

# The Art and Science of Pediatrics



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Weill Cornell Medical College



**Weill Cornell  
Medicine**



**NewYork-Presbyterian**  
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# Table of Contents

The Art & Science of Pediatrics

Volume 17 | December 5, 2019

- 3 Letter from the Chair**  
Gerald M. Loughlin, MD, MS, Nancy C. Paduano Professor & Chairman
- 4 Faculty Interviews by Students**
  - 4 Interview with Dr. Jane Chang**  
by Stephanie Rager, Class of 2023
  - 6 Interview with Dr. Edith Schussler**  
by Daniel Hejazi Pastor, Class of 2023
- 7 Pediatrics Interest Group Update**  
Nahomy Ledesma, Class of 2022 & Briana Christophers, MD-PhD Entering Class 2018
- 9 Student Reflection**  
Prithvi Mohan, Class of 2021
- 11 New Initiatives in Pediatrics**
- 12 Student Research Abstracts**
  - 12 Associated Costs of Pediatric Ambulatory Healthcare-Associated Infection**  
Ford WJH, Oyeku O, MD, Heo M, PhD, Saiman L, MD, DeLaMora P, MD, Rabin B, Zachariah P, MD, Rosenberg R, MD, Mirhaji P, MD, PhD, Obaro-Best O, Drasher M, Klein E, Peshansky A, MSc, Balem KA, RN, Bundy D, MD, MPH, Rinke ML, MD, PhD
  - 13 High-throughput Drug Screen Identifies Potential Chemotherapies for Choroid Plexus Carcinoma**  
Garman TS, Maachan UB, PhD, Adeuyan O, Guadix S, Ramos-Espiritu L, PhD, Dahmane N, PhD, and Souweidane MM, MD
  - 14 Identifying Synergistic Combinations with CDK4/6 Inhibitor Palbociclib in vitro for the treatment of H3K27M Diffuse Intrinsic Pontine Glioma**  
Guadix SW, Adeuyan O, BS, Maachani UB, PhD, Lee D, Garman TS, Dahmane N, PhD, DiLiberto M, PhD, Chen-Kiang S, PhD, Souweidane MM, MD
  - 15 Regulation of Energy Expenditure and Metabolic Homeostasis in Fat**  
Kramer DJ, Becher T, MD, Chi J, Marchildon F, Cohen P, MD, PhD
  - 16 ECG Screening for Sudden Cardiac Death in an Asymptomatic Ped Cohort**  
Oh Y, Skaria, A, MD, Oshiro K, MD, Abramson A, MD, Dayton J, MD, Flynn P MD
  - 17 Decreased Quality of Life in Pediatric Patients with Obesity and at Risk for Type 2 Diabetes Mellitus**  
Zhao AS, Lin-Su K, MD, Censani M, MD
- 18 Service Learning Organizations**
- 24 Faculty Mentors and Advisors**
- 30 Mentoring and Research Opportunities**
- 41 Acknowledgments**



## Letter from the Chair

December 2019

Dear Weill Cornell Medicine Students and Faculty:

On behalf of the Department of Pediatrics and the Weill Cornell Medical Student Pediatric Interest Group, it is a pleasure for me to welcome you to the Seventeenth Annual Pediatric Research Day. In addition to medical student research and scholarly project abstracts, this year's Journal, "The Art and Science of Pediatrics," features interviews with faculty, activities sponsored by the Pediatric Interest Group and community service opportunities for medical students.

The work presented in this journal and displayed at Pediatric Research Day is the product of a wonderful collaboration between our medical students and faculty committed to developing the next generation of pediatric scientists. What makes this effort even more special is that our students accomplished this work in spite of the tremendous demands placed on their time by medical school. We believe this exposure to research early in one's medical career is an essential first step not only in launching a successful career in investigation but also in establishing a foundation for lifelong learning for those who choose to pursue clinical medicine.

As Chairman of the Department of Pediatrics, I congratulate and thank the students and their faculty mentors on the success of their research efforts, and acknowledge the strong leadership of the Pediatric Interest Group: Nahomy Ledesma Vicioso and Briana Christophers and their advisors, Drs. Thanakorn Jirasevijinda and Susanna Cuninghams-Rundles, on organizing and continuing this important pediatric program.

**Gerald M. Loughlin, M.D., M.S.**  
Nancy C. Paduano Professor and Chairman  
Department of Pediatrics, Weill Cornell Medicine

# Faculty Interviews by Students

## Interview with Dr. Jane Chang

by Stephanie Rager, Class of 2023

Upon meeting Dr. Jane Chang, it is immediately clear that she is someone who loves her job. “It’s very rewarding work, and every day is different. I love the patient population and it’s a privilege to watch my patients grow as they develop through adolescence.” She is passionate about helping young men and women navigate the many challenges of adolescence and works with a multidisciplinary team of providers to ensure that each patient receives the most robust care.

I recently had the pleasure of speaking with Dr. Chang about Adolescent Medicine, several outstanding initiatives she is involved with, her role as an educator, and the importance of mentorship.

### **Initial Interest in Pediatrics and Adolescent Medicine**

Like many in Pediatrics, Dr. Chang always enjoyed working with kids, whether that was as a teacher, a camp counselor or a babysitter. Her interests in Pediatrics and Adolescent Medicine were further sparked by her first summer research experience in college. She worked with an Adolescent Medicine doctor in a clinic for teenage mothers, shadowing and conducting qualitative research on what motherhood meant to the patients. She was inspired by the work of her mentor and the positive impact that she was able to have on young women during such a difficult time.

In residency, Dr. Chang did an away elective at the Children’s Hospital at Montefiore in Adolescent Medicine and found that she loved counseling teens about their reproductive decisions and aiding their transition into healthy adulthood. This helped to confirm her decision to specialize in Adolescent Medicine, and she went on to complete her fellowship at Montefiore.

### **The Teenage Parenting and Pregnancy Program (TAPP)**

Dr. Chang now runs the Teenage Parenting and Pregnancy Program (TAPP), a unique initiative that provides simultaneous care for both the mother and her baby. The care starts during pregnancy, with obstetrical and gynecological care, and continues after the baby is born, with pediatric care. Because teenage mothers tend to prioritize their baby’s health while potentially neglecting their own, this structure ensures that both mother and baby receive adequate and individualized care. A dedicated social worker follows each mother, helping her figure out transportation to weekly appointments, childcare, and how to return to school. Meanwhile, mothers receive counseling about contraception, immunizations, and mental health concerns.

Dr. Chang emphasized the importance of working with the mothers on their terms, which often includes texting instead of calling and being flexible about rescheduling missed appointments. Every

year, the program benefits 40-60 new mothers and holds social events for the mothers and their babies, such as the upcoming holiday party.

### **Navigating the Parent-Adolescent Relationship**

Adolescence is a unique period, because while patients are still minors and are often accompanied to doctor's appointments by parents, patients can begin to make their own healthcare decisions about matters like contraception. Dr. Chang stressed the importance of setting expectations for parents and adolescents at the start of each visit. She begins by explaining that she will get a medical history from both parties, then at some point will ask the parent to step out during the physical exam so she can speak with the adolescent in private. This helps the patient feel comfortable speaking about sensitive matters while ensuring that the parent still feels included in their child's care.

In conjunction with physicians at Columbia University Medical Center, Dr. Chang recently conducted research regarding joint decision-making about the HPV vaccine. The R01-funded research has found that an important factor that influences the decision to get vaccinated is how strongly the physician recommends the vaccine. Interestingly, there may also be discordance between who claims primary responsibility for the decision to get vaccinated: sometimes the parent thinks it was their decision while the adolescent thinks it was their own decision.

### **Important Issues in Adolescent Medicine: LGBTQ Health, Mental Health, and Vaping**

When I asked Dr. Chang about what she views as some major current health issues within adolescent medicine, she mentioned LGBTQ health, mental health, and vaping. "There was very little training as a fellow about LGBTQ health, but it's getting better now," she notes. Adolescence can be a particularly challenging time for LGBTQ youth. To assist transgender and gender-diverse patients during this difficult period, Dr. Chang started Weill Cornell's interdisciplinary Compass program, which offers mental health counseling, family support, sexual health counseling, puberty suppression, and gender-affirming hormone treatment for patients.

Dr. Chang also talked a bit about vaping as a new health crisis among teens and young adults. A lot of her patients have experimented with vaping or vaped in social settings without knowing that it's addictive. "A lot of patients aren't even aware that they're consuming nicotine," she explained. For this reason, education is one of the most important components of vaping cessation.

### **Finding Mentorship**

Throughout our conversation, Dr. Chang repeatedly emphasized the importance of mentorship. "I still think about the physician I worked with for summer research in college and how much she encouraged me to pursue medicine and eventually adolescent medicine." She says to look for people in your field of interest who can help you navigate your future career path and connect you with others in that discipline as well. It can be particularly useful to find research mentors early on, as many academic residency and fellowship programs have research requirements. She also notes that it's important to then pay it forward, serving as a mentor for those behind you once you find something you love.

## Interview with Dr. Edith Schussler

by Daniel Hejazi Pastor, Class of 2023

Dr. Edith Schussler is an Assistant Professor of Clinical Pediatrics at Weill Cornell Medicine and Assistant Attending Pediatrician at New York-Presbyterian Hospital and the Phyllis and David Komansky Children's Hospital. Throughout her medical career, Dr. Schussler has worked with children that have immune deficiencies and allergic diseases and used research to better understand pathology and treatment. I had the privilege to speak with Dr. Schussler about her interest in medicine and the day-to-day of a pediatric allergist/immunologist at Weill Cornell Medicine.

