MAY | SPRING 2020 | VOLUME 5, ISSUE 1

THE CORE REPORT

The spot for news from the Cores of the Pediatric Research Alliance

Pediatric Cores operation during COVID-19 pandemic

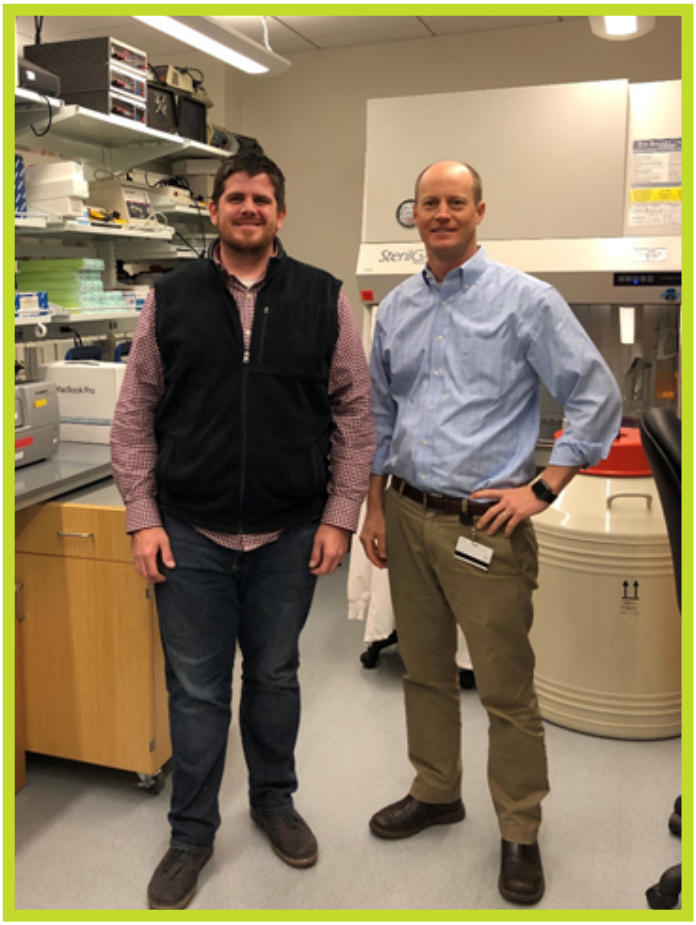
The onset of the COVID-19 pandemic required Emory University to implement a rapid research activity ramp-down across the campus. In swift response to that, our Pediatric Cores made well-organized plans to remain open for ongoing essential and critical research projects. Cores involved in animal or human sample work operated under a skeleton staff to meet the research demand while also protecting the health and safety of both Core employees and user groups.

During this period of research ramp-down, all Pediatric Cores have been providing consultation, data analysis and work-related communications via email and conference calls. Staff are freely available to discuss study related questions and issues. The Pediatric Biostatistics Core is providing their full set of services while working remotely. The Peds/Winship Flow Core closed the lab at Winship Building C, and have maintained sorting and analysis for essential studies in the lab at HSRB. The Clinical Translational Discovery Core (CTDC) suspended all service for non-essential studies, but is serving a critical role as the laboratory processing center for large COVID related study. The staff from both Flow Core and CTDC have contributed tremendously in Emory COVID-19 related studies. Biomarkers Core have processed and analyzed samples from essential studies only, and stored samples for non-essential studies within a strict temperate controlled environment. Animal Physiology Core is performing ongoing essential studies. Staff from CF Discovery core rotate to collect samples from patients at urgent visits only.

Amid the COVID-19 global outbreak, we have been incredibly proud of our Pediatric Cores who have contributed tremendously to Emory's essential research efforts during this difficult time. Please stay tuned in the coming weeks as we outline our plans for ramping research back up, according to the timeline established by Emory University.

INSIDE THIS ISSUE

Core Highlight: Children's Clinical and Translational Discovery Core (CTDC)



In the fall of 2019, Children's Clinical and Translational Discovery Core (CTDC) celebrated 4 years of operation. Throughout the last 4 years, the CTDC has continued to expand in the areas of clinical trial support, correlative biology research, and banking of biological samples for future distribution.

