Our Mission

The Wendy Klag Center will **promote research and education** regarding the **origins, detection, measurement and prevention** of conditions that affect behavioral, socioemotional and/or cognitive development, as well as evaluation of **services and policies** that support optimal development of affected children and their families. The Center will also **promote expansion of partnerships** with the School of Medicine and the Kennedy Krieger Institute.
Wendy Klag Center researchers, staff and students mark Autism Awareness and Acceptance Month in April 2017.

The Year in Review

The Wendy Klag Center enjoyed a productive 2017 under the continued leadership of Director Dani Fallin, and Associate Directors Janet DiPietro, Elizabeth Stuart, Li-Ching Lee, and Heather Volk. Faculty affiliates within Johns Hopkins entities and the Kennedy Krieger Institute now number 63 researchers with interest in autism or other developmental disabilities. Their expertise is wide-ranging, from epidemiological research into the genetic and environmental origins, to molecular knowledge, educational approaches, services and policies affecting individuals and families, plus biostatistical methods for analyzing data in all these realms. Since 2008, the center has directly supported the education and training of 16 promising students and funded 14 faculty and student research projects. In 2017, the center’s directors and faculty affiliates brought in $10.6 million in federal research grants. Their success fosters collaborations among national and international researchers, and they provide opportunity for graduate students and post-doctoral fellows to deepen their skills as they grow into experienced researchers. In 2017, these researchers have produced over 100 scientific publications (see appendix).
Since its beginning in 2013, the Wendy Klag Center has been supported solely by donations. In 2017, 90 percent of WKC expenditures went directly toward faculty and student research, student training, and community building among those at Hopkins and Kennedy Krieger Institute interested in autism.

### Core External Research Studies

The leaders of the Wendy Klag Center continue to work on multiple externally funded projects. In 2017, Dr. Fallin was awarded a grant to continue to work on the Centers for Disease Control-funded Study to Explore Early Development (SEED). This study, now in its third round, has enrolled hundreds of Maryland families to explore prenatal and early life risk factors for autism. Throughout all three phases, SEED has yielded collaborations with autism researchers in seven states. It also has served as the basis for training many aspiring masters, doctoral, and post-doctoral students, including Norazlin Kamal Nor, a pediatrician who earned her doctorate in genetic epidemiology in December 2017. Her thesis, “Copy Number Variants, Dysmorphology and Abnormal Growth in Autism Spectrum Disorder,” included data from SEED’s first phase.

Dr. Volk has parlayed 2016 WKC faculty research funding to join in a large national research project exploring environmental exposures and their effect on autism. As explained in the Summer 2017 JHSPH Magazine, Volk and other researchers are acting as “Tooth Fairy” to collect children’s baby teeth to measure environmental exposures in
the womb. This focus on environmental influences on children’s neurodevelopment will be combined with other key pediatric outcomes that have high public health impact, such as obesity, airway function, and health outcomes.

Dr. Fallin, Dr. Volk and WKC core faculty member Christine Ladd-Acosta, PhD, are among a team of researchers who were awarded a five-year, $2.3 million NIEHS grant in 2017 to study air pollution, autism, and ADHD. The investigators will be led by Amy Kalkbrenner, PhD, of the University of Wisconsin-Milwaukee, and Diana Schendel, PhD, of Aarhus University in Denmark. The project will use Danish registry data and genetic data available through the Lundbeck Foundation Initiative for Integrative Psychiatric Research (iPSYCH). While other projects have explored air pollution and autism, this new project also will investigate ADHD and intellectual disability, as well as gene-by-environment interaction.

