IOWA MSTP

mstp@uiowa.edu
@IowaMSTP

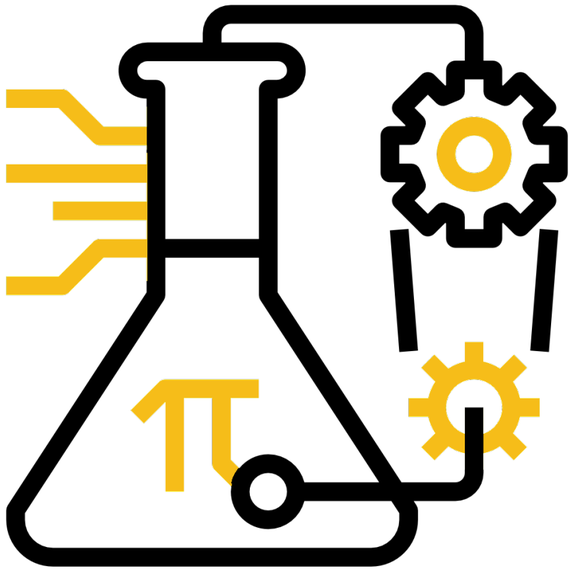
INSIDE THIS ISSUE:

STEM at the Children's Museum, karaoke, publications by our students, successful thesis defenses, exciting alumnus research, poetry by Shakoora Sabree, M3G, and a special valentine

Spring 2019 Newsletter

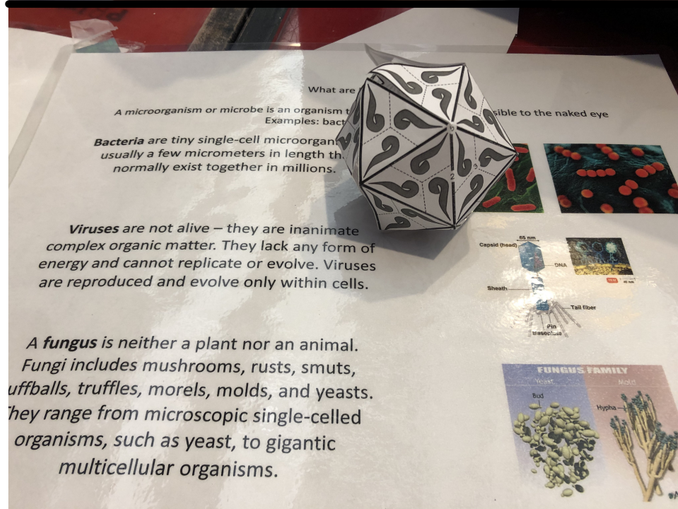
STEM for Kids!

"On January 25th, three of our MSTP students volunteered at the Iowa Children's Museum Family Free STEM Night. This night effectively engaged kids in STEM activities led by students from the Carver College of Medicine partnering with University of Iowa Health Care. There were several stations hosted by MSTP, Medical, Physician Assistant, and Physical Therapy Students. The kids could interact with the students to learn about germs & viruses, sun safety, laparoscopic surgery, casting their own finger or wrist, and trying different physical therapy activities.