Children's Clinical and Translational Discovery Core Mission

The CTDC offers laboratory and technical assistance to investigators conducting basic science, epidemiologic, translational, and clinical research. Our mission is to support and complement the research efforts of investigators by providing laboratory research services, technical assistance, and access to biological samples that represent a variety of diagnoses and healthy volunteers.

(Left) Technical Director: Bradley Hanberry, PhD
(Right) Scientific Director: Chris Porter, MD, PhD

Using the Core

The use of the CTDC is open to investigators at Emory, Children's Healthcare of Atlanta, and collaborators within and outside of Emory. The core offers:

- **Clinical Trial Support:** Clinical sample processing and storage services for their subsequent use in hypothesis-driven clinical research.
- **Correlative Biology Studies:** Support and advice on the conduct of correlative biology studies associated with clinical trials from initial study design and planning through the implementation and interpretation of molecular assays of drug targets and genomic correlates of disease.

Biorepository: Access to a variety of human biological specimens from both healthy control participants and patients with a variety of diagnoses. Samples that the CTDC processes and stores include, but are not limited to: plasma, serum, peripheral blood mononuclear cells (PBMC), urine, stool, saliva, and biopsies.

New Service!! Long-term Storage

Sample integrity is essential for any type of scientific research. The CTDC provides centralized biorepository services that include secure, alarm-monitored, cold storage solutions that ensure samples are stored with the utmost of integrity. The CTDC currently is able to store samples at 4˚C, -80˚C, and - 150˚C. Because constant temperature is critical to sample viability, our cold storage is equipped with a monitoring system that notifies personnel should the temperature of any unit deviate from its acceptable range.

Meet the New Personnel of the Cores!

Lisa Bixby, MS
Pediatric/Winship Flow Cytometry Core

My name is Lisa and I joined the Flow Core in May of 2019 as a Senior Flow Cytometry Technologist. I provide cell sorting, training and instrument assistance to users of the core. Some of my favorite parts of the job are troubleshooting flow panel and sorting issues. I have an M.S. in immunology and 15 years of flow cytometry experience.

Before I moved to Atlanta, I worked at the UNC Flow Cytometry Facility and served as lab manager to a cancer immunotherapy lab at UNC. Outside of work I spend most of my time reading, hiking, hanging out with my cat Joey, homebrewing and (thinking about) running. I'm also fascinated with moral philosophy and how it applies to our everyday choices.

-**Submitted by Lisa Bixby**

Gaurav Joshi, PhD
Integrated Cellular Imaging Core (ICI)

Hello, my name is Gaurav Joshi, and I am one of the imaging scientists at the Integrated Cellular Imaging (ICI) Core at Emory. I am located in HSRB E-G21 to help you with everything imaging. I completed my Ph.D. in Cell Biology at the University of Connecticut.