Dr. Lee continues to lead the Maryland site of the CDC-funded Autism and Developmental Disabilities Monitoring Network (ADDM), which estimates the current U.S. prevalence of autism spectrum disorders at one in 68 children (1.46 percent). Dr. Lee also is a highly regarded global autism researcher who has led prevalence and intervention studies in Taiwan and Bangladesh. Her international research initiatives were highlighted in the cover story of the Summer 2017 JHSPH Magazine. Dr. Lee also served as guest editor of Sage’s Autism July 2017 special edition on global autism research.
The WKC’s partnership with the Center on the Early Life Origins of Disease at Hopkins has flourished, generating autism data among the participants of the Boston Birth Cohort (BBC). Two students with ties to the WKC used this collaboration to achieve their doctorates. Kripa Raghavan, who received WKC funding in 2015 to explore prenatal micronutrients as a possible risk factor for ASD, in 2017 published her surprising hypothesis-generating findings in *Paediatric Perinatal Epidemiology*, showing that both very low and extremely high levels of maternal plasma folate and Vitamin B12 levels at birth were associated with ASD risk for the offspring. Martha Brucato, an MD/PhD student, included BBC data on prenatal exposure to fever as well as a new method using machine learning and latent class analysis to identify children with ASD in administrative health data. In April, Dr. Brucato defended her thesis, “In utero exposure to maternal immune activation and Autism Spectrum Disorder.”
In 2017, Dr. Fallin and Dr. Volk conducted a very successful pilot study with a US-based online research registry of thousands of autism-affected families known as SPARK: Simons Foundation Powering Autism Research for Knowledge. The pilot study, called GEARs (Genes and Environment Research Study), grew from a relationship established when SPARK’s principal investigator spoke at a WKC symposium in 2015. The pilot study, funded with just $100 from the WKC, drew responses from more than 1,000 families who agreed to share the genetic, demographic and other data that they previously donated to SPARK, as well as their responses to an environmental questionnaire developed by Dr. Fallin and Dr. Volk. The online format proved to be unexpectedly popular with participating families, who also offered important feedback to the researchers to improve the questionnaire. No results are in yet, but Drs. Fallin and Volk hope that the pilot data will be helpful in seeking federal funding for a larger, more comprehensive study.

**Pilot and Student Research Awards**

In June 2017, the Wendy Klag Center announced its fourth round of recipients for research awards to faculty and students affiliated with the center. Several projects from prior years matured into publications or earned federal funding based on the results of the WKC pilot funding. In the 2017 student category, doctoral student Calliope Holingue won funding for a proposal to study the gut microbiome composition among children with autism. Gastrointestinal problems affect many with autism, making this a particularly relevant issue for families.

“My goal is to better understand how autism and the microbiome are related, so we can leverage that information to improve the mental and physical health of individuals with autism.”

- Calliope Holingue

In the 2017 faculty competition, Department of Epidemiology Assistant Professor Christine Ladd-Acosta, PhD, received funding to study how a hormone-like lipid called prostaglandin E2 interacts with immune activating exposures in pregnant women, potentially increasing risk for autism spectrum disorders. This work uses biospecimens collected from an enriched-risk cohort of women who already had one child diagnosed
with autism and were again pregnant. The cohort, from the Early Autism Risk Longitudinal Investigation (EARLI Study), includes families from the Mid-Atlantic region, as well as California.

**Current and Past WKC-funded Student and Faculty Research**

**2017 Funded Faculty Projects**
- Chris Ladd-Acosta, PhD, Assistant Professor, Department of Epidemiology. “Prostaglandin E2 (PGE2) and Risk for Autism Spectrum Disorder.”

**2017 Funded Student Projects**
- Calliope Holingue, PhD student. “Microbiome Composition and Structure of Children with Autism Spectrum Disorder.”

**2016 Funded Faculty Projects and Progress**
- Robert Gilman, MD, Professor, Department of International Health. “Smell as Diagnostic Aid for Autism.” This research is taking place in Peru.
- Vanya C. Jones, PhD, Assistant Professor, Department of Health, Behavior and Society. “Childhood Unintentional Injury Safety Practices: What are the experiences of parents of children with Autism Spectrum Disorder?” Data was collected from participants in the Interactive Autism Network online registry.
- Heather Volk, PhD, Assistant Professor, Department of Mental Health. “Measurement of Environmental Exposure Biomarkers in Shed Deciduous Teeth.” This research dovetails with a larger effort to collect children’s baby teeth as part of the NIH’s Environmental Influences on Child Health Outcomes (ECHO) Program.

**2016 Funded Student Projects and Progress**
- Martha Brucato, MD/PhD student in the Department of Epidemiology. “Developing Methods Utilizing Machine Learning and Latent Class Analysis to Identify Children with ASD in Administrative Health Data.” This project, involved the Boston Birth Cohort, helped complete Dr. Brucato’s doctoral thesis.
- Bo Y. Park, postdoctoral fellow in the Department of Mental Health. “Maternal Metabolic Syndrome and Autism Spectrum Disorder (ASD) Risk.” Dr. Park’s project also involves the Boston Birth Cohort.

**2015 Funded Faculty Project and Progress**
- Li-Ching Lee, PhD, Associate Scientist in the Department of Epidemiology, in collaboration with Parul Christian, DrPH, in International Health. “Parent-mediated In-home Intervention for Children with Autism Spectrum Disorder in Bangladesh.” The results of this study have been accepted for publication.