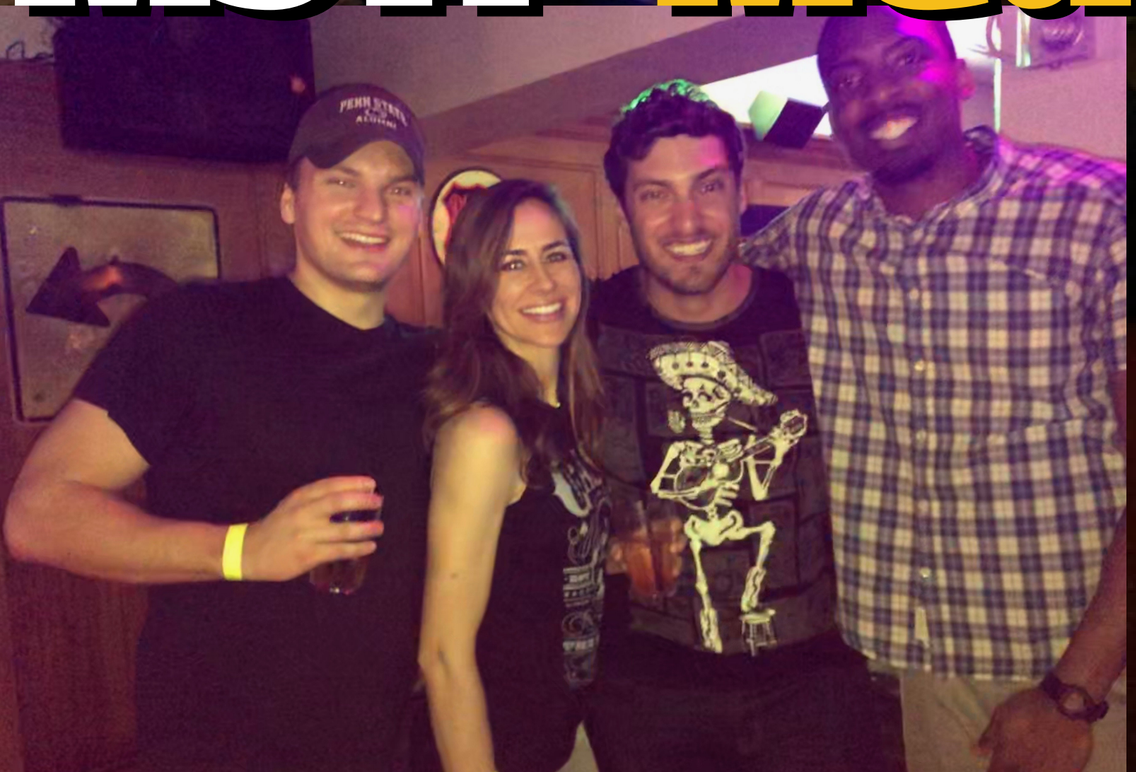


Our MSTP students were in charge of the Germ Station, helping kids visualize that their hands are covered in germs and learn different ways to practice hand hygiene. The kids put lotion on their hands that is invisible to the naked eye but glows when under a black light, mimicking the imperceptible nature of germs. Some kiddos shook hands with friends or parents to visualize how easily germs can be transferred by contact. They were, then, challenged with washing all of the glow germs off, teaching them proper hand hygiene and how to keep themselves and others healthy. Many were shocked when they learned that the proper length of washing their hands should be the time it takes to sing Happy Birthday—TWICE! In addition to learning that germs can make them sick and what they can do to stop the spread of germs, kids were able to make 3D viruses to take home with them. STEM night was a huge success, with over 900 kids and their families enjoying the activities."