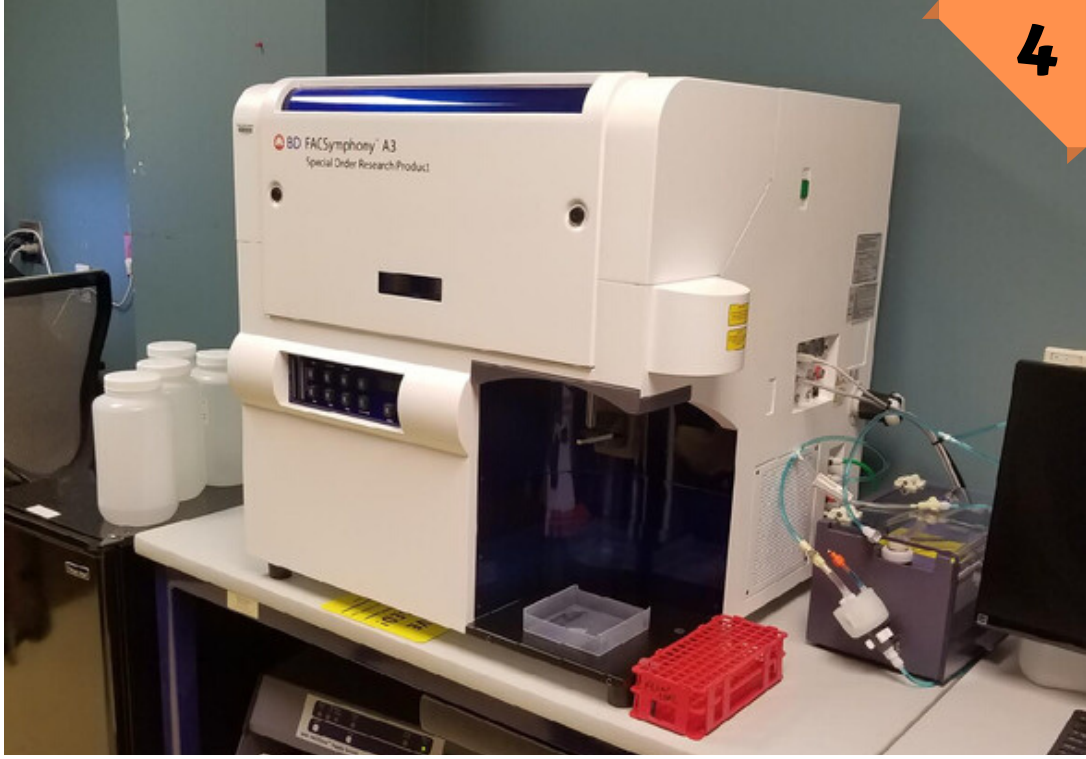
My work on understanding the toxicity of silica particles (responsible for fibrotic lung disease silicosis) to alveolar macrophages was done using various imaging modalities. Before moving to Emory, I was a postdoc at Harvard School of Public Health, where I worked on understanding the regulation of cell death in healthy and diseased lungs. My scientific journey has made me adept in designing, executing, and quantifying imaging experiments. I welcome you all to come and chat about your science and explore what ICI has to offer. Microscopes at HSRB can help you do widefield, deconvolution, and super-resolution with an option to do live-cell imaging as well as confocal imaging.

I find cooking very therapeutic. In my free time, I like exploring nature and hiking. Having lived in the northeast for many years, I look forward to exploring the south. Recommendations welcome.

-**Sumbitted by Gaurav Joshi**

Instrument highlights - Flow Cytometry Core

FACSymphony A5 & A3

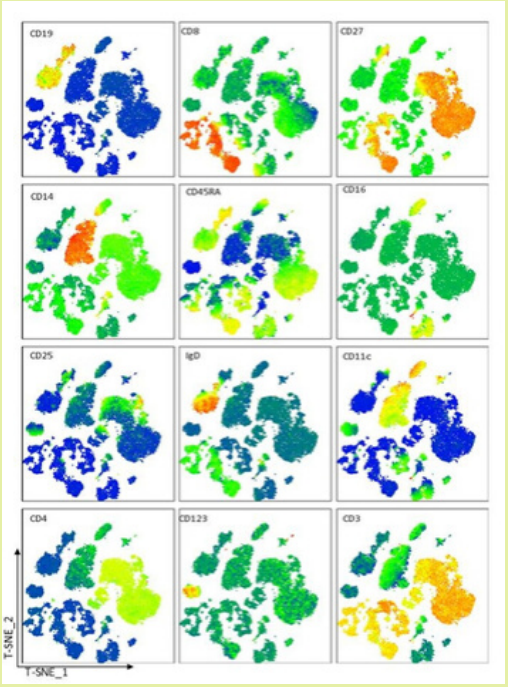


The Pediatrics & Winship Advanced Flow Cytometry Core recently purchased a FACSymphony A5 and FACSymphony A3 to meet the high demand. The BD FACSymphony™ system is a novel cell analyzer that leverages the inherent benefits of flow cytometry and enables the simultaneous measurement of up to 28 different characteristics of a single cell. This high parameter flow cytometer is a powerful analytical tool that enables scientists to identify and analyze distinctive phenotypes in heterogeneous populations. These high parameter instruments utilize state of the art low-noise electronics to maximize sensitivity and a re-designed fluidics system to minimize carryover.

