating across campus? Sample a smattering of new knowledge created by Drew student researchers over the past year alone.

MODELING NEUROLOGICAL DISEASE

Alexandria Holroyd C'20
Faculty Mentor > Marvin Bayne, RISE

Working with the roundworm *C. elegans*, a model for studying human neurological disease, Holroyd used a neurotoxin to induce varieties of Parkinson's disease and autism spectrum disorder and assess damage to the worms' neurons. In the process, she developed specialized techniques for choosing worms and photographing them with a fluorescence microscope.

MISOPHONIA

Kelly Maegerlein C'21
Faculty Mentor > Andy Evans, RISE

Certain common, repetitive auditory and visual stimuli—for example, food chewing and hair twirling—evoke a fight-or-flight response in people with misophonia. By analyzing current research on this newly identified psychological disorder, Maegerlein ascertained that additional work is needed on two fronts: its genetic basis and its less-studied visual aspect.

ANTIBIOTIC DISCOVERY

Allison Ramos C'18
Faculty Mentor > Arnold Demain, RISE

Working with *S. platensis*, a bacterium that produces the antibiotics platensimycin and platencin, Ramos tested several compounds for their efficacy in stimulating antibiotic production in two different strains of the bacterium, one a normal producer and the other a high-producing mutation. She found that all compounds stimulated antibiotic production in the normal strain but only one, aspartic acid, did so in the mutant strain.

» WHO KNEW? PHYSICS **«**

Could a Star Trek tractor beam soon be a reality?

Negative, Captain. Today's particle manipulation technology would be more likely to melt than move large objects.

Eva Wagenknechtova C'20

CYBERBULLYING

Umair Sayeed C'21
Faculty Mentor > Jon Kettenring, RISE

What might be the most efficient way to identify cyberbullying on social media? Studying various computer algorithms, Sayeed determined that the optimal solution is one that incorporates machine learning. Such computer systems can progressively improve their own performance, allowing them to learn, for example, new vocabulary indicative of cyberbullying.

OPIOID WITHDRAWAL IN NEWBORNS

Alexander Pearce C'19
Faculty Mentor > Alan Rosan, Chemistry

Newborns exposed to opioids in the womb may suffer a set of withdrawal symptoms known as neonatal abstinence syndrome. Pearce, in a comparison of available treatments, found that, of the two accepted drugs, buprenorphine is superior to methadone, while a third, less-studied drug, buprenorphine/naloxone, might be the best option of the three.

50+
student researchers spent last summer in DSSI labs.

THROAT SINGING

Ian Nadler C'18
Faculty Mentor > James Saltzman, Music

Through a technical analysis of Tuvan throat singing, in which singers produce two tones simultaneously, Nadler employed the physics governing music production to extrapolate a major cultural purpose of throat singing among the once-nomadic Central Asian people: to emulate the sounds of—and thereby connect more intimately with—nature.

>400
undergraduates have conducted research with our RISE scientists.

NEW MEDICINAL COMPOUNDS

David Van Dongen C'19
Faculty Mentors > Ronald J. Doll, RISE; Roger Knowles, Biology

Working on several drug discovery projects, Van Dongen synthesized a variety of compounds for biological testing and evaluated them for druglike properties, namely an ability to pass through the gastrointestinal tract and blood-brain barrier membranes. His work has yielded several promising compounds for the treatment of diseases of the central nervous system.

CONSTRUCTABILITY OF NUMBERS

Jeff Moorhead C'18
Faculty Mentor > Seth Harris, Mathematics & Computer Science

Moorhead examined the mathematical implications of the so-called constructability of numbers—the ancient Greek method of finding the answer to a geometric problem using only a compass and straightedge—and determined ways in which an understanding of the method can help spark insight into problems in fields far outside pure mathematics.

GLOBAL DESERTIFICATION

Zoe Coates Fuentes C'18
Faculty Mentor > Timothy Carter, Political Science

Growing degradation of the Earth's dryland ecosystems—a process known as desertification—is a global environmental challenge. Analyzing meteorological and geological patterns, Fuentes argues that the release of particulates known as mineral dust aerosols into the atmosphere—a little-studied effect of desertification—will exacerbate climate change and lead to even greater degradation of arid and semiarid lands.

COUNTERING CLIMATE CHANGE

Janna D. Fadler C'21
Faculty Mentor > Jon Kettenring, RISE

How vulnerable are Argentina, Brazil and Peru to climate change? Fadler used three variables—geographic location, extreme weather events and predicted climate effects—to determine each country's risk and measure it against current environmental policies. Her research demonstrates the importance of tailoring mitigation policies to a country's particular risk factors.

» WHO KNEW? PSYCHOLOGY **«**

Can a fragmented sense of self arise from contact with social worlds outside one's own?

A survey of Drew students found a link between a fractured self-sense and contact via internet technology.

Joao Pedro Martins Pinheiro C'19

» WHO KNEW? CLIMATOLOGY **«**

The four- to fivefold increase in CO_2 levels over a 350,000-year period during the Early Eocene Climatic Optimum mirrors the projected increase over the next 300 years alone.

Mason A. Scher C'20

1 in 5
student papers submitted to *Drew Review* is accepted for publication

FUTURE CANCER DRUGS

Alex T. Longacre C'20
Faculty Mentor > Ronald J. Doll, RISE

To help in the design of new kinase inhibitors—highly effective agents that fight certain types of leukemia by disabling a mutated form of the enzymes known as kinases—Longacre assessed two kinase inhibitors already in use and recommended a pathway to the creation of future drugs. This step is essential, given the drugs' known susceptibility to resistance.