**2015 Funded Student Project and Progress**
2014 Funded Faculty Projects and Progress

- Elise Pas, PhD, Assistant Scientist in the Department of Mental Health, in collaboration with the Kennedy Krieger Institute. “Reducing Behavior Problems Among Students with ASD through Coaching Teachers in a Mixed-Reality Setting.” This project led to a 2016 publication in the Journal of Autism and Developmental Disorders.

- Alden Gross, PhD, Assistant Professor in the Department of Epidemiology, in collaboration with the Kennedy Krieger Institute. “Development and Validation of a Continuous Scale of Autism Severity across ADOS Modules.” This research was presented at IMFAR in 2016.

2014 Funded Student Projects and Progress

- Allan Andersen, post-doctoral fellow in the Department of Mental Health, in collaboration with the Kennedy Krieger Institute. “A Survey of Cost and Effectiveness of Parental Responses to Elopement among Children with ASD in the Interactive Autism Network.” Results were presented at an international autism research conference.

- Kelly Bakulski, postdoctoral fellow in the Department of Epidemiology. “Heavy Metals Exposure and Autism Spectrum Disorders in the Early Autism Risk Longitudinal Investigation (EARLI).” This project has now received NIH funding.

- Luke Kalb, doctoral student in the Department of Mental Health. “Effects of Federal Mental Health Parity on Psychiatric Emergency Department Use among Privately Insured Youth with an Autism Spectrum Disorder.” This research was presented at IMFAR 2016. It helped Dr. Kalb complete his doctorate.

Scholarship and Internships

The center’s internship program flourished in 2017. Meredith Nicholson, a masters student in the Department of Population, Family and Reproductive Heath, served at the Maryland Center for Autism and Developmental Disabilities (MCDD), run by the Kennedy Krieger Institute. As a self-identified autistic advocate, Ms. Nicholson did her own research using the Interactive Autism Network (IAN) online registry to compare the health outcomes among autistic adults diagnosed with ASD as children compared to the outcomes of those diagnosed with ASD as adults. She also made a positive mark on the Hopkins community as an autistic advocate. Ms. Nicholson persuasively argued to rebrand the school’s annual observance of Autism Awareness Month to an “Autism Awareness and Acceptance” event. She presented a lecture on autistic self-advocacy as part of the autism and public health class taught by Drs. Fallin and Lee. Ms. Nicholson was also an invited speaker on the topic of neurodiversity for the Johns Hopkins 14th Annual Diversity Conference in September 2017.
In late 2017, Department of Mental Health masters students Da-Yea Song and Meghana Shetty were selected as WKC interns. Song was placed at MCDD, and Shetty was placed at a new partnership location, the Sheppard Pratt-Lieber (SPL) Research Institute. SPL is a new joint venture aimed at translating scientific advances in genetics and brain research into clinical practice.

“My Wendy Klag Center internship allowed me to directly apply much of the biostatistics, epidemiology, and public health material I had been learning in the classroom.”
-- Meredith Nicholson

WKC Associate Director Heather Volk (from left) and Director M. Daniele Fallin are shown with funding recipients Martha Brucato, Bo Park, Vanya Jones and Meredith Nicholson. Other WKC associate directors are Janet DiPietro, Li-Ching Lee, and Elizabeth Stuart.
**Education and Training**

Wendy Klag Center Director M. Daniele Fallin and core faculty member Li-Ching Lee continue to jointly teach a Bloomberg School course devoted to autism. The course includes guest speakers in addition to the teaching of the etiology, epidemiology, and prevalence of autism. In 2017, Drs. Fallin and Lee were recognized for Excellence in Teaching as rated by their students.

Building on her interest in the gut microbiome, doctoral student Calliope Holingue, a 2017 WKC student research award recipient, taught a 2017-2018 winter intercession course titled “Mental Health and the Gut.”

The center continues to hold its monthly journal club during the academic year, enriching students’ background, building collaborations within the WKC, and enabling students and affiliated faculty to learn different methods and disciplines from one another. Retired physician Carol Newill, MD, volunteers her time to lead the journal club and mentor student presenters. These journal clubs offer student presenters a chance to hone their analytical thinking, presentation skills, and contacts with a faculty member who helps them guide discussion. It offers others at the school a chance to stay abreast of research and informally discuss research ideas. At the end of the academic year, the WKC hosts a “Sneak Peek” at JHSPH research that will be presented at the annual International Meeting for Autism Research (IMFAR). The IMFAR Sneak Peek enables presenters to gain feedback and practice before their IMFAR presentation, and it allows those in the Wendy Klag Center community who cannot attend IMFAR to learn about the latest research taking place.