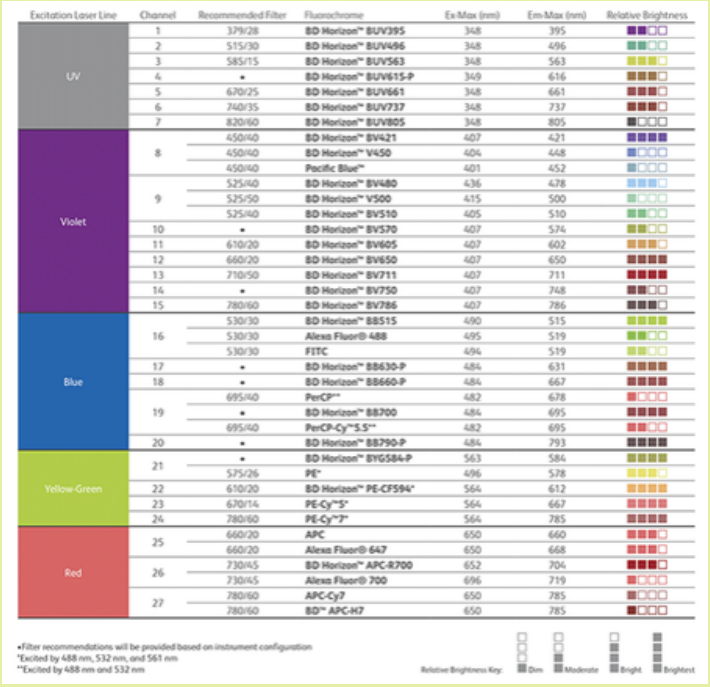
The core provides recommended voltage settings as well as stain indexes for the most common fluorochromes on both the A5 and A3. Staff are available to assist in panel design and provide hands-on assistance with at least 2- to 3-days notice. Further information on the A5 and the A3 can be found on the core website here:

https://www.pedsresearch.org/research/cores/flow-cytometry-core/bd-facsymphony/

-**Submitted by Aaron Rae**



Tsne plots generated from multi-color experiements on the FACSymphony A3



Excitation Laser Line	Channel	Recommended Filter	Fluorochrome	Ex-Max (nm)	Em-Max (nm)	Relative Brightness
UV	1	379/28	BD Horizon™ BUV395	348	395	
	2	515/30	BD Horizon™ BUV496	348	496	
	3	585/15	BD Horizon™ BUV563	348	563	
	4	•	BD Horizon™ BUV615-P	349	616	
	5	670/25	BD Horizon™ BUV661	348	661	
	6	740/35	BD Horizon™ BUV737	348	737	
	7	820/60	BD Horizon™ BUV805	348	805	
Violet	8	450/40	BD Horizon™ BV421	407	421	
		450/40	BD Horizon™ V450	404	448	
		450/40	Pacific Blue™	401	452	
	9	525/40	BD Horizon™ BV480	436	478	
		525/50	BD Horizon™ V500	415	500	
		525/40	BD Horizon™ BV510	405	510	
	10	•	BD Horizon™ BV570	407	574	
	11	610/20	BD Horizon™ BV605	407	602	
	12	660/20	BD Horizon™ BV650	407	650	
	13	710/50	BD Horizon™ BV711	407	711	
	14	•	BD Horizon™ BV750	407	748	
	15	780/60	BD Horizon™ BV786	407	786	
Blue	16	530/30	BD Horizon™ BB515	490	515	
		530/30	Alexa Fluor® 488	495	519	
		530/30	FITC	494	519	
	17	•	BD Horizon™ BB630-P	484	631	
	18	•	BD Horizon™ BB660-P	484	667	
	19	695/40	PerCP**	482	678	
		•	BD Horizon™ BB700	484	695	
		695/40	PerCP-Cy™5.5**	482	695	
	20	•	BD Horizon™ BB790-P	484	793	
Yellow-Green	21	•	BD Horizon™ BYG584-P	563	584	
		575/26	PE*	496	578	
	22	610/20	BD Horizon™ PE-CF594*	564	612	
	23	670/14	PE-Cy™5*	564	667	
	24	780/60	PE-Cy™7*	564	785	
Red	25	660/20	APC	650	660	
		660/20	Alexa Fluor® 647	650	668	
	26	730/45	BD Horizon™ APC-R700	652	704	
		730/45	Alexa Fluor® 700	696	719	
	27	780/60	APC-Cy7	650	785	
		780/60	BD™ APC-H7	650	785	