Although the medical profession was a part of her family growing up, Dr. Schussler decided to start on another path, eventually reaching the position of vice president at Radisson Edwardian. In the early 2000s, Dr. Schussler decided on a change of career and did her medical post-baccalaureate at Harvard University before starting her medical studies at the Icahn School of Medicine at Mount Sinai. Dr. Schussler also completed her residency in pediatrics and a Fellowship in Allergy and Immunology at Mount Sinai and then moved to Weill Cornell Medicine to become an attending and assistant professor.

As a student at the beginning of my medical career, I couldn't help but ask Dr. Schussler what attracted her to the field of immunology during her time at medical school. Dr. Schussler recalled that during every basic science unit and clinical rotation she experienced in school, she would see the immune system as a central component of human health that affected all the different systems in the body. The intricacies of the immune system continued to fascinate her as she focused her clinical interests on immunodeficiencies and allergy medicine. Today, Dr. Schussler primarily helps families to find the best way to manage their child's allergies, including with lifestyle and dietary changes. Additionally, another aspect of Dr. Schussler's clinical practice is treating pediatric patients that have immunodeficiencies to improve their quality of life.

During our interview, Dr. Schussler conveyed to me that a consequence of the complexity of the immune system is that no two patients are alike and that at times the exact causes of the diseases are not known. Dr. Schussler therefore emphasized the importance of translational medicine in pediatric immunology today. Through genetic sequencing techniques, physicians have a new tool to try to pinpoint the genesis of a disease. When speaking about the importance of bench to bedside, Dr. Schussler said that the genetic information gathered from these techniques ensures that the physician has the ability to reach out to scientists currently doing focused research on that gene. Dr. Schussler enjoys this collaborative environment that is present in immunology which allows the physician to inform the research of the scientist—and vice versa. While talking about current research on immunodeficiencies, Dr. Schussler particularly highlighted the global network that exists to connect science and medicine in immunology and hopes that in the near future we will have more screening methods to identify immunodeficiencies and start intervening therapies earlier on.

Speaking with Dr. Schussler has given me an excellent sense and impression of the field of pediatric immunology. The immune system is simultaneously robust and delicate and works alongside all the other systems of the body to keep us healthy. The complexity of this system allows it to function against many different pathogens, but it also means that there are many points where it can go awry. Working to understand these failures of the immune system through research will better allow physicians to get interventions to patients earlier and improve patient outcome. My interactions with Dr. Schussler showed me that the field of immunology is constantly progressing from both the clinical and scientific side and that collaboration between these two is central to that.

## **Pediatrics Interest Group Update**

Nahomy Ledesma, Class of 2022

Briana Christophers, MD-PhD Entering Class 2018

The Pediatrics Interest Group has had a wonderful 2019 with activities & opportunities for the Weill Cornell community to be exposed to the world of Pediatrics. As aligned with our goals of education and exposure, we aimed to bring a little of the joy of Pediatrics to the community with these events:

### **Spring Match Panel**

On Thursday, May 16th, we had our Spring Match Panel with students who recently matched into Pediatrics Residency. These admirable students described their recent journey through the residency application, and delivered relevant and useful insight into what their medical school experience was like as they discovered that Pediatrics was the right career for them. Panelists: Brandon E Sumida, Christopher G. Xanthos, Lynne M. Rosenberg, Eliza R. Gentzler, Jonathan Steinman

### **Fall Resident + Fellows Panel**

On November 5th, we had our Fall Resident/Fellow Panel where some amazing panelists spoke to us about all aspects of life as a Peds resident/fellow. From choosing the right path to life/work balance, the lovely conversation (and our two little extra guests) made this a lovely and informative evening for all present.

Panelists: Drs. Jules Romano (PGY3), Zachary Hena (PICU/Cardio), Karishma Parikh (Neuro), Hannah Carron (PGY3), Sean Cullen (PGY3).





## Coffee Chats

The Coffee Chat Program was designed to foster mentorship and introduce students to research and clinical Faculty in Pediatrics as they chat over a cup of coffee or tea. This program was developed in order to introduce students to the excellent Pediatric faculty at Weill Cornell and to form lasting academic relationships, one coffee at a time! We were thrilled to kick off this program with chats featuring Dr.

Oleh M. Akchurin, Dr. Gerald Loughlin, Chairman of the Department of Pediatrics, and Dr. Jamie Palaganas. If you are interested in participating in a future Peds Interest Group Coffee Chat, please contact Briana Christophers at [brc4001@med.cornell.edu](mailto:brc4001@med.cornell.edu).



Students with Dr. Loughlin as part of the coffee chat program.

## Pediatrics Research Day 2019

The 2019 Pediatrics Research Day is, more than anything, a day of celebration for all things Pediatrics, particularly the students whose research breathe life into Pediatrics and helps move the field forward.

We hope all PIG members and activity participants enjoyed these activities and we look forward to passing the reins to the Class of 2023 this winter.

# Student Reflection

by Prithvi Mohan, Class of 2021, former Peds Interest Group leader

I always had a pediatric leaning coming into medical school. I remember scoping out all the clubs and opportunities when I came for my revisit weekend. I jumped right in when I got here, and my favorite part of preclinicals was the afternoons I spent with MACHO, going up to Harlem to jump around with 3rd and 4th graders. Our aim was to teach kids about nutrition and exercise through the lens of personal responsibility and practical tools for success later in life. Although our immediate focus was on healthy choices in nutrition and exercise habits, we hoped to instill values and skills such as mindfulness, which can be applied to other endeavors in life. In between the drag of basic science coursework and the anxiety of settling into first year, this little slice of pediatrics was my saving grace.

While the networking experiences and viewpoints I got being a part of the PIG were invaluable, pediatric clinical experience is hard to come by during preclinical time. My first true exposure was during my first year summer abroad in India. I spent my first four weeks in the pediatric department of the Christian Medical College, Vellore. On the general pediatrics wards, I would best describe my presence as constantly in the way. The wards have lines of metal beds next to each other, with open windows and no air conditioning. As a visitor, I would often just find myself shuffling to the least obtrusive positions (in retrospect after an entire year of clerkships, this statement still rings true). From a learning perspective, I saw pathologies that I will likely never see on the wards in the US – the first patient I saw was a 5 month old baby with severe malnutrition complicated by tuberculosis. I quickly grew used to how commonplace severe bacterial sepsis and tuberculosis were in the pediatric populace. Importantly, I felt reaffirmed in my interest in pediatrics, especially with an emphasis on global health and nutrition.

I had over an entire year between my global health experience and my core pediatrics clerkship. This included finishing up my preclinicals and 8 months of relentless clerkships. Fast forward to August of this year, and I was really hitting a low to keep moving through clerkship year, so I'm not exaggerating when I say being on pediatrics rejuvenated me (we learned how to do newborn exams and swaddle babies on our first day, who in the world could be upset?). The first patient I picked up was a 15 year old boy with Crohn's disease and autism spectrum disorder, presenting with a perineal abscess. He was in so much pain and discomfort, and refusing to eat or drink. His parents could barely visit him, and he spent most of his time isolated in bed. I remember spending at least 2 hours that first day negotiating with him to drink one jug of water and a few bites of food. I bothered him about food and water so much

that I think he started to eat more so I would shut up and go away. This is a pretty nondescript story, but I remember him and all of my in-patients on pediatrics because of how much time I would spend with their families. Every clinical team will tell you that the medical student has the luxury of time to get to know patients and their families, and this rings especially true on pediatrics. Clerkships are a constant confusion of trying to learn the ropes and find a useful role, so the ability to do things such as educating a difficult family about their son's AML relapse is both rewarding and useful to the team.

This is a rambling, abbreviated, reductionist reflection on my journey in pediatrics during my time at Weill Cornell. The most important takeaway for me is how crucial my clinical exposure and time with patients have been to reinforcing my passion for pediatrics. While I have a long road left ahead of me, it's pretty nice to know that I'm going to get to hang out with the most fun and cutest patients around.

# New Initiatives in Pediatrics

## THE COMPASS PROGRAM

*A safe space for youth navigating their gender experience*



We provide services for gender-diverse children and LGBTQ+ youth including primary health care, family support, mental health counseling, sexual health counseling, and gender-affirming hormone treatment in a safe, welcoming and nonjudgmental space.

***For patients enrolled in Medicaid up to 19 years old***

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# Student Research Abstracts

## Associated Costs of Pediatric Ambulatory Healthcare-Associated Infection

William J. H. Ford,<sup>1</sup> Suzette Oyeku MD,<sup>2,3</sup> Moonseong Heo PhD,<sup>4</sup> Lisa Saiman MD,<sup>5</sup> Patricia DeLaMora MD,<sup>1</sup> Barbara Rabin,<sup>6</sup> Philip Zachariah MD,<sup>5</sup> Rebecca Rosenberg MD,<sup>6</sup> Parsa Mirhaji MD PhD,<sup>3</sup> Oghale Obaro-Best,<sup>8</sup> Michael Drasher,<sup>9</sup> Elizabeth Klein,<sup>3</sup> Alexandre Peshansky MSc,<sup>3</sup> Kelly Ann Balem RN,<sup>2,3</sup> David Bundy MD MPH,<sup>10</sup> Michael L. Rinke MD PhD<sup>2,3</sup>

<sup>1</sup>Weill Cornell Medicine, New York, NY. <sup>2</sup>Children's Hospital at Montefiore, Bronx, NY. <sup>3</sup>Albert Einstein College of Medicine, Bronx, NY. <sup>4</sup>Clemson University, Clemson, SC. <sup>5</sup>Columbia University Irving Medical Center, New York, NY. <sup>6</sup>Mount Sinai School of Medicine, New York, NY. <sup>7</sup>New York University School of Medicine, New York, NY. <sup>8</sup>State University of New York Upstate Medical University, Syracuse, NY. <sup>9</sup>Wayne State Univ. School of Medicine, Detroit, MI. <sup>10</sup>Medical Univ. of South Carolina, Charleston, SC.