**Highlights, Awards and Media Mentions**

In 2017, Dr. Christine Ladd-Acosta, a WKC core faculty member, was lead author of a paper named by the journal *Environmental Research* as its “Best Paper of the Year 2016.” The full citation is: Ladd-Acosta C, Shu C, Lee BK, Gidaya N, Singer A, Schieve LA, Schendel DE, Jones N, Daniels JL, Windham GC, Newschaffer CJ, Croen LA, Feinberg AP, Daniele Fallin M. *Presence of an epigenetic signature of prenatal cigarette smoke exposure in childhood. Environ Res. 2016 Jan;144(Pt A):139-148.* The study used data from the Study to Explore Early Development (SEED).

In March, Dr. Fallin was interview on NPR’s Baltimore affiliate about “Why Do Myths About Vaccines Persist?”
In April, *Fit Pregnancy* quoted Dr. Fallin in its article “Early Autism Diagnosis: What Parents Need to Know.”

Also in April, the Baltimore NPR station featured WKC Kennedy Krieger faculty affiliate Kiely Law, MD, PhD, in a segment about “Adulthood with Autism.”

Dr. Fallin and Calliope Holingue, a 2017 WKC student research funding recipient, co-wrote a December editorial for the online autism news site *Spectrum* on the need for a reliable instrument to measure gastrointestinal problems among people with autism.

In August, Dr. Volk was quoted in *USA Today* about the number of new TV shows, such as ABC’s “The Good Doctor” and Netflix’s “Atypical” series, which feature characters who have autism spectrum disorder.

**Collaborations and Community-Building**

Many of the research collaborations and internships associated with the Wendy Klag Center would not be possible if not for the partnerships the center has fostered. In 2017, the WKC also hosted various events, including a fall social to welcome new JHSPH students and introduce them to the Wendy Klag Center and its mission. The WKC co-hosted two speakers who came to JHSPH, including University of Michigan biostatistician Daniel Almirall, PhD, and University of Pennsylvania policy and services researcher Molly Condon, PhD. Through the JHSPH Department of Mental Health, the WKC community was able to hear lectures by prominent University of Pennsylvania researcher David Mandell, PhD, as well as talks by JHSPH Assistant Scientist Alene Kennedy-Hendricks, PhD; KKI psychologist Amy Keefer, PhD; and then-doctoral student Luke Kalb. Dr. Kalb, who earned his doctorate in mental health in 2017, is now one of two new autism researchers employed by the Kennedy Krieger Institute who became Wendy Klag Center KKI-Affiliated faculty members. Dr. Kalb, a 2014 WKC research funding recipient, continues to work in the realm of services and policy, most recently delving into crisis services for young adults with ASD. Gazi Azad, PhD, now a clinical psychologist at KKI’s Center for Autism and Related Disorders, has research expertise in exploring communication between parents whose children have ASD and the children’s classroom teachers.

The summer 2017 federal attempts to repeal the Affordable Care Act prompted the Wendy Klag Center to mount an educational campaign on Facebook and Twitter, with help from social media experts with the JHSPH Office of External Affairs. The goal was to
educate the public about how Medicaid and its expanded coverage has supported care for many children and adults in the autism community.

Also in collaboration with the JHSPH office of external affairs, the Wendy Klag Center again marked April as Autism Awareness and Acceptance Month with a schoolwide photo. The school’s large Wall Of Wonder had a multi-day display to highlight the school’s research in autism.

The center also attended community events such as Kennedy Krieger’s annual autism conference, the Honestly Autism Day community conference, and an early childhood family resource event in Baltimore City.

In Closing …

The leaders, students, and staff of the Wendy Klag Center sincerely thank the donors, funders, research collaborators, and participating families who make our work possible and drive our mission to advance the understanding of autism spectrum disorders and other developmental disabilities. It is truly an honor to do this work. We invite you to explore the WKC’s website (www.jhsph.edu/WKC) for regular updates, and to view our award-winning video.
Appendix: Selected 2017 Publications (WKC members and affiliates in bold)


King MA, Wissow LS, Baum RA. The role of organizational context in the implementation of a statewide initiative to integrate mental health services into pediatric primary care. Health Care Manage Rev. 2017.


Rice CE, Lee L. Expanding the global reach of research in autism. 2017.


