Dear Friends and Colleagues,

If you’ve ever planted a tree, you know that a sapling takes time to establish roots before it thrives in height, branches out, and bears abundant fruit. Established in 2013, the Wendy Klag Center for Autism and Developmental Disabilities (WKC) has enjoyed a growth-filled year of deepened roots, robust relationships, and exciting research offshoots. With the support of donors, we have established a vigorous network of researchers who collaborate, explore new areas of inquiry, use WKC pilot funding to reach loftier limbs of federal grants, and train a new generation of public health leaders.

Sincerely,

\[Signature\]

Director, M. Daniele Fallin, PhD
Associate Directors, Janet DiPietro, PhD, Li-Ching Lee, PhD, Elizabeth Stuart, PhD, and Heather Volk, PhD
Wendy Klag Center researchers, staff and students mark Autism Awareness and Acceptance Month in April 2018. Credit: Will Kirk/Homewoodphoto.jhu.edu

The Year in Review

The Wendy Klag Center enjoyed a productive 2018 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

Our Mission

The Wendy Klag Center promotes 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 also facilitates expansion of partnerships with the School of Medicine and the Kennedy Krieger Institute.
number 66 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 17 promising students and funded 17 faculty and student research projects. In 2018, the center’s directors and faculty affiliates brought in $7.5 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 2018, these researchers produced nearly 50 scientific publications related to autism and developmental disabilities (see appendix).

Since its beginning in 2013, the Wendy Klag Center has been supported solely by donations. In 2018, 85 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, including new projects. In 2018, Dr. Heather Volk became co-principal investigator of the neurodevelopment cohort of a giant national study called **ECHO: Environmental influences on Child Health Outcomes.** This NIH-funded project brings together 84 longitudinal study cohorts to explore how environmental exposures affect neurodevelopment, obesity, airway health, and general health outcomes. Volk was a recipient in 2016 of WKC pilot funding to explore baby teeth as a biomarker for neurodevelopmental disorders, a project that has been incorporated into ECHO.

Dr. Volk also is principal investigator of a new project funded by the Food and Drug Administration (FDA) to better understand the use and potential regulation of six chemicals often compounded into substances used by families of children with autism. Volk is doing this work with Co-Investigator Luke Kalb, PhD, a former JHSPH masters and doctoral student who is now an assistant professor in the Department of Mental Health and at the Kennedy Krieger Institute. Another staff member on the project is Meghana Shetty, MHS, who was a Wendy Klag Scholar.
in 2018, the year she graduated from JHSPH. As representatives of the Wendy Klag Center, the team brings expertise regarding the current and historical use of these chemicals among people with autism. Their exploration will include surveys through the US-based online research registry of thousands of autism-affected families known as SPARK: Simons Foundation Powering Autism Research for Knowledge. This new step will build on a very successful 2017 research collaboration between Drs. Fallin and Dr. Volk and SPARK. The FDA project includes collaboration with JHSPH’s Center of Excellence in Regulatory Science and Innovation.

Dr. Fallin continues work on the Centers for Disease Control (CDC)-funded Study to Explore Early Development (SEED). This study, now in its third round, has enrolled hundreds of Maryland families – and thousands of other U.S. 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.

In addition to being a noted global autism researcher, Dr. Li-Ching Lee continues to lead the Maryland site of the CDC-funded Autism and Developmental Disabilities Monitoring Network (ADDM), which released new estimates in 2018. ADDM reported that the current U.S. prevalence of autism spectrum disorder is one in 59 children. A later section of this annual report discusses a June symposium based on the new prevalence numbers.

**Pilot and Student Research Awards**

The Wendy Klag Center announced its fifth round of recipients for competitive research awards to faculty and students. In the faculty category, one winner was Gazi Azad, PhD, a new assistant professor in the Department of Mental Health who is also a clinical psychologist at the Kennedy Krieger Institute. Azad won funding for her proposal, “Partners in School: Improving Parent-Teacher Communication for Continuity of Care in Children with ASD.” Her work focuses on improving children’s outcomes by improving communication between caregivers and teachers.
A team of faculty member J. Marie Hardwick, PhD, and postdoctoral fellow Madhura Kulkarni received funding for their joint project, “Underlying Mechanisms of Neurodevelopmental Disorder-Related Genes.” Hardwick holds the David Bodian Professorship in the Department of Molecular Microbiology and Immunology, and Kulkarni works in her lab.