**Background:** Little is known about the attributable cost of ambulatory healthcare-associated infections (HAI), despite the many patients at risk for infection. This study estimated costs associated with pediatric ambulatory central line-associated bloodstream infections (CLABSI) and catheter-associated urinary tract infections (CAUTI).

**Methods:** Electronic queries identified pediatric patients seen between October 2010 and September 2015 with possible HAI at four urban, pediatric tertiary-care academic medical centers. Manual chart review adjudicated presence of HAI. The first HAI for each patient was matched up to 1:3 with controls. Charges were obtained for HAIs and matched controls for 30 days before, the day of, and 30 days after the HAI. Charges were converted to costs with standardized cost-to-charge ratios files and converted to 2015 United States dollars. Estimation of costs of ambulatory HAI was performed using a difference-in-difference analysis.

**Results:** After manual chart review, 177 unique patients with a CLABSI in the study window were matched with a total of 382 controls. Queries of charge databases yielded charges for 165 cases (93%) and 317 controls (83%). The estimation of CLABSI costs was \$5,684, (95% CI: \$1,005, \$10,362; p=0.0174). After manual chart review, 53 unique patients with a CAUTI in the study window were matched with a total of 110 controls. Queries of charge databases yielded charges for 30 cases (57%) and 43 controls (39%). The estimation of CAUTI costs was \$6,600 (95% CI: \$1,055, \$12,145; p=0.0208).

**Conclusions:** Pediatric ambulatory CLABSI and CAUTI are associated with significant and appreciable healthcare costs.

# High-throughput Drug Screen Identifies Potential Chemotherapies for Choroid Plexus Carcinoma

Tyler S. Garman,<sup>1</sup> Uday B. Maachan PhD,<sup>2</sup> Oluwaseyi Adeuyan,<sup>2</sup> Sergio Guadix,<sup>1</sup> Lavoisier Ramos-Espiritu PhD,<sup>3</sup> Nadia Dahmane PhD,<sup>2</sup> and Mark M. Souweidane MD<sup>2</sup>

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<sup>3</sup>High Throughput and Spectroscopy Resource Center, Rockefeller University

Introduction: Choroid plexus carcinoma (CPC) is a rare, aggressive brain cancer most often found in infants, with a median age of diagnosis being 1 year old. Five year overall survival ranges from 16-50%, depending on treatment type and study. Currently, there is no standard of care for CPC, in part due to the lack of knowledge about the most effective chemotherapies for CPC.

Methods: A panel of 3,484 known pharmacologically active compounds were screened using a luminescent cell viability assay against two patient-derived cell lines: CCHE-45 and CPC-T8209. A literature review selected 6 candidate compounds based on their biological activity and clinical success in other cancers. These candidate compounds were then re-validated in a separate laboratory test against CCHE-45 and a normal astrocyte line. Four compounds frequently used in CPC were also tested to serve as a comparison to candidate compounds.

Results: Six compounds showed promise following validation, all with an IC<sub>50</sub> under 1 $\mu$ M for both cell lines. The promising mechanisms of action are p97 AAA-ATPase inhibitors, HDAC inhibitors, PI3K inhibitors, protein translation inhibitors, proteasome inhibitors, TOPK inhibitors, and IGFR1 inhibitors. Of these, a dual HDAC and PI3K inhibitor shows the most promise because of its nanomolar potency and its ability to suppress expression of c-myc, a main component of most CPCs.

Conclusion: There are multiple promising candidate agents and targets to improve the care of patients with CPC. Further work should investigate these compounds in vivo, to further stratify targets based on improved survival, tumor size reduction, and less off-target toxicity.

# Identifying Synergistic Combinations with CDK4/6 Inhibitor Palbociclib in vitro for the treatment of H3K27M Diffuse Intrinsic Pontine Glioma

Sergio W. Guadix,<sup>1</sup> Oluwaseyi Adeuyan,<sup>1</sup> Uday B. Maachani PhD,<sup>1</sup> Dennis Lee,<sup>1</sup> Tyler S. Garman,<sup>1</sup> Nadia Dahmane PhD,<sup>1</sup> Maurizio DiLiberto PhD,<sup>2</sup> Selina Chen-Kiang PhD,<sup>2</sup> Mark M. Souweidane MD<sup>1</sup>

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**Introduction:** Diffuse intrinsic pontine glioma (DIPG) is a devastating pediatric brainstem tumor. Current epigenetic therapies, such as histone deacetylase (HDAC) inhibitors, target the H3K27M mutation in DIPG. Palbociclib, an orally active CDK4/6 inhibitor, inhibits cell growth by targeting cell cycle dysregulation in DIPG. However, systemic toxicities limit effective dosing of both therapeutic strategies due to poor drug penetrance through the intact blood-brain barrier. We hypothesized that combination of palbociclib with existing therapies for DIPG could ameliorate systemic toxicities by lowering the dosing threshold for successful treatment.

**Methods:** A literature review identified 5 candidates as potential synergistic partners with palbociclib for H3K27M-mutant DIPG. Single-compound validation was conducted using 72-hour viability assays in four well-established DIPG cell lines. Viability assays for combination therapy were conducted in two cell lines. Combination indices were obtained using Compusyn Software for assessments of synergy.

**Results:** Palbociclib monotherapy demonstrated in vitro growth inhibition of all 4 DIPG lines at micromolar doses. Three candidates for potential synergistic activity with palbociclib demonstrated efficacy on all 4 DIPG lines with monotherapy. These included the HDAC inhibitor panobinostat, histone demethylase inhibitor GSK-J4, and androgen receptor blocker enzalutamide. Panobinostat displayed nanomolar range potency and was administered with palbociclib in combination. Preliminary results indicate synergism between palbociclib and 10-40nM doses of Panobinostat.

**Conclusion:** Combination of CDK4/6 inhibitor palbociclib with the HDAC inhibitor panobinostat yields potent synergistic growth inhibition of DIPG cells in vitro. Future work will focus on translating these results to in vivo models of DIPG using convection enhanced delivery.

# Regulation of Energy Expenditure and Metabolic Homeostasis in Fat

Daniel J. Kramer, T Becher MD, J Chi, F Marchildon, Paul Cohen MD PhD

Introduction: Obesity, a global affliction, is most severe in the United States, with 1/3 of adults being obese and 2/3 being overweight or obese. Obesity and the metabolic syndrome cost over \$250 billion per year in the United States, more than 20% of all medical spending. Existing therapies for obesity are limited by poor efficacy or unacceptable side effects. Human body fat is predominantly “white” adipose tissue (WAT), low in mitochondria and specialized for storing energy. Brown adipose tissue (BAT), rich in brown-staining mitochondria, dissipates energy and protects against disease. Brown fat cells (adipocytes) dissipate energy by thermogenesis—generation of heat from uncoupled respiration. White adipocytes can be induced in vivo by cold and adrenergic stimulation to take on thermogenic properties. These “beige” adipocytes augment whole-body energy expenditure.

Methods: RNA-sequencing of subcutaneous white fat from mice was performed to identify novel molecular candidates important to the regulation of metabolism and energy expenditure in adipocytes. RNA-sequence results were cross-validated with cell type-specific ribosomal profiling, qPCR, proteomics and pharmacology.

Results: We have identified DGB26, a novel molecular target in adipose strongly induced by cold exposure and the thermogenesis-driving transcription factor PRDM16. In other cell types, DGB26 is a plasma membrane protein. However, in adipocytes it is alternatively targeted to the mitochondria to act as a secondary regulator of uncoupled respiration, by mechanisms still being elucidated.

Conclusions: DGB26 is a novel regulator of uncoupled respiration. Studies are underway to characterize its function in vitro and its effects on whole-body energy expenditure in vivo.

## ECG Screening For Sudden Cardiac Death in an Asymptomatic Pediatric Cohort

Yuna Oh, Amy Skaria MD, Kristin Oshiro MD, Erika Abramson MD MSC, Jeffrey Dayton MD, Patrick Flynn MD

Purpose: Sudden cardiac death (SCD) is rare but devastating. ECG screening for diseases that predispose to SCD is controversial, and there is currently no standard of care or consensus in the United States. If screening ECGs are performed, patients are often referred to a cardiologist's office based on abnormal ECG machine readings; these referrals may or may not be warranted. The primary objectives of our study were (1) to assess the accuracy of ECG machine readings in an asymptomatic pediatric cohort when compared to review by a pediatric cardiologist and (2) to describe a unique model of SCD screening and the cardiac diseases detected by this model.