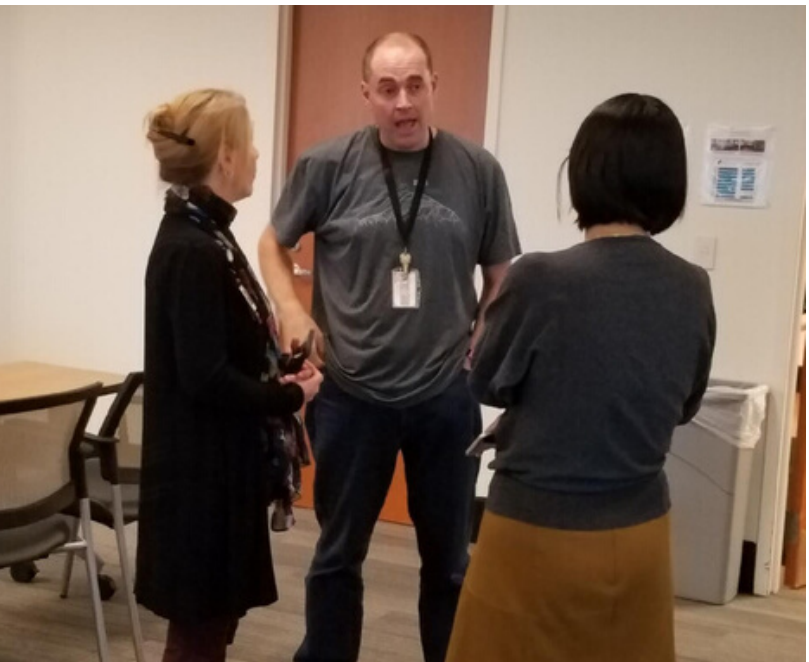
•Filter recommendations will be provided based on instrument configuration
*Excited by 488 nm, 532 nm, and 561 nm
**Excited by 488 nm and 532 nm

Relative Brightness Key: Dim, Moderate, Bright, Brightest

Chart showing some of the available fluorochromes on the FACSymphony

Pediatric/Winship Flow Cytometry Core Open House Event

Since 2019, our partnership with the Winship Cancer Institute has allowed for specific support of cancer-related projects. This partnership has thrived in the past year, allowing extra support for researchers conducting cancer- and child-health related studies to receive a blended subsidy from both the Department of Pediatrics and Winship. On 10/30/2019, The Pediatrics & Winship Advanced Flow Cytometry Core conducted an Open House event at Kauffman Auditorium, C5012 for Peds/Winship researchers and core users. Dr. David Archer, the Core Scientific Director, gave a presentation and showcased core personnel and services. This event was successful in providing an opportunity for Winship researchers who are not familiar with the core services to hear from the core director regarding how the equipment works and how it can assist with their research. There were also mini tours set up during the event for the participants to view the instruments at the Winship site.



Pediatric/Winship Flow Cytometry Core - New Rates in CY2020

Starting 1/1/2020, both sorting and analysis base rates decreased significantly from 2019 pricing. In addition, child health researchers and cancer researchers receive a generous subsidy off these base rates. Please go to our website for detailed information on new prices and the subsidy policy.
https://www.pedsresearch.org/research/cores/flow-cytometry-core/overview/#tab=tab03

Continued Core Highlight (CTDC) from Page 2

CAP!