Current and Past WKC-funded Student and Faculty Research

2018 Funded Faculty Projects
- Gazi Azad, PhD, Department of Mental Health. “Partners in School: Improving Parent-Teacher Communication for Continuity of Care in Children with ASD.”
- J. Marie Hardwick, PhD, Department of Microbiology and Molecular Immunology, “Underlying Mechanisms of Neurodevelopmental Disorder-Related Genes.”

2018 Funded Student Projects
- Madhura Kulkarni, doctoral student, jointly with advisor J. Marie Hardwick, “Underlying Mechanisms of Neurodevelopmental Disorder-Related Genes.”

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

2017 Funded Student Projects and Progress
- Calliope Holingue, PhD student. “Microbiome Composition and Structure of Children with Autism Spectrum Disorder.” A gastrointestinal measurement tool has been designed for this study, and plans are under way to recruit families.
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. The study was accepted for publication and also has been presented at a conference.

- **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. Her work was presented at the International Society for Autism Research conference in 2016.

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 study was published in 2016.

• **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 the International Society for Autism Research conference 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 the International Society for Autism Research conference 2016. It helped Dr. Kalb complete his doctorate and has led to additional areas of research and collaboration.
The work of Kalb and colleagues was featured in the Fall 2018 JHSPH Magazine. Kalb, a former Wendy Klag Center Scholar who is now an assistant professor in the Department of Mental Health and Kennedy Krieger Institute, researches autism and psychiatric crises. The article, “Crisis Averted,” talks about the Mental Health Crisis Assessment Scale that Kalb and colleagues have developed. Their goal is to link the families of at-risk autistic youths with services, to intervene before a crisis arises.

**Education and Training**

Another mission of the Wendy Klag Center is to foster the education and training of graduate students who will be the next generation of autism/developmental disabilities researchers. For those seeking real-world learning, the WKC plays internship matchmaker for JHSPH graduate students seeking in-the-field experience. Twice a year, students apply for internship placement and funding up to $5,000 to work at the Maryland Center for Developmental Disabilities (MCDD) or the Sheppard Pratt-Lieber Research Institute. In late 2018, Ndeye Marieme Ndiaye, a masters student in the Department of Biochemistry and Molecular Biology, was selected as a WKC intern. Ndiaye, who already has significant research experience and hopes to become a developmental pediatrician, will serve at MCDD.

For those in the classroom, 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. Additionally, WKC Scholar Calliope Holingue, a doctoral student in the Department of Mental Health, has begun teaching “The Gut Microbiome and Mental Health,” on both graduate and undergraduate campuses.

The Wendy Klag Center also offers informal training and education experiences, such as our monthly journal club during the academic year. The journal club enriches 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 Society for Autism Research (INSAR) annual meeting. The INSAR Sneak Peek enables presenters to gain feedback and practice before their INSAR presentation, and it allows those in the Wendy Klag Center community who cannot attend INSAR to learn about the latest research taking place.

**Events and Community-Building**

Another of the Wendy Klag Center’s core missions is to build research collaborations among faculty at the Johns Hopkins and Kennedy Krieger institutions. In early 2018, we held a retreat for Johns Hopkins and Kennedy Krieger faculty who have chosen to affiliate with the Wendy Klag Center. The goal was twofold: to learn about various research initiatives by WKC faculty affiliates and to bring together researchers from different disciplines to work on collaborative research funding.

Retreat attendees learned about current research initiatives and brainstormed collaborations.
In April, we had the **WKC’s annual Autism Awareness and Acceptance** photo, which promotes the center’s mission within and beyond the Hopkins community. The school promoted the Wendy Klag Center’s work with an online feature, *“World Autism Day: How JHSPH Researchers are Addressing Autism.”* It highlights the work of Gazi Azad, Dani Fallin, Luke Kalb, Chris Ladd-Acosta, Li-Ching Lee and Heather Volk.