Methods: A retrospective study was conducted for 2263 asymptomatic patients ages 10-18 who received a screening ECG between the years 2014-2018 at a private general pediatrics office in NYC offering elective screening ECGs during well child checks. Each ECG was automatically interpreted by the ECG machine and then sent to our institution for review. Pediatric cardiologists reviewed the ECGs using standardized criteria specifically aimed at identifying risks for SCD. Cardiology referral was recommended only for significant findings. We compared ECG machine reads with cardiologist readings to assessed accuracy.

Results: Screening ECGs conducted on 2263 asymptomatic pediatric patients yielded inaccurate ECG machine readings 28.2% (639/2263) of the time (Figure 1). 27.4% (620/2263) of the readings were false positives, meaning an abnormal automated interpretation deemed to not warrant referral when reviewed by the cardiologist. The most common benign ECG readings that did not prompt a referral were bradycardia (349), right ventricular conduction delay (138), left atrial enlargement (110), and ST elevation (58). Nineteen readings (0.8%) were false negatives (normal automated reading determined to warrant referral when reviewed by the cardiologist). Out of a total of 34 patients referred for formal cardiac evaluation, 25 patients had normal results, and 2 patients were diagnosed with SCD-related conditions including Brugada syndrome and hypertrophic cardiomyopathy (Table 1). Calculated sensitivity and specificity for automated ECG readings identifying SCD risk are approximately 72.9% and 71.7% in this cohort.

Conclusions: ECG machine readings have poor accuracy for screening for SCD risk, with 1 out of 4 total interpretations yielding false-positive results. These false-positive

findings are often concerning to primary care providers, leading to unnecessary specialist referrals and subsequent work-up, increased healthcare costs, and patient and parent concern. Furthermore, false-negative interpretations can lead to detrimental consequences for the patients. If screening ECGs are performed, a model in which practitioners familiar with SCD review ECGs will increase the accuracy of ECG interpretations and significantly reduce unnecessary cost potentially contributing to development of a reasonable strategy for universal SCD screening.

## Decreased Quality of Life in Pediatric Patients with Obesity and at Risk for Type 2 Diabetes Mellitus

Alice Zhao, Karen Lin-Su, Marisa Censani

Background: The Centers for Disease Control and Prevention estimates that 18.5% of children and adolescents meet the criteria for obesity in the United States. Youth with obesity have been shown to have significant deficits in health-related quality of life (HRQOL), a score that measures an individual's physical and psychosocial functioning. However, scarce research has been conducted on HRQOL in children with obesity and documented cardiometabolic risk, especially in children ages 8-12.

Methods: Forty-five children and adolescents ages 8-18 with obesity (BMI >95th percentile for age) and at risk for type 2 diabetes (fasting glucose >100 mg/dL, 2 hour oral glucose tolerance test [OGTT] blood glucose level >140 mg/dL, fasting insulin >16 uU/mL, insulin peak post-OGTT load >150 uU/mL, or insulin level at 120 minutes of OGTT >75 uU/mL) were recruited into the study. The patients and one parent were each asked to complete the Pediatric Quality of Life Inventory (PedsQL) Version 4.0. The parent was also asked to complete a demographic survey and the Family Nutrition Physical Activity (FNPA) tool, which studies obesogenic environments and practices. A lower FNPA score is associated with a more obesogenic environment.

Results and Conclusions: Parents of children with obesity and at risk for type 2 diabetes reported significant decreases in terms of total HRQOL, the physical component of HRQOL, and the emotional component of HRQOL in comparison to the general population. The children themselves reported a significant decrease in both total HRQOL and the physical component of HRQOL in comparison to the general population. When comparing children ages 8-12 with obesity and at risk for type 2 diabetes and children ages 8-12 in the general population, the only significant decrease in HRQOL was observed in parent-reported total HRQOL. However, when comparing adolescents ages 13-18 with obesity and at risk for type 2 diabetes and adolescents ages 13-18 in the general population, both parent- and child-reported total

HRQOL had significant decreases. Adolescents had significantly lower total FNPA scores compared to children, as well as significantly lower scores in the “Beverage Choices” and “Healthy Environment” FNPA subcategories. Families earning less than \$50,000 had significantly lower “Family Activity Involvement” FNPA subcategory scores compared to families earning between \$50,000 and \$150,000 and families earning over \$150,000. Families earning less than \$50,000 also had significantly lower “Child Activity Involvement” FNPA subcategory scores. Non-Hispanic black families also had significantly lower “Family Eating Habits” FNPA subcategory scores compared to non-Hispanic white families. Youth, especially adolescents, with obesity and at risk for type 2 diabetes mellitus experience significant decreases in quality of life compared to the general population. Targeted interventions based on observed disparities in age, income, race are needed.

## Service Learning Organizations

### Camp Phoenix

Every year, almost one million American children are burned. Fortunately, advancements in trauma and resuscitative care have improved the treatment and survival of these young patients. Despite these medical and surgical advances, the psychosocial care of pediatric burn victims continues long after discharge. These children often return home with scars as permanent reminders of their trauma and the aftermath of surviving a serious burn usually includes considerable stress, diminished self-esteem, and difficulty creating positive social relationships. Camp Phoenix provides a safe environment for pediatric burn survivors and their siblings to interact with their peers, share their experiences and establish a system of support. Many of Camp Phoenix’s campers come from low socio-economic backgrounds, and this is their only means to obtain a summer camp experience.



Camp Phoenix, the first burn camp in the United States run by medical students, was founded in 2000 by Paul Mullan, a 2004 Graduate of Weill Cornell Medical College. Since then, Camp Phoenix has expanded and now sponsors three single day events and one overnight camping trip each year. Past events have been held at the Intrepid Museum, the Bronx Zoo, Lucky Strikes Bowling, Sony Wonder Technology Lab, Chelsea Piers, New York Knicks games, the Museum of Natural History and NYC Firehouses, amongst many others. We have worked with over 250 children at these events, with an average of 30 campers and 25 volunteer counselors at each event. Camp Phoenix activities are designed to build confidence, emphasize teamwork, initiate friendship, and maximize fun.

Last June, a group of campers and volunteer counselors spent an incredible three days at Camp Kinder Ring in Hopewell Junction, NY. The overnight camping trip is always especially memorable for both campers and counselors. Campers participate in activities such as swimming, tie-dye, sports, and field games. For many of our campers, this is their first time away from home and outside of an urban setting. Campers are divided into cabins, where they work together and quickly develop their sense of community and camaraderie. They create cabin names and cheers and group enthusiasm is rewarded as the cabins participate in one of Camp Phoenix's favorite traditions, the Messy Olympics. Campers compete for cabin pride in games such as the Human Ice Cream Sundae.

In addition to helping the campers and their families, Camp Phoenix offers a unique educational experience for the medical students involved. Our volunteers serve as mentors for children with a range of medical and psychosocial issues, allowing them to hone their skills as leaders, role models, and caretakers. Positive experiences at the day events and overnight weekend camp have inspired many volunteers to develop interest in Pediatrics, Burn Surgery and Psychiatry.

Camp Phoenix aims to give future physicians opportunities outside of the classroom to better appreciate the art of compassionate and empathetic care for complex patients. Our shadowing program allows medical students to spend time with the pediatric team in the burn unit. These experiences will help students learn about the inpatient and surgical experiences of our campers and relevant psychosocial issues. Camp Phoenix creates a platform to educate all interested students about what our campers went through during the rehabilitation phase of their burn care and to provide unique insight from experts.

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## **The Heads Up! Literacy Program**

*A Project of the Weill Cornell Medical College Department of Pediatrics*

Economic disadvantage and limited parental education mean that children born into poverty are susceptible to delays in language development. These children routinely lag behind their peers before pre-school or kindergarten even begins. In most cases, this gap continues to widen in elementary and middle school as children with poorer educational foundations fall further below school standards. Weakness in language and reading skills can lead to poorer educational and health outcomes, such as school failure, low self-esteem, troubled behavior, and substance abuse. In contrast, recent studies have shown that reading aloud to children from early on in life has positive effects on children's language and pre-literacy skills.

In an effort to improve early literacy, the Heads Up! Pediatric Literacy program has initiated an intervention mediated by pediatric primary care physicians. Doctors are the professional

constituents with the most access to children and parents before school begins. By having physicians alert parents to the need to read to their young children—and by giving an age-appropriate book as part of the physical exam—we make the promotion of early language and literacy development a standard part of primary pediatric care.

Beyond encouraging language development and school readiness, books can also be used for assessment in the exam room. Books can help physicians see whether a four-month-old reaches for objects or if a child who moves to accept a book has a normal gait. In addition, at WCMC, trained volunteers help children select more books and conduct parent outreach in the waiting room. Because we believe deeply in the mission of promoting child literacy, we are working hard to keep this program going as strong as ever through continued involvement with volunteers as well as book donations.

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## Health for Life

Health for Life is a program run by the NYP Department of Pediatrics that works with overweight children. A team of pediatricians, fitness specialists, social workers, nutritionists, and medical student volunteers help children and teens ages 7-18 learn about how to lead a healthier life. The 8-week program has 2 major components: nutrition and exercise. The nutrition sessions focus on learning how to prepare healthy meals via cooking demonstrations and hands-on activities. The exercise portion focuses on having fun while engaging in physical activity and teaching participants how to incorporate activity into their daily lives. Medical students have the opportunity to form relationships with children and their parents, while also serving as role models and having a great time!