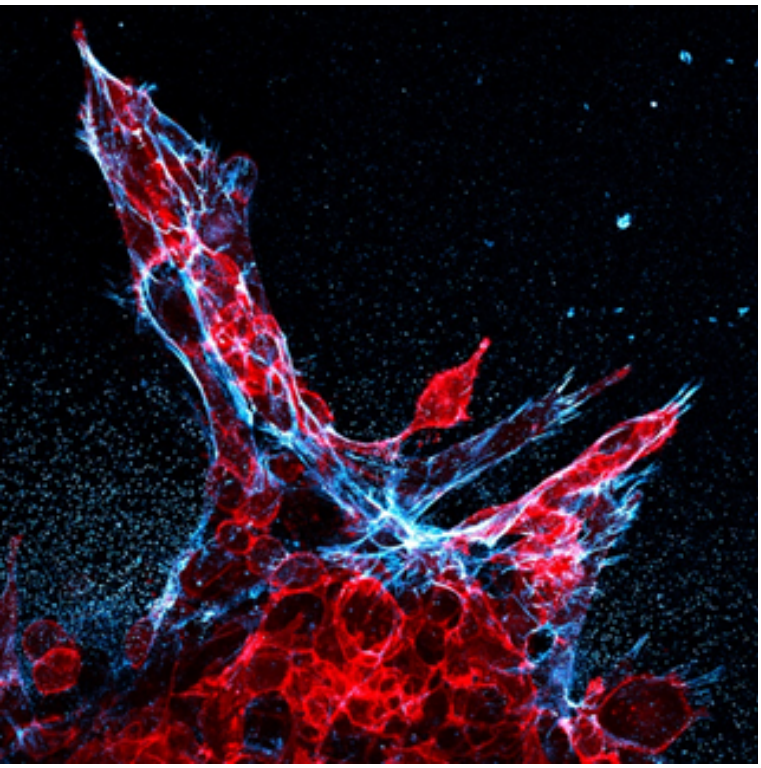
Emory Processing Lab at the Children's Healthcare of Atlanta Center for Advanced Pediatrics The Emory University Clinical Processing Laboratory, located on the 5th floor of the Children's Healthcare of Atlanta Center for Advanced Pediatrics, provides a secure laboratory space for the processing of biological samples that are obtained as part of a clinical trial. Emory University clinical research coordinators have access to all of the equipment necessary to process and store these bio-specimens, including calibrated centrifuges and pipettes. In order to accommodate the strict processing requirements of clinical studies, all centrifuges also have the ability to cool (refrigerate) to temperatures as low as 0˚C. The laboratory also provides a monitored 4˚C refrigerator, -20˚C freezer, and -80˚C freezer.

Collaboration with the Pediatric/Winship Flow Cytometry Core

The CTDC has recently established a collaboration with the Pediatric/Winship Flow Cytometry Core. The CTDC is able to work with the Flow Core by processing biological samples and preparing them for analysis via Flow Cytometry. Aaron Rae and his excellent staff in the Flow Core then perform analysis of these precious samples.