![Image](Image)

Heather Volk, Dani Fallin, Mike Klag and Li-Ching Lee marked World Autism Day.

Right: The school highlighted Wendy Klag Center autism research online. Credit: Homewoodphoto.jhu.edu

We also celebrated the induction of **Craig J. Newschaffer, PhD, into the Johns Hopkins Society of Scholars.** Newschaffer, who founded the WKC’s predecessor organization at JHSPH, went on to become director of the A.J. Drexel Autism Institute and is now dean of the College of Health and Human Development at Penn State. Newschaffer is a frequent research collaborator and the driving force behind the EARLI and ECHO projects that continue at the Wendy Klag Center today. As part of his induction, Newschaffer presented a talk at JHSPH and met with students afterward.

![Image](Image)

**DEPARTMENT OF EPIDEMIOLOGY**
**DEPARTMENT OF MENTAL HEALTH**
**2018 JHU SOCIETY OF SCHOLARS INDUCTEE LECTURE**

**So You Say There Are No More BIG Epidemiologic Questions?**
Perspectives From Autism Research

**Craig J. Newschaffer, PhD**
Professor and Interim Associate Dean for Research
Director, A.J. Drexel Autism Institute
Drexel University
Former Associate Professor
Department of Epidemiology and Mental Health, JHSPH
The symposium featured introductions Dean Emeritus Michael J. Klag, MD, MPH, founder of the Wendy Klag Center.

The biggest Wendy Klag Center event of 2018 was the June 4 autism prevalence symposium at JHSPH, titled “Why Counts Count: Today’s Autism Numbers, Tomorrow’s Projections.” The event centered around the release of the CDC’s latest autism prevalence report, showing that 1 in 59 children in 11 U.S. communities has an autism spectrum disorder. Here in Maryland, the research is led by Li-Ching Lee, PhD, who is a WKC associate director. Lee presented new data and prevalence trends from ADDM, the CDC’s Autism and Developmental Monitoring Network. Lee also presented projections of future adult autism counts in Maryland and the U.S., prepared in collaboration with Qingfeng Li, PhD, assistant scientist, in the Departments of International Health and Population, Family and Reproductive Health.

Eric Salzano, executive director of Maryland nonprofit autism services provider Community Services for Autistic Adults and Children (CSAAC), spoke about the overview of services for teens and adults. Closing the symposium was a panel discussion with (shown above) Zosia Zaks, M.Ed., C.R.C., the manager of programs and education at Towson University's Hussman Center for Adults with Autism; Rhonda Workman, director of federal programs for the Maryland Developmental Disabilities Administration; Maureen van Stone, J.D., associate director of the Maryland Center for Developmental Disabilities at Kennedy Krieger
In September, the Wendy Klag Center was one of the divisions collaborating to host a special event marking 75 years since Dr. Leo Kanner first described autism as a child psychologist at Johns Hopkins Hospital. The hospital’s Department of Psychiatry teamed with the WKC, Kennedy Krieger Institute and the Lieber Institute for Brain Development. The event featured speakers Robert Findling, MD, MBA; James Harris, MD; Joseph Piven, MD; and Joseph Buxbaum, PhD. Prior to the event, Dr. Piven was the special guest at a luncheon lecture series hosted by the Wendy Klag Center, designed to showcase the work of up-and-coming faculty at JHSPH.

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. The center attended community events such as the Honestly Autism Day community conference in Baltimore County, an early childhood family resource event in Baltimore City, and an Autism Society of Baltimore-Chesapeake meeting. Outreach coordinator Michelle Landrum served as parent co-chair of a Baltimore County Birth-to-5 early intervention committee. The Wendy Klag Center also hosted visiting autism researchers and clinicians from Kings Health Partners from the United Kingdom, as well as three lectures by visiting postdoctoral fellows from other American universities.
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.jhsp.h.edu/WKC) for regular updates, and to view our award-winning video.
Appendix: Selected 2018 Publications (WKC members and affiliates in bold)