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## Health Professions Recruitment & Exposure Program (HPREP)

The Health Professions Recruitment & Exposure Program (HPREP) is part of the Pipeline Mentoring Institute of the Student National Medical Association (SNMA). HPREP aims to expose high school students from underrepresented minorities to science, medicine and the health professions. The overarching goal is to encourage minority students to pursue a career in medicine by giving them meaningful exposure to the health field. During the three-month after school program, the students attend a variety of lectures, participate in an anatomy lab dissection, receive assistance on their college application and essay, hear about the intersections of medicine and other disciplines, and build a lasting relationship with a medical student mentor. This year we anticipate around 96 high school students to engage roughly 45 medical students from across all classes to be mentors and role models for the

high schoolers. HPREP has a rich history in the community, with alumni often coming back to speak on the program. This program began here at Cornell and has subsequently spread to many other medical colleges around the country.

Student Leadership: Jonathan Yu

Faculty Advisors: Dr. Carol Capello (cfc2002@med.cornell.edu), Dr. Jane Chang (jac9009@med.cornell.edu)

## The Komansky Children's Hospital Family Advisory Council

The Komansky Children's Hospital Family Advisory Council (KCHFAC) is a group of 35 dedicated parents and family members of pediatric patients who are committed to working together as equal partners with hospital staff and administration to provide Patient and Family-Centered Care to all patients since 2007. KCHFAC has three areas of focus:

Quality and Patient Safety/Advisors: The KCHFAC members are active on numerous Departmental and Hospital Committees, including the Quality and Patient Safety Council. KCHFAC members have direct impact and influence on policies, programs, and practices which affect the care and services of children and their loved ones. The Komansky Children's Hospital joined the Solution for Patient Safety Learning Collaborative with over 97 hospitals working together to eliminate harm in pediatrics. We use the Patient and Family Centered approach to address current priorities in health care specifically in reducing readmission, decreasing infections and preventable medication errors, improving medication management, providing safe care transitions, and improving cost efficiency.

Medical Education/Family Faculty: Working in close collaboration with medical staff, we developed and host programs to educate medical students, residents and nurses on the principles of Family-Centered Care. KCHFAC parents are afforded the opportunity to impart their experiences and opinions in order to contribute a family point of view based on "real life" situations. Family Faculty Groups work closely with Drs. Jennifer DiPace and Thanakorn Jirasevijinda, and Nursing Educator Nicole Farnsworth.

Patient Experience/Support Group: A child's stay in the hospital can often be a stressful and difficult time. Our members, through the sharing of their experiences, help guide other families and provide them with emotional support. From the parent lunches, teas and dinners to celebrating with patients/families at one of our many holiday events, we are committed to creating initiatives that support families and systematically manage support.

The Komansky Children's Hospital Family Advisory Council has partnered with Quality Improvement Research Team "Improving Pediatric Patient-Centered Care Transitions (IMPACT) to improve transitions care for patients with medical complexity who depend on technology for daily functioning. This technology includes tracheostomy, feeding tubes, indwelling central venous lines, and ventriculoperitoneal shunt. We have developed the Simulation-based Discharge Program that has 2 parts: 1) Simulation-based education where

caregivers can learn about tracheostomy care on mannequins 2) Parent-Parent Support provided by the FAC Members in person and via telephone platform. Parent To Parent Network is a peer to peer program that provides the emotional support to families of children inpatient at The Komansky Children's Hospital. In addition to participating in the Simulation Discharge Program as described above, this program provides support to families with children with Autism, Cancer, Cerebral Palsy, Down Syndrome, Diabetes, Leukemia, Neuroblastoma, Pancreatitis, Seizure Disorder, and Sepsis.

Program Faculty Mentor: Mariella Guerra, Mag9152@nyp.org

## **MACHO – Motivating Action Through Community Health Outreach**



Motivating Action through Community Health Outreach (MACHO) is a Weill Cornell Medical College student led, community centered response to the alarmingly increasing rate of childhood obesity, particularly within minority and socioeconomically disadvantaged communities. The program partners with Public School 83 in East Harlem and aims to teach adolescents about nutrition and exercise through the lens of personal responsibility and practical tools for success in life. Although the immediate focus of our program is on healthy choices related to nutrition and exercise, MACHO's participants learn values and skills that can be applied to many other endeavors in life. By empowering our youth to lead healthy lives, we hope they can motivate and inspire others in their community to do the same.

Student Leadership: Michael Tzeng

Faculty mentor: MacKenzi N. Hillard, MD, mnh@med.cornell.edu

## **Weill Cornell Youth Scholars Program (WCYSP)**

The main purpose of the Weill Cornell Youth Scholars Program (WCYSP) is to expose students of underprivileged and underrepresented backgrounds, especially from inner-city high schools, to the substantial educational resources and opportunities at Weill Cornell Medical College and NewYork-Presbyterian Hospital/Weill Cornell Medical Center. Many of these high schools have exceptionally high drop-out rates that coincide with low percentages of graduates going on to attend a four-year university. By developing early experiences in medicine, students can develop appropriate attitudes towards their education, interpersonal skills, and, more importantly, confidence in themselves to succeed academically.

The WCYSP curriculum is designed to educate, inspire, and prepare participants for personal and professional success. We seek to address some of the weaknesses that prevent many inner-city students from performing well at the college level through an innovative format that emphasizes critical reading and writing. Students attend lectures, given by WCMC

students, in physiology, anatomy, and the basic medical sciences. Our daily Problem Based Learning (PBL) sessions provide a forum for youth scholars to interact with one another and learn the value of collaboration. All high school students that completed the program reported that it had a significant impact on their personal motivation to pursue a career in science or medicine and are more motivated to take more challenging courses in high school. Moreover, all of the students who graduated from the program went on to college, and most of those now in college major in science or other pre-medical tracks. Weill Cornell medical students, residents and attending physicians serve as mentors and teachers in the program. Volunteer teachers can choose one or more topics and are given lecture notes and Powerpoint slides that are prepared in advance to maintain consistent quality. Alternatively, volunteer teachers may use their own teaching materials for their particular topic with proper review in advance. The program runs for four weeks every July from Tuesday to Friday. Typically, each lecturer will give one or two one-hour lectures, but can choose to volunteer more of their time. We also recruit new leadership every year to plan the next summer's program under the guidance of leaders from the previous year.

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## **Kids in Chronic Care Support (KICS)**

KICS is a student-run program with the New York Presbyterian Hospital that creates one-on-one matches between Weill Cornell medical students and children or adolescents currently receiving therapy. The focus of the program is to provide support for the children and their families; it gives the kids an opportunity to form a close, consistent relationship with someone outside of their treatment team. KICS currently works with departments of pediatric neurosurgery and hematology/oncology. KICS leadership personally matches students with patients interested in having a buddy. Once a match is made, the student makes the initial contact with the patient during a clinic visit. After this, buddies can spend time together whenever it is best for both; this can be during hospital visits or even outside of the hospital. For kids, the hospital can be an intimidating place associated with pain, discomfort, and, of course, the terrible effects of chemotherapy. Medical students can help make their treatment experience a little better. Especially in pediatrics, the diagnosis of cancer can have a major impact not only on the patient but also on the patient's family. KICS provides medical students with the opportunity to follow a patient case longitudinally and also to delve into the impact of chronic illness on patients and their families.

## **MagicAid**

MagicAid is a club devoted to providing "magic therapy" to pediatric patients in the hospital. Medical students will visit patients in various pediatric wards, performing and teaching magic tricks to the patients and their families. This exciting service organization serves as a unique way for medical students to positively impact the patients' experiences and well-being. No experience with magic necessary—the effects are fun and easy to learn!

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# Mentoring & Research Opportunities in Pediatrics

## Erika Abramson, MD, MS

General Academic Pediatrics, Departments of Pediatrics and Healthcare Policy and Research  
Weill Cornell Medicine  
[err9009@med.cornell.edu](mailto:err9009@med.cornell.edu)

Field(s) and topics of interest: Educational research, pediatric hospitalist and outpatient medicine, health services research, healthcare safety and quality research

Research: Health services research, healthcare safety and quality research

Project Description: I mentor a host of residents and fellows on general pediatric, educational, and health services research projects. There is frequently a role for medical students in these projects, with varying responsibilities ranging from subject recruitment, retrospective chart review, data analysis, and abstract/manuscript writing. If any interest in these fields, please feel free to reach out to me.

Preferred Experience: None required

## Oleh Akchurin, MD, PhD

Pediatric Nephrology, Department of Pediatrics  
Weill Cornell Medicine  
[oma9005@med.cornell.edu](mailto:oma9005@med.cornell.edu)

Field(s) and topics of interest: Nephrology/Pediatric Nephrology. Iron metabolism, fibrosis, bone health, growth and development.

Research: Anemia, iron metabolism, renal fibrosis and bone health in chronic kidney disease

Project Description: In this project, we are targeting the novel mechanisms linking iron metabolism alterations in chronic kidney disease (chronic renal insufficiency) with renal fibrosis, and systemic complications of chronic kidney disease, including those affecting the skeletal system. The studies are conducted in both basic science (mouse models) and clinical / translational (the cohort of children with chronic kidney disease) settings.

Students' Role in the Project: Students interested in basic science will be able to participate in laboratory experiments. Students interested in clinical research will have the opportunity to work with our patient database.

Preferred Background/ Experience: Previous research experience would be helpful but not required.