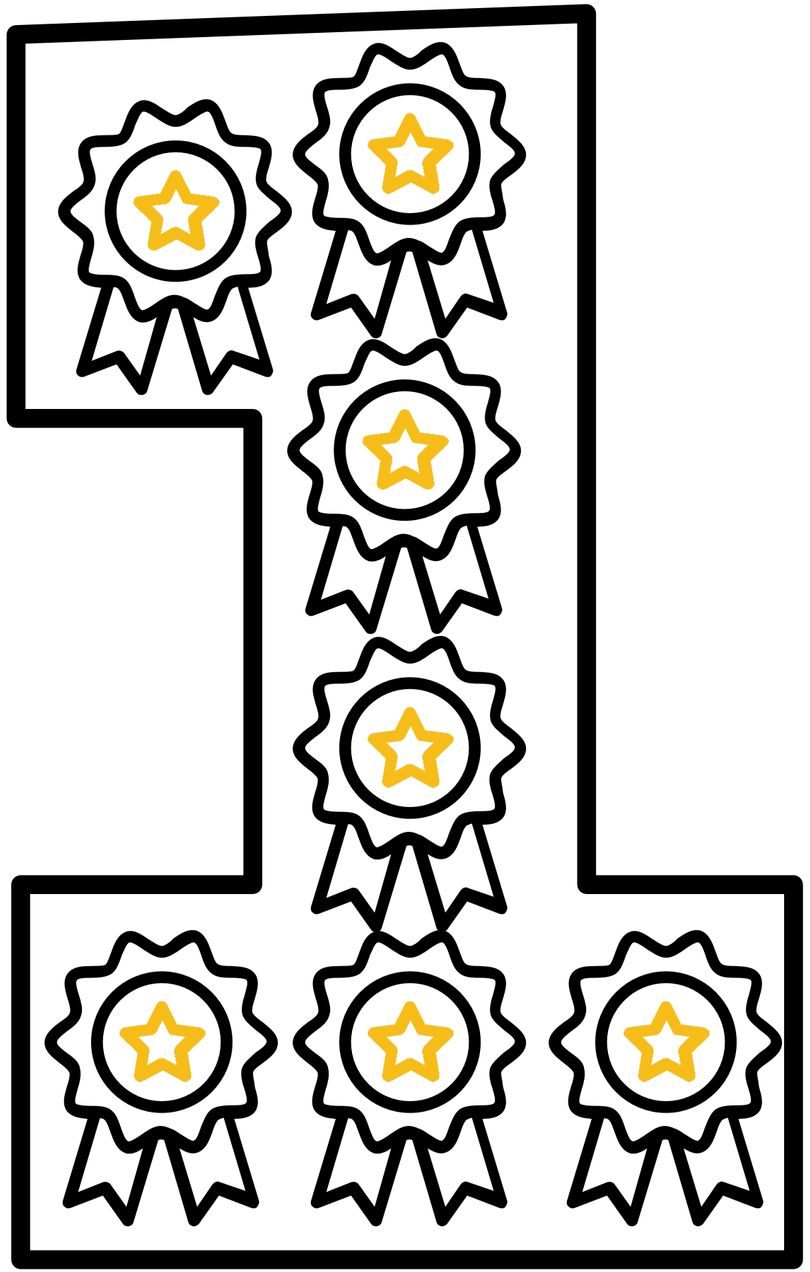
—Lucy Evans, M4G



MSTP Medleys



Karaoke



Publications by MSTP Students

Amanda Benavides, MD, PhD (2017), Metzger A, **Alexander Tereshchenko, M5G**, Conrad A, Bell EF, Spencer J, Ross-Sheehy S, Georgieff M, Magnotta V, Nopoulos P. Sex-specific alterations in preterm brain. Pediatr Res. 2019 Jan;85(1):55-62. Epub 2018 Sep 19.

Kolb R, Kluz P, Tan ZW, **Nick Borcherding, M5G**, Bormann N, Vishwakarma A, Balcziak L, Zhu P, Davies BS, Gourronc F, Liu LZ, Ge X, Jiang BH, Gibson-Corley K, Klingelhutz A, Tan NS, Zhu Y, Sutterwala FS, Shen X, Zhang W. Obesity-associated inflammation promotes angiogenesis and breast cancer via angiopoietin-like 4. Oncogene. 2018 Dec 5. [Epub ahead of print]

Cole Haskins, M5G, McDowell BD, Carnahan RM, Fiedorowicz JG, Wallace RB, Smith BJ, Chrischilles EA. Impact of preexisting mental illness on breast cancer endocrine therapy adherence. Breast Cancer Res Treat. 2018 Nov 21. [Epub ahead of print]

Fischer AJ, Pino-Argumedo MI, Hilkin BM, Shanrock CR, Gansemer ND, Chaly AL, **Keyan Zarei, M5G**, Allen PD, Ostedgaard LS, Hoffman EA, Stoltz DA, Welsh MJ, Alaiwa MHA. Mucus strands from submucosal glands initiate mucociliary transport of large particles. JCI Insight. 2019 Jan 10;4(1). pii: 124863. [Epub ahead of print]

Almeida DRP, Chin EK, Arjmand P, **Gabe Velez, M5G**, **Lucy Evans, M4G**, Mahajan VB. Fibrin Glue and Internal Limiting Membrane Abrasion for Optic Disc Pit Maculopathy. Ophthalmic Surg Lasers Imaging Retina. 2018 Dec 1;49(12):e271-e277.

Jauregui R, Thomas AL, Liechty B, **Gabe Velez, M5G**, Mahajan VB, Clark L, Tsang SH. SCAPER-associated nonsyndromic autosomal recessive retinitis pigmentosa. Am J Med Genet A. 2018 Dec 18. [Epub ahead of print]

TO MY MOTHERS DOWN SOUTH

SHAKOORA SABREE

where the sun sparks a high fever
over the pink walled room in the left corner
facing what once was auntie's home.
the purple flower-patterned blanket
packed away in the closet, full of one night's tears
shed in acceptance of an eternal loneliness.
i can still feel the warmth of your palm
on my back, as you comfort me with soothing rubs
and the words: one day, you'll find that special one.

where numerous pot holes divide rocky roads
that spiral up to the little school on the hill,
a familiar white van opens its doors
from which eight children and i parade,
dressed in lime green and that awful yellow,
taking turns stepping into your outstretched hands,
before scurrying off to lessons of the day.
fourteen years, I spent there under your care.
five later, I found out that masses roamed within.

where rain drops collect upon the grass strands that grow
in luscious green patches over your youngest child.
whose grin of one who knows his charm, still lights my mind.
beside him, big sister hugs him close, placing kisses
you long to give upon his freckled face. four years pass
and just as the promise of smiles return,
two becomes three.
i pick up the phone with no words of comfort and
silently cry as you selflessly confess your love for me.