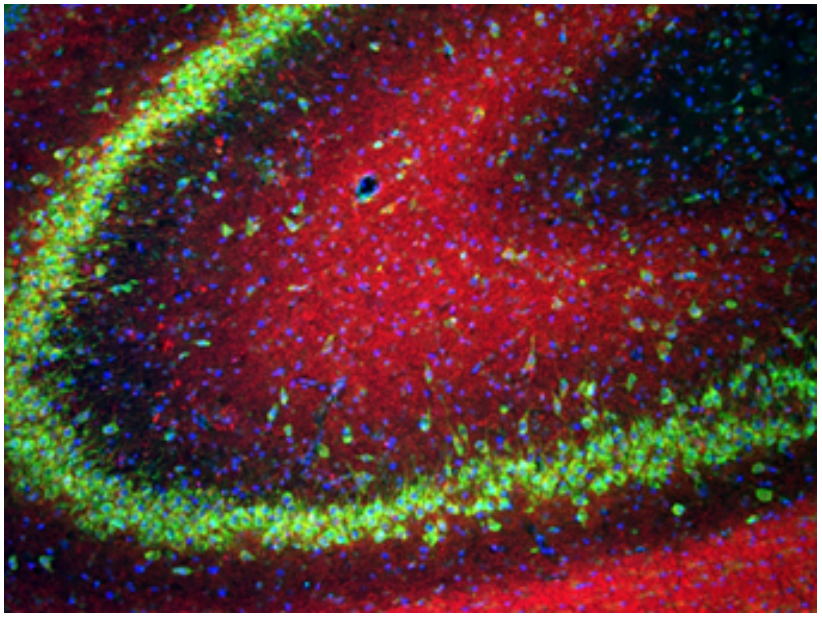
Highlights in ICI

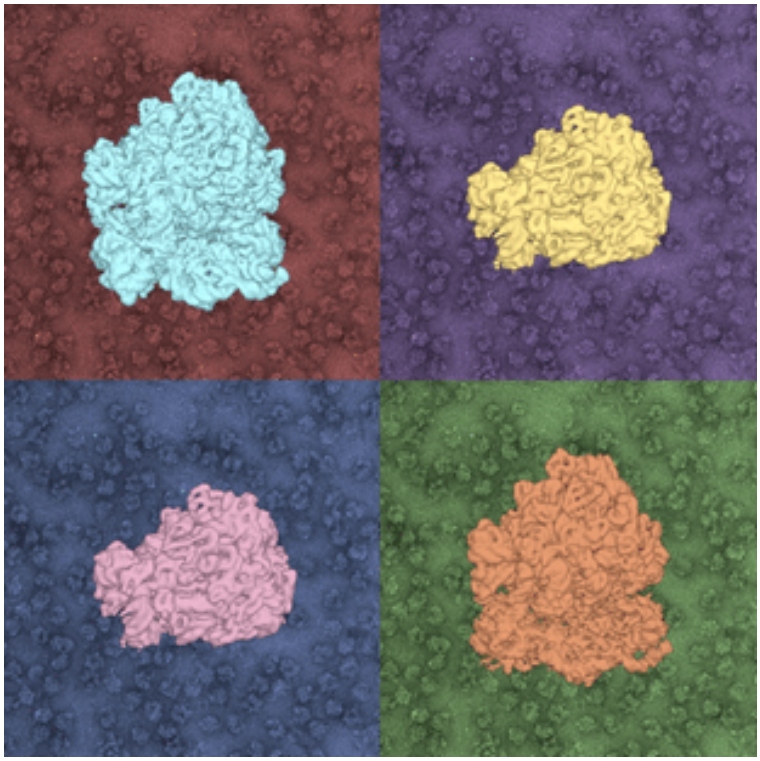
ICI Image Competition in 17th GDBBS DSAC Student Research Symposium:
Emory graduate students competed in an image competition sponsored by the Integrated Cellular Imaging Shared Resource and Emory's Graduate Division of Biological and Biomedical Sciences on January 28, 2020. The winners, representing five categories, were:



"Paving the Way" shows a cancer invasion and metastasis model. The cell membranes of highly-invasive cancer cells grown in a 3-D spheroid (i.e. lab-grown tumor) are marked red. These cancer cells are invading through a gel-like substance called Matrigel that mimics certain connective tissues in the body. Fibronectin-rhodamine* (cyan) was mixed into this Matrigel matrix. As the cancer cells invade outwards, they remodel the fibronectin from tiny specks into long linear fibers that extend in the direction of invasion. Thus, these cancer cells are "paving" a road forward for collective cell invasion. *Fibronectin: extracellular protein that is important for adhesion. - Technical – Cell - **by Emily Summerbell, Marcus Lab, Cancer Biology**

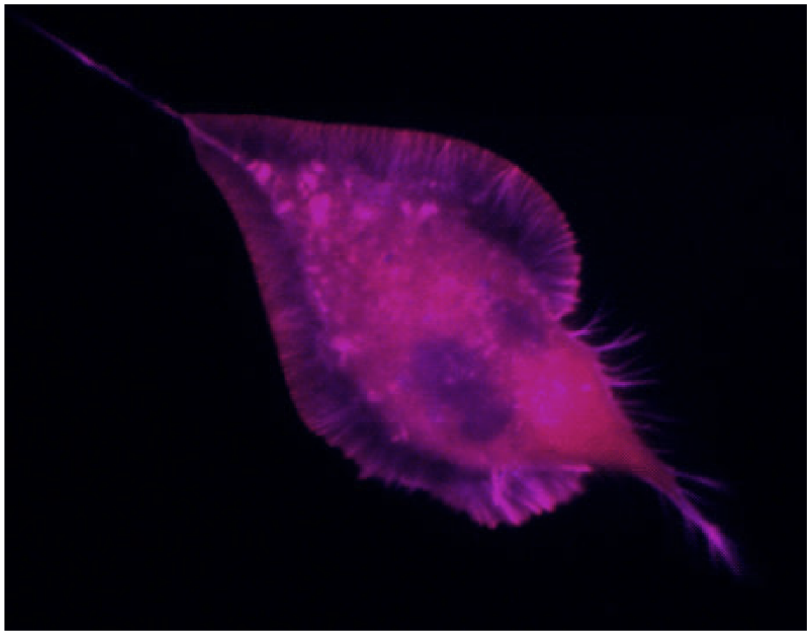
"Memory Lane" shows a rat hippocampus, a brain region required for forming and storing memories. DNA within neuronal nuclei are stained in blue (DAPI), organelles within neuronal cell bodies are stained in green (NeuroTrace Nissl), and axon projections that allow for communication between hippocampal neurons are stained in red (Neurofilament Heavy Chain). - Technical - Non Cell, **by Daniel Lustberg, Weinshenker Lab, Human Genetics**