## Michael J. Alfonzo MD, MS

Pediatric Emergency Medicine, Departments of Pediatrics and Emergency Medicine  
Weill Cornell Medicine  
[mia2016@med.cornell.edu](mailto:mia2016@med.cornell.edu)

Field(s) and topics of interest: Pediatric Emergency Medicine; Global Health; Sepsis; Electronic Health Records

Research: Title: Impact of Saving Children's Lives Program on Provider Knowledge, Resource Capacity and Patient Outcomes in Tanzania Co-investigators: Christine Joyce MD (Pediatric Critical Care Medicine, Weill Cornell), Adolphine Hokororo (Pediatrics, Weill Bugando)

Project Description: Saving Children's Lives (SCL), was created in 2013 to fill the gap in community healthcare providers' knowledge and skills to recognize and treat acute illness in children. A 2-day program adapted from the AHA program PEARs (Pediatric Advanced Emergency Assessment, Recognition, and Stabilization) is designed to reinforce the WHO's IMCI (Integrated Management of Childhood Illness) training and focus on the acutely ill child needing urgent hospital referral. Disorders include acute respiratory distress and hypovolemic shock from diarrhea. Implementation of a standardized mortality audit will be used for collection of outcome measures. Following provider training, data will be collected and analyzed to assess for a decrease in mortality.

Students' Role in the Project: Students will join a multidisciplinary team in several projects. Students can participate in research study design, data collection, and manuscript writing. Students will learn how to obtain informed consent, conduct chart reviews, and analyze data.

Preferred Background/ Experience: None required. Interested students should be creative, motivated, and interested in global health. Students planning to participate in a global health elective are strongly encouraged to collaborate.

### **Zoltan Antal, MD**

Pediatric Endocrinology  
Weill Cornell Medicine  
Email: zoa9003@med.cornell.edu

Field(s) and topics of interest: Endocrine late effects in survivors of childhood cancer, Mental health in children with type 1 diabetes, Growth in children with Fanconi Anemia

Research: Current projects:

- Growth chart assessment in children with Fanconi Anemia
- Evaluating gonadal function in male survivors of cancer post stem cell transplant

Project Description: Currently we are doing retrospective analyses in above listed study groups. Future plans include a proposal to do a prospective analysis of sexual function in males at risk for hypogonadism that will focus on correlation with serum testosterone levels.

Students' Role in the Project: This will vary with the project and may include such activities as data collection and analysis or formulation of a validated questionnaire to be used in the prospective study.

Preferred Experience: None required

### **Elaine Barfield, MD**

Pediatric Gastroenterology and Nutrition, Department of Pediatrics  
Weill Cornell Medicine  
elb2020@med.cornell.edu

Field(s) and topics of interest: Home Infusions of biologics in pediatric Inflammatory Bowel Disease (IBD), Fecal Microbiota Transplant for recurrent *Clostridium difficile* infection.

Research: Examination of a home infusion program in IBD; Safety of home infliximab infusions in IBD; Multicenter study of fecal microbial transplantation for *Clostridium difficile* infection in children; Cost of hospital infliximab and vedoluzimab infusions in pediatric IBD.

Students' Role in the Project: IRB proposal development, subject recruitment, data entry, abstract and manuscript preparation. The student will learn the basics of research project development, subject recruitment, and gain experience in writing abstracts/manuscripts

Preferred Background/ Experience: Must be enthusiastic, motivated and very organized. Knowledge of End Note and REDCap are helpful but not required.

### **Marisa Censani, MD**

Pediatric Endocrinology, Department of Pediatrics,  
Weill Cornell Medicine  
mac9232@med.cornell.edu

Field(s) and topics of interest: Obesity and insulin resistance, bone and mineral metabolism, growth, thyroid disorders, and diabetes.

Project Description: Patient recruitment, data acquisition, data analysis, and abstract formulation in patient-oriented research studies; please contact Dr. Censani for further details.

Preferred Background/ Experience: None

### **Kimberley Chien, MD**

Pediatric Gastroenterology and Nutrition, Department of Pediatrics  
Weill Cornell Medicine  
kac9091@med.cornell.edu

Field(s) and topics of interest: Transition care of pediatric patients with chronic gastrointestinal diseases, currently investigating the needs of adolescents with Inflammatory Bowel Disease (IBD) during transition to adulthood and measuring effectiveness of interventions to improve patient outcomes and quality of life; Prevention of venous thromboembolism (VTE) in pediatric IBD

Research Project #1 (Principal Investigators (PI): Drs. Chien and Kucine): VTE burden in hospitalized IBD children. We are establishing the current risk/incidence of VTE in hospitalized pediatric IBD and studying the impact of VTE/ complications on the US healthcare system using national databases. Qualitative and quantitative research methods will be used.

Students' Role in the Project: Students will be involved in collection and analysis of data, and abstract writing.

Research Project #2 (PI: Dr. Kimberley Chien): Assessment of the WCM formal transition care program for pediatric IBD. We will investigate transition-care related issues and assess the impact of our established formal transition care program on the transition readiness of adolescent IBD patients using qualitative and quantitative research methods.

Students' Role in the Project: Students will be involved in patient recruitment, collection and analysis of data, national presentation submission, and abstract writing.

Preferred Experience for both: None required

### **Chris Cunniff, MD**

Medical Genetics, Department of Pediatrics  
Weill Cornell Medicine  
cmc9039@med.cornell.edu

Field(s) of Interest: Medical genetics, including genetic disorders associated with predisposition to cancer, multiple malformation syndromes and disorders of sexual development

Research: Bloom Syndrome Registry – a database of health information on persons with Bloom syndrome, a chromosome instability syndrome with predisposition to cancer

Project Description: The Bloom Syndrome (BS) Registry contains information on all aspects of health in this population and can be used to ask and answer questions about health and welfare in BS. We have ongoing projects examining feeding, growth, cancer development, intelligence, and academic accomplishment. Dr. Cunniff is also interested in development of guidelines for care of people with genetic disorders and their utility.

Students' Role in the Projects: Students may propose a question that can be examined with Registry data, or he/she may also join in one of our currently existing or planned projects. The student will work closely with Dr. Cunniff and the Bloom Syndrome Registry Research Assistant to extract and analyze data from the Registry; or he/she will use data being actively collected to describe characteristics of a subset of persons in the population.

Preferred Experience: None required

## **Diane Felsen, PhD and Dix P Poppas, MD**

Pediatric Urology, Department of Pediatrics  
Weill Medicine  
dfelsen@med.cornell.edu

Field(s) of and topics of interest: Congenital Adrenal Hyperplasia and Bladder dysfunction

Research Project #1: Modeling Congenital Adrenal Hyperplasia in zebrafish and in adrenocortical cells: Congenital Adrenal Hyperplasia [CAH] is an inherited deficiency of enzymes involved in steroid hormone production, mainly 21-hydroxylase [21-OHase]. Decreased cortisol and aldosterone production causes adrenocorticotrophic hormone stimulation of the adrenal cortex, leading to excess synthesis of male hormones. In severe CAH, children require life-long treatment to replace cortisol and aldosterone. Deficiency in females causes virilization, beginning in utero, causing virilized external genitalia that is often treated with feminizing genitoplasty.

There are 2 sub-projects. The first uses the zebrafish to model CAH and 21-OHase deficiency. Using CRISPR/CAS-9 to delete 21-OHase and study the effects in zebrafish, we will determine if replacement restores the phenotype. Studies examine the effects of 21-OHase and other steroid synthetic enzymes. Other studies will be carried out using the H-295 human adrenocortical cell line. Overall the goal is to determine if/how 21-OHase enzyme activity can be restored in patients with CAH.

Research Project #2: Design of a Synthetic Bladder Augment Patch: Bladder dysfunction related to small, fibrotic bladders is a significant problem in children, due to high bladder storage pressures and low bladder volume. High pressures impact bladder function by inducing fibrosis and can lead to incontinence, renal failure and a lifetime of dialysis, and may require renal transplantation. The conventional surgical approach to increase bladder size is bladder augmentation [ileocystoplasty], but has significant morbidity. We are designing a synthetic bladder augmentation patch to increase the bladder storage capacity, which would reduce much of the current surgical morbidity, and also eliminate the metabolic complications of ileocystoplasty. We will be testing this bladder patch in a porcine animal model.

Students' Role in the Project: Students will learn basic laboratory techniques related to zebrafish/cell growth and maintenance, as well as cloning, PCR, western blots and CRISPR/CAS9 technology. In the bladder project, the student will assist in surgery and will then study the tissue in vitro using a variety of basic lab techniques.

Preferred Background/ Experience: Willingness to learn and work hard and committed interest are pre-requisites.

## **Cori Green, MD, MS**

General Academic Pediatrics, Department of Pediatrics  
Weill Cornell Medicine  
[cmg9004@med.cornell.edu](mailto:cmg9004@med.cornell.edu)

Field(s) and topics of interest: Integration of pediatric mental health (MH) care into primary care, training practicing and future pediatricians in managing pediatric mental health problems, integrated models of mental health care

Research: Predictors for managing mental health problems in medical pediatric resident trainees: A needs assessment for improved education

Project Description: National assessment of pediatric training programs, their integrated models of mental health care, and trainee-perceived responsibility and practice behaviors.

Students' Role in the Projects: Students will be involved in recruitment of subjects, administrative tasks for the project, analysis of data, and abstract writing.