Successful Defenses!

Tiffany Borbon, M5G: *"Bacterial Coinfections during Murine Cutaneous Leishmaniasis"*
Mentor: Mary Wilson, MD – Microbiology

Nicholas Borcherding, M5G: *"Big Data Analytics and Cancer Biology: Lessons in Taking Science From the Processor to the Patient"*
Mentor: Weizhou Zhang, PhD - Cancer Biology

Charlotte Feddersen, M5G: *"Utilization of Forward Genetic Approaches to Elucidate Mechanisms of Cancer Initiation and Drug Resistance"*
Mentor: Adam Dupuy, PhD - Anatomy & Cell Biology

Rachel Genova, M5G: *"The Role of Neprilysin in Ocular Surface Homeostasis and Corneal Wound Healing"*
Mentor: Andrew Pieper, PhD - Molecular Physiology & Biophysics

Joseph Giacalone, M5G: *"Treating Retinal Disease"*
Mentor: Ed Stone, PhD & Budd Tucker, PhD – Genetics

Cole Haskins, M5G: *"Influence of Preexisting Mental Illness on Breast Cancer Endocrine Therapy Adherence"*
Mentor: Betsy Chrischilles, PhD – Epidemiology

Max (Guanghao) Liu, M5G: *"Investigating the TAU-FYN interaction in healthy and disease states of the brain"*
Mentor: Gloria Lee, PhD – Neuroscience

Alexander (Sasha) Tereshchenko, M5G: *"Brain structure and function in juvenile-onset Huntington's disease"*
Mentor: Peg Nopoulos, MD – Neuroscience

Sean Tompkins, M5G: *"The Role of the Mitochondrial Pyruvate Carrier in the Development of Hepatocellular Carcinoma"*
Mentor: Eric Taylor, PhD – Biochemistry

MSTP Alumnus Discovers a Key Wakefulness Pathway

Excerpt from News from the University of Iowa Carver College of Medicine

With a finding that will "rewrite neuroanatomy textbooks," University of Iowa neurologist **Aaron Boes, MD, PhD**, and his colleagues show that the thalamus is not a critical part of the brain pathway involved in keeping humans awake and conscious.

The finding upends decades of medical dogma that placed the thalamus as a critical relay point for the signals originating in the brainstem and ending in the cortex that maintain consciousness (wakefulness). The new study, published online Nov. 12 as a preprint in the *Annals of Neurology*, provides the first systematic evidence from humans that questions the routing of this critical pathway. The study evaluates patients with strokes of the thalamus and shows that even extensive injury to the thalamus does not severely impair consciousness.

"Beyond just challenging a long-standing dogma that has persisted for decades, what's really exciting about this finding is that it has implications for clinical care for patients," says Boes, UI assistant professor of pediatrics and neurology and a member of the Iowa Neuroscience Institute. "Based on the old understanding, people have tried to stimulate the thalamus for disorders of consciousness without much success. Our results suggest that was the wrong target to go after and that the hypothalamus or basal forebrain would be better targets."

To evaluate the role of the thalamus in the neural circuitry of arousal in humans, the UI team led by Boes and Joel Geerling, MD, PhD, assistant professor of neurology, searched medical records to identify 33 patients who had had a stroke that affected the thalamus. They used the patients' MRI images to map the precise brain areas damaged by the stroke and assessed the level of consciousness for each patient within the first 12 hours of the stroke.

There were four patients with severely impaired arousal (coma, or stupor), all of whom had damage that extended beyond

the thalamus into the hypothalamus and brainstem. In contrast, none of the patients with damage confined purely to the thalamus experienced severe impairment of arousal (wakefulness).

"It looks like the pathway most critical for maintaining consciousness runs from the brainstem through the hypothalamus and basal forebrain into the cortex," Boes says. "I hope future studies will now focus on this new pathway. I think that could change the management of patients in a coma, and those with other disorders of consciousness."

We made you this valentine out of "Tissue" Paper

(Think you know the identity of this histology ?
Send us an email, mstp@uiowa.edu)

Happy Valentine's Day from the IOWA MSTP