"Ribosome Zone" is in honor of the artist Andy Warhol. One can see the bacterial ribosomes through negative stain electron microscopy in the background and cryogenic electron microscopy in the forefront. - **Nature, by Xingwen Loy, Brosi Lab, Population Biology, Ecology, and Evolution**

"**Virginia Basin"** looks out on the face of Gothic Mountain and is a Brosi Lab field site located in the Colorado Rockies. The lab has been studying interactions between subalpine wildflowers and their pollinators for the past 10 years to understand how anthropogenic changes impact plant pollination, one of the most vital ecosystem processes on earth. This field site is one of over a dozen that the Brosi Lab works in around the historical Rocky Mountain Biological Lab (RMBL), which was founded in 1928 and annually hosts over a hundred field biologists from around the world. – **Artistic, Pooja Srinivas, Dunham Lab, Biochemistry**



"Swordfish" is a time-lapse video of a migrating mouse neuroblastoma (neural cancer cell) expressing actin in blue and red actin binding protein LASP1 in red. The edges of the actin cytoskeleton ruffle as the cell migrates, while actin comets shoot through the cell. Actin: a structural/scaffolding protein that is important for structure and movement. - Video, **by Stephanie Pollitt, Zheng Lab, Cell Biology**

(If the video does not display appropriately on your computer, please click here to watch it.)

Summer Internships for Bioinformatics Master's Students

Do you have a need for bioinformatics expertise in your research? If so, see below for an opportunity to engage with and recruit students from the Georgia Tech Master of Science in Bioinformatics program, https://bioinformatics.gatech.edu/.

GT Bioinformatics master's students are encouraged to be engaged in productive, bioinformatics-related work during the summer following their first year of MS study. Students generally work 40 hours per week in paid internships (minimum stipend accepted last year was $15 per hour).

For summer 2020 internships, Georgia Tech requires that students work a minimum of 5 weeks, between the dates of May 4, 2020 and August 14, 2020. More information about the Georgia Tech Graduate Co-op and Internship program, including a sample offer letter, may be found here: https://career.gatech.edu/graduate-student/application-process.

Please note the summer 2020 deadline for students to register internships is **May 22, 2020.** Besides paid summer internships, MS Bioinformatics students are required to engage in research for academic credit. Students work 10 hours per week minimum. Each fall, we admit a class of 30-40 new master's students who will need to begin research in mid-August. Most MS students remain in the same research lab throughout the three semesters of study (fall 2020-spring 2021-fall 2021, usually away for summer internship). We host a poster session as part of our new student orientation in August 2020. We welcome interested labs to present a poster and recruit students.

For additional information about summer internships or academic year research for credit, please contact:

Lisa D. Redding
Academic Program Coordinator II
Bioinformatics and Quantitative Biosciences
Georgia Institute of Technology
Email: lisa.redding@biosci.gatech.edu

Other Resources!!

ABiL GT

The Applied Bioinformatics Laboratory of Georgia Tech (ABiL - http://abil.ihrc.com/) offers a wide range of bioinformatics services to address both data analysis and workforce development needs. ABiL scientists work collaboratively with partners from academic, government, non-profit, and industry sectors to provide custom-designed and turn-key solutions for a variety of data analysis challenges. Our services include end-to-end project management including conception, planning and execution. ABiL team members also deliver a series of hands-on instructional modules for workforce development and training in bioinformatics. Course content is delivered in small group settings via an active-learning instructional model; individualized expert consultation in bioinformatics also is available.
Location:
Krone Engineered Biosystems Building, Room 2200
Website: https://petitinstitute.gatech.edu/research/applied-bioinformatics-laboratory

Cores Information

Please visit:
https://www.pedsresearch.org/research/cores/
for more Peds Cores information!!

How to Acknowledge the Cores:

These cores are generously supported by Children's Healthcare of Atlanta and Emory University. When presenting or publishing work completed using the core, please include "**Children's Healthcare of Atlanta and Emory University [core name]**" in the acknowledgments.

This newsletter serves to highlight the activities of the cores supported by Emory University's Department of Pediatrics and Children's Healthcare of Atlanta. If you have a story idea for a future edition, please contact:

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