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# Duke Center for Autism and Brain Development

## Annual Report  
**July 1, 2017 – June 30, 2018**

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Dear Friends,

We are excited to share with you the growth and progress that the Duke Center for Autism and Brain Development witnessed during the 2018 Fiscal Year (FY18). We are especially proud that the National Institutes of Health has designated our Center as an NIH Autism Center of Excellence and provided $12M in new funding to conduct research aimed at improving screening, treatment and outcomes for children with Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD). In this FY18 Annual Report, we highlight a few of the many research projects being conducted at the Center. The Duke Center for Autism has a strong focus on developing new and more effective treatments; we are involved in eight clinical trials that are testing new treatments ranging from cellular and molecular approaches to parent coaching. Our interdisciplinary research reaches across many different disciplines at Duke, including neuroscience, genetics, engineering and computer science, psychiatry, and psychology, and data science, among others. Partnerships among engineers, computer scientists, and behavioral science researchers are harnessing technology and data science to create better ways to measure outcomes in clinical trials and autism screening tools.

In addition to our research, we continue to increase and enhance our ability to provide compassionate, patient-centered clinical care at Duke. We are pleased to tell you about the expansion of the Duke Autism Clinic. Leadership from Duke University Hospital, the Department of Psychiatry and Behavioral Sciences, and our Center worked together to launch an expanded clinical program at our Pavilion East at Lakeview location. The Duke Autism Clinic is staffed by an interdisciplinary clinical team that includes psychologists, psychiatrists, social workers, and nurses. The clinical team works closely with Duke specialty and primary care providers and the community to develop a comprehensive treatment plan for each individual. We are grateful for Duke University Hospital’s support in helping our Center improve our ability to meet the needs of individuals with ASD and their families.

Our report also features a few of the many trainees that are involved at the Center. Inspiring, educating, and training the next generation of autism researchers and clinicians is a key aspect of our mission. Their passion and accomplishments continue to be a source of inspiration to all of us.

Lastly, we are pleased to tell you about some of the events that have allowed us to partner with the community, including persons on the autism spectrum, families, educators, athletes, and corporate collaborators, all of whom are working towards the goal of making a real difference in the lives of people with autism and their families. This year, we were thrilled to have our first employee on the autism spectrum start working at the Center, and to have partnered with the Duke Baseball team and coaches to provide the first ever “Baseball Bonanza” sports clinic for youth on the autism spectrum at Duke!

We want to say thank you to all of you—our supporters and partners in our mission to provide exceptional, compassionate care to families so that each individual with autism will realize his or her fullest potential and to expand our impact through education, innovative research, and public policy. As you read through this year’s annual report, if you have a question or feedback you would like to share, please reach out to me at geraldine.dawson@duke.edu. Enjoy!

Warm regards,

Geraldine Dawson, PhD
Director
World-wide, caring for individuals with autism represents one of the largest and fastest growing public health challenges. One in 59 children in the U.S. has an autism spectrum disorder.

The Duke Center for Autism and Brain Development was established in 2014 with the founding mission to provide exceptional, compassionate care to individuals with autism and their families so that each individual with autism will realize his or her fullest potential and to expand our impact through transformational research, education, and public policy. Our goals are to promote innovative, interdisciplinary collaborations, provide and coordinate clinical services, build capacity in the field of autism research and clinical service by providing training opportunities, and partner with the community to ensure a broad and long-lasting impact.

DUKE CENTER FOR AUTISM AND BRAIN DEVELOPMENT HIGHLIGHTS JULY 2017–JUNE 2018

**Faculty/students/staff**

100

employed full or part time

- 38 Staff
- 27 Faculty
- 6 Undergraduate students
- 6 Graduate students
- 5 Postdocs
- 1 High school student
- 16 Gap-year students
- 1 Visiting graduate student

**Research**

>$48M

in total active sponsored research funding

- 8 clinical trials testing novel treatments

**Outreach**

15

Duke-sponsored autism awareness and education community outreach events

- reaching over 1,400 community members
- 3,340 individuals enrolled in Duke Autism Volunteer Research Registry
- Social Media: 4,177 followers on Facebook and Twitter