Preferred Experience: None required

## **Daniel W. Green, MS, MD**

Clinical Orthopaedic Surgery  
Hospital for Special Surgery  
[greendw@hss.edu](mailto:greendw@hss.edu)

Field(s) of Interest: Pediatric Orthopedic Surgery and Scoliosis

Research: Selected clinical projects in pediatric orthopedic surgery

Project Description (with Co-Investigators Drs. Emily Dodwell and Peter Fabricant) Previous projects have included: DDH, congenital muscular torticollis, discoid meniscus, scoliosis and kyphosis.

Students' Role in the Project: Literature review, radiograph review, data analysis

Preferred Background/ Experience: None requested

## **Katherine A. Hajjar, MD**

Pediatric Hematology-Oncology, Departments of Pediatrics and Cell and Developmental Biology  
Weill Cornell Medicine  
[khajjar@med.cornell.edu](mailto:khajjar@med.cornell.edu)

Field(s) and topics of interest: Hemostasis and thrombosis, angiogenesis, vascular leak and inflammatory syndromes, sepsis

Research: Regulation of membrane dynamics in vascular biology and inflammation

Project Description: The plasma membrane serves as a dynamic platform for assembly of molecules that regulate the clotting of blood and prevent fluid leak from blood vessels. At the same time, repair of intracellular organelle membranes is central to the control of inflammation. In humans, the annexins are a 12-member family of calcium-regulated, phospholipid-binding proteins that modulate a spectrum of dynamic membrane-related events. Our lab is defining these mechanisms in the context of vascular health and the inflammatory response. We use in-patient and out-patient clinical samples, genetically engineered mice, and cell culture techniques to determine how the annexins, especially annexin A2, impact health and disease. Our aim is to understand their specific roles in

preventing thrombosis and vascular leak, regulating the innate immune system, and controlling the development new blood vessels. In particular, we wish to examine these processes in the pediatric population, where little is known about annexin expression and function. Ultimately, we hope that this research will lead to new treatment approaches for disorders involving thrombosis, excessive angiogenesis, and unregulated inflammation in children.

Students' Roles in the Projects: Depending on prior experience, students will learn basic laboratory techniques such as cell culture, basic molecular biology, western blotting, ELISA, mouse surgery, and blood and tissue processing. In addition, students may embark on analytical literature reviews relevant to ongoing projects.

Preferred Background/Experience: Strong interest in research, intellectual curiosity, and enthusiasm.

### **Barry Kosofsky, MD, PhD**

Pediatric Neurology, Departments of Pediatrics, Neurology  
Weill Cornell Medicine  
bar2009@med.cornell.edu

Research: Exercise therapy as treatment for mild Traumatic Brain Injury (mTBI)

Project Description: We are pursuing a clinical research program to establish the efficacy of a graded exercise program to accelerate the recovery of individuals who have persistent post-concussive symptoms following mTBI. We are using functional (autonomic, EEG, evoked responses, and eye tracking), and structural (DTI/MRI) assessments to identify changes in the brain following mTBI that will be predictive of, and correlate with the response to exercise therapy.

Students' role in the project: Subject enrollment and assessments during participation in a clinical research protocol.

Preferred Background/ Experience: Clinical research experience preferred (especially prior work in clinical trials).

### **Nicole Kucine, MD**

Pediatric Hematology/Oncology, Department of Pediatrics  
Weill Cornell Medicine  
nik9015@med.cornell.edu

Research: Assessment of VTE burden in hospitalized pediatric IBD patients

Principal Investigators: Dr. Kimberley Chien, Dr. Nicole Kucine

Project Description: We are establishing the current risk/incidence of VTE among hospitalized pediatric IBD patients. We are also investigating the impact of VTE and its complications on the US healthcare system. Using national databases, we will apply qualitative and quantitative research methods to assess patients during their hospitalizations.

Students' Role in the Projects:

Students will be involved in collection and analysis of data, and abstract writing.

Preferred Experience: None required

## Juhi Kumar, MD, MPH

Pediatric Nephrology, Department of Pediatrics  
Weill Cornell Medicine  
juk2013@med.cornell.edu

### Field(s) and topics of interest:

- Non-invasive biomarkers of kidney injury in pediatric kidney allograft recipients using urine messenger RNA and urinary metabolites
- Early detection of kidney injury in neuroblastoma survivors
- Mineral metabolism in pediatric chronic kidney disease

Research: My NIH funded research focuses on identifying early biomarkers of kidney injury so that renoprotective measures can be instituted in a timely way and lessen further kidney damage. I am currently evaluating biomarkers of kidney injury in two specific pediatric populations, kidney transplant recipients and neuroblastoma survivors.

### Project Descriptions:

- 1) VIRTUUS: Validating Injury in the Renal Transplant Using Urinary Signatures) in Children Study (PI's: Juhi Kumar, Sandra Amaral, Brendan Keating)  
This is a NIH/NICHD funded multi-center cohort study that aims to validate in pediatric kidney allograft recipients, urinary messenger RNA signatures and metabolite profiles associated with acute cellular rejection, antibody mediated rejection and BK virus nephropathy in adult kidney transplant recipients. By validating noninvasive diagnostic and prognostic biomarkers of early kidney allograft injury in pediatric recipients we hope to advance pediatric transplant clinical practice - by creating opportunities for non-invasive immune surveillance to inform preemptive treatment decisions before clinical signs arise, resulting in better long-term outcomes.
- 2) Identifying Biomarkers of Kidney Injury in Neuroblastoma Survivors Clinical and Translational Science Center (PI's: Juhi Kumar, Anuradha Gajjar, Danielle Novetsky Friedman). This study aims to assess traditional and novel markers of kidney injury in neuroblastoma survivors.

Students' Role in the Project: Students will assist in several aspects of the projects

Preferred Experience: Not required

## David C. Lyden, MD, PhD

Pediatric Hematology Oncology, Department of Pediatrics  
Children's Cancer and Blood Foundation Labs  
Weill Cornell Medicine  
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Field(s) and topics of interest: Cancer Metastasis

Research Title: Tumor exosomes determine pre-metastatic niche formation and organotropism

Project Description: Tumor microparticles known as exosomes are released into the circulation and fuse with specific cells at distant sites establishing a pre-metastatic niche in cancer patients. Tumor exosomes transfer exosomal tumor contents (proteins, miRNA and DNA) into normal cells and "educate" these cells to a pro-metastatic phenotype. Recently, our lab has discovered a new particle call exomere (amembranous particle smaller than an exosome), which packages proteins enriched in metabolic enzymes.

Students' Role in the Project: The student will be responsible for determining the key factors associated with exosomes that support their role in organotropism.

Preferred Background/ Experience: None requested

## **Marianne Nellis, MD, MS**

Division of Pediatric Critical Care  
Department of Pediatrics,  
Weill Cornell Medical College  
212-746-3056  
man9026@med.cornell.edu

Field(s) of Interest: Transfusion medicine research

Research Title: The Effects of Transfusion of Blood Products in Critically Ill Children

Project Description: I am working on several retrospective and prospective projects looking at the effects of red blood cell and platelet transfusions on critically ill children.

Students' Role in the Projects: Students can be involved in the projects on several levels including data acquisition, analysis and manuscript writing.

Preferred Experience: None required

## **Snezana Nena Osorio, MD**

General Academic Pediatrics, Department of Pediatrics  
Weill Cornell Medicine  
snm2001@med.cornell.edu

Field of Interest: Safety & quality in healthcare

Title of Project: Improving Pediatric Patient-Centered Care Transitions: A Multi-Center Research Quality Improvement Collaborative

Project Description: This study aims to promote partnership between patients/parents/caregivers and medical teams via shared ownership of care transitions at hospital discharge. The transition from the inpatient to outpatient setting presents a safety risk to pediatric patients. Errors in improper medication use, failure to recognize and activate contingency plans, and failure to adhere to follow-up appointments reflect poor patient hand-off prior to hospital discharge. We aim to improve parent/caregiver self-management.

Our intervention- Pediatric Discharge Bundle consists of 1) pre-discharge confirmation of patient/caregiver readiness for discharge, 2) caregiver's ability to teach-back essential components of a patient/caregiver-generated care plan, and 3) post-discharge phone follow-up to review essential information and clarify questions to "bridge the gap" prior to follow-up with the PCP. Our secondary objectives are to improve care coordination, provider handoff, and to decrease readmission rate.

Medical Student Research Opportunities IMPACT Study: #1. Teach Back Direct Observation: To evaluate the quality of the Teach Back technique used at hospital discharge by the nursing staff. After training, students will observe discharge instructions by nursing staff using a checklist-type instrument. Schedule is flexible and can be in the afternoon or evening. #2. Preventable Readmissions: To understand the epidemiology of preventable pediatric readmissions and to identify the risk factors contributing to preventable readmissions. After training, students will 1) review charts to determine the causes for readmission using an established tool; 2) interview caregiver in person or by phone about their hospital experience. #3. Provider Satisfaction Surveys and Qualitative Study: To better understand discharge communication needs to handoff patients from the hospitalist services to outpatient subspecialty providers.

Preferred Background/ Experience: None

## Jeffrey Perlman, MD

New Born Medicine, Department of Pediatrics  
Weill Cornell Medicine  
jmp2007@med.cornell.edu

Field(s) and topics of interest: Neonatology, Brain development, Resuscitation, Global health

Research: Our current project goal is to determine biomarkers for identifying infants at high risk for neurodevelopmental deficits following perinatal hypoxia-ischemia treated with selective head cooling

Project Description: Evaluate the value of advanced MRI imaging and/or recovery of the EEG as early biomarkers of outcome in infants with HIE treated with selective head cooling

Students' Role in the Project: Assist in the review of the EEG after birth until the development of sleep awake cycling and delineate the pathways to recovery. Evaluate the potential role of MRI spectroscopy and or DTI in predicting recovery following HIE.

Preferred Background/ Experience: None

## Matthew Smith-Raska, MD, PhD

Division of Newborn Medicine, Department of Pediatrics  
Weill Cornell Medicine  
Email: mrs7001@med.cornell.edu

Field(s) and topics of interest: Genetics, Epigenetics, Genomic Imprinting

Research: I am interested in genomic imprinting, a model of epigenetic inheritance, in which traits/information are inherited independent of DNA sequence (by an unknown mechanism). In the case of imprinting, this is based on whether an allele/gene/chromosome is inherited from the mother or father. Specifically, I am studying how 2 genes (Nlrp7 and Khdc3l) influence initiation of imprinting in the oocyte. Women carrying these genetic mutations are unable to properly initiate imprinting in oocytes, and can develop hydatidiform moles if these oocytes are fertilized. By studying genes in a tissue culture model, I will explore their cellular function and regulation of imprinting.

Project Description: The project involves analyzing gene and protein expression changes upon knockout of a variety of genes important in genomic imprinting, in order to better understand their function. This involves tissue culture as well as a variety of cellular and molecular biology techniques. This may also lead to analysis of tissues from knockout mouse models.

Students' Role in the Project: Students will be expected to contribute to their portion of the project, including performing qPCR, Western Blots, bacterial cloning, and tissue culture. There is also the possibility of mouse breeding and dissection.

Preferred Experience: (if any or "None required"): None

## Heidi Stuhlmann, PhD

Departments of Cell & Developmental and Pediatrics  
Weill Cornell Medicine  
hes2011@med.cornell.edu

Research: Placental Development and Placentopathies

Project Description: The placenta serves as the site of contact for the maternal and embryonic circulatory systems to enable nutrient and gas exchange. It contains two primary functional cell types, trophoblast and endothelial cells. Proper placental development requires invasion and

differentiation of trophoblast cells, as well as coordinated maternal vascular remodeling and fetal vasculogenesis. Any disruption in these processes can result in placental pathologies, including intrauterine growth restriction and preeclampsia (PE). Uteroplacental vascular insufficiency, a main cause of IUGR, results in chronic oxygen and nutrient deprivation. Fetal circulatory adaptations compensate for growth restriction, but also program the fetus for increased risk of hypertension, cardiovascular disease, and type 2 diabetes, later in life. PE is a leading cause of maternal and fetal morbidity and mortality worldwide, and the only resolving treatment is delivery of the baby and placenta. Although the pathophysiology of PE remains largely unknown, inadequate trophoblast cell invasion, endothelial cell dysfunction, dysregulated uteroplacental vascularization, and an imbalance of pro- and anti-angiogenic growth factors have been implicated in the disease.

We are using mouse models, trophoblast stem cells and human placental samples to investigate the role of EGFL7 and miR-126 during normal and pathological placental development. Expression of EGFL7, a secreted angiogenic factor, and miR-126 a non-coding microRNA within the *Egfl7* gene were previously thought to be endothelial-restricted. We found that *Egfl7* and miR-126 are expressed in the placenta in the maternal and fetal vasculature, as well as in trophoblast cells (Lacko et al., 2014. *Mech. Dev.* 133:163-176). Using loss-of-function mouse models, we uncovered specific and distinct roles for EGFL7 and miR-126 during placental development. Loss-of *Egfl7* results in defects of placental vascularization, malperfusion, and fetal growth restriction. Our studies show that miR-126 regulates glycogen trophoblast proliferation and expression of imprinted genes specifically in the placenta. We also have a keen interest to understand their role in human placentas. In an ongoing collaboration with clinician-scientists in Maternal-Fetal Medicine at Weill Cornell, Columbia, and the University of Rom, we are investigating the role of EGFL7 protein in preeclampsia.

Student's Role in the Project: The student would get “hands-on” lab experience. Initially, the student would work together with a research scientist in the lab and later on work more independently. Potential projects include: Analysis of serum, placental explants cultures from PE patients for presence of EGFL7, and miR-126.

Preferred Background/ Experience: Basic lab skills, some knowledge in developmental biology, strong interest in research to understand disease mechanisms.

## **Mark Souweidane, MD**

Neurological Surgery  
Weill Cornell Medicine  
mmsouwei2med.cornell.edu

Field(s) and topics of interest: Pediatric brain tumors, Drug delivery to the brain, Translational research using preclinical models, early response monitoring for brain tumors

Research: Using preclinical research methods employing cell culture work and animal models derived from children with brain tumors, the Souweidane laboratory explores novel therapeutic agents, tumor response rates, and unconventional drug delivery methods with the hope of implementing early phase clinical trials in children.

Project Description: Incurable tumors in children warrant exploratory methods for treatment. Using a host of preclinical methods, drugs are tested to assess utility against some of these tumors. Therapeutic agents are also manipulated for in vivo tracking to assess important pharmacokinetic monitoring. Nontraditional delivery routes including convection-enhanced delivery, intra-arterial and intrathecal are tested for early phase translation.

Students' Role in the Project: Lab or bench side research (minimum commitment of 6 months, preferable one year)  
Retrospective data analysis related to neuro-imaging response data (minimum commitment of 6 months)

Preferred Experience: None required other than a professional and collegial demeanor

## Chani Traube, MD

Pediatric Critical Care Medicine  
Department of Pediatrics, Weill Cornell  
chr9008@med.cornell.edu

Field(s) of Interest: Pediatric Delirium, Pediatric Critical Care Medicine; Pediatric Neuro-Intensive Care

Research: Pediatric Delirium: Outcomes after Pediatric Critical Care Project Description: Nearly 200,000 children are admitted to the pediatric intensive care unit in the US each year, and nearly 97% survive their critical illness. However, there is considerable morbidity in survivors. Our research group seeks to define the long-term outcomes after pediatric critical illness, and investigate ways to change PICU care so as to improve the long-term health of survivors and their families.

Delirium affects 1 in 4 children admitted to the PICU, and is associated with poor outcome. At Cornell, we have implemented universal delirium screening in the PICU as standard of care. We are now investigating ways to prevent and treat delirium in at-risk children

Students' Role in the Project: Students will have the opportunity to join a multidisciplinary team engaged in several projects regarding pediatric critical illness and delirium. They will participate in research study design, data collection, and manuscript writing. Students will learn how to obtain informed consent, conduct chart reviews, analyze data, and perform follow-up phone calls using surveys to detect whether a patient has experienced long-term effects from delirium or critical illness.

Preferred Background/ Experience: None required. Interested students should be friendly, comfortable interacting with children and their families, and demonstrate organizational skills and attention to detail. Research is ongoing, with active clinical trials in progress, others pending IRB approval, and others in planning stage.

## Stefan Worgall, MD, PhD

Pediatric Allergy, Immunology, Pulmonology  
Friedman Research Laboratories  
Weill Cornell Medicine  
stw2006@med.cornell.edu

Field(s) and topics of interest: Cystic fibrosis / host defense in lung / gene therapy

Research: Lung antigen presenting cells in cystic fibrosis and Respiratory Syncytial Virus (RSV) vaccine using capsid-modified adenovirus vectors

### Project Descriptions:

1. Cystic fibrosis lung disease is characterized by exaggerated inflammation and increased susceptibility to infections. Although the CFTR protein is primarily thought to be expressed by epithelial cells we and others have studied the expression of CFTR in non-epithelial cells, in particular antigen presenting cells in the lung. This project studies the abnormalities of lung dendritic cells derived from CF knock-out mice. Our data so far indicates that abnormal CFTR expression lung macrophages and dendritic cells is related to abnormalities in innate immune responses. These findings are important in understanding lung disease in CF and also to identify new targets for therapy of this severe disease.

2. Infections with RSV are one of the major causes for viral lower respiratory tract illness, especially in young children. Our laboratory has been working on the development of genetic vaccines for pulmonary pathogens. This project aims to analyze the immunological properties of a novel anti-RSV vaccine using a capsid-modified adenovirus vector. Protection against RSV could be achieved with an efficient vaccination strategy inducing neutralizing humoral immunity as well as a Th1-

dominant cellular response. Adenovirus gene transfer vectors can be used to evoke robust systemic and mucosal immunity against an immunogen expressed as a transgene and Ad functions as a potent adjuvants. The Ad modifications include the addition of a RGD motif to the fiber knob, a modification known to enhance infection of antigen presenting cells and to increase Th1-type immune response, as well as the addition of RSV epitopes into the Ad capsid. These modified vectors will be assessed to induce immunity and protection against RSV in adult and neonatal mouse models. The study will evaluate if a modified Ad vector expressing the RSV F protein engineered to increase activation and infectivity of antigen presenting cells could be useful as a RSV vaccine.

Students' Role in the Project: Design of new and continuation of the present experiments. Student will be involved in cell culture studies and flow cytometry analysis of lung dendritic cells (project 1) and adenovirus vector construction and immunological analyses (project 2).

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AAP Student Representative: Briana Christophers

Faculty Advisors: Susanna Cunningham-Rundles, PhD and Thanakorn Jirasevijinda, MD