**Clinical services**

- 2,987 phone calls from community answered to provide information about autism
- 615 autism diagnostic evaluations provided
- 6 types of clinical intervention services offered to infants through young adults with autism: parent-coaching, early behavioral intervention, social skills training, emotional and behavioral regulation, cognitive-behavioral therapy, and medication

**Training**

45 trainees

- 19 Pediatric Residents
- 5 Postdocs
- 6 Undergraduates
- 5 Graduate/practicum students
- 1 Visiting graduate student
- 5 Graduate/medical students
The Duke Center for Autism has been designated as an NIH Autism Center of Excellence and received substantial funding for research on autism spectrum disorder (ASD) and attention deficit hyperactivity disorder (ADHD).

**Improving Outcomes for Children with Both Autism and ADHD**

Half of all children with ASD also have ADHD. Moreover, studies have shown that, when a young child has both ASD and ADHD, the child is 30 times more likely to receive their autism diagnosis after age 6.

Unfortunately, these late-diagnosed children miss out on early treatment that could dramatically improve their ability to learn, interact socially with family and friends, and gain employment later in life.

“Our studies have shown that when you start intervention early, kids have much better outcomes. Early intervention can change brain development and helps children learn, communicate, and develop relationships,” says Geraldine Dawson, PhD, director of the Duke Center for Autism and Brain Development. “We want to understand why children who have both ASD and ADHD are being missed and help them get early interventions.”

Naomi Davis, PhD, director of the Diagnostic and Assessment Core, says, “We also want to test new treatment approaches that can improve children’s outcomes.”

Duke is one of five universities nationally to receive the five-year Autism Center of Excellence designation. The interdisciplinary research program will bring together researchers across the Duke campus, involving the disciplines of psychology, psychiatry, pediatrics, neuroscience, engineering, computer science, biostatistics and bioinformatics, and public policy, in three major projects designed to improve early detection and treatment in children with both autism and ADHD. In all, seventeen Duke faculty members are involved in the project.

The new $12.5 million National Institutes of Health Autism Center of Excellence (ACE) award seeks to understand the connections between autism and ADHD, test new screening tools to improve early diagnosis, understand racial and ethnic disparities in diagnosis and treatment, and study the effectiveness of a new combined behavioral and medical intervention for children with both autism and ADHD.
The first project, A+ Health, will follow several thousand infants and toddlers who are seen in Duke pediatric primary care clinics to identify those with autism, ADHD, or both. Researchers will compare symptoms, progression, and overall health outcomes over time and test new screening tools. This project leverages the new field of “data science” which uses new data analytic techniques to study large data sets collected from population-based samples. By studying many factors that can influence early detection and outcomes, the team seeks to develop better tools for early detection, reduce disparities in access to care, and provide better and more individualized healthcare for individual children and families.

A second project, A+ Development, will focus on understanding how brain dysfunction in autism and ADHD is both similar and different. Using EEG, eye-tracking, digital recording, and other tools, researchers hope to identify signatures in brain activity and attention-related biomarkers that could predict risk for autism and ADHD in infancy.

The third project, A+ Treatment, will evaluate a treatment that combines behavioral intervention with the use of Adzenys-XR-ODT, an FDA-approved stimulant drug for treating ADHD. The researchers will study whether treating ADHD symptoms improves children’s ability to benefit from early behavioral intervention and how the combined treatment affects autism and ADHD symptoms and patterns of brain activity.

As data from Duke and the other four Autism Centers of Excellence are collected, they will become part of a centralized NIH National Database for Autism Research, available to scientists and institutions around the world who are working to uncover the causes and develop the best treatments for both autism and ADHD.

Why do 50% of children with autism also have ASD? Are these separate conditions or one condition?

“In five years, the field is going to recognize that this study is really important.”

Scott Kollins, PhD

A+ Health: A Population Health Study of Children’s Development

Scott Kollins, PhD, co-leads the ACE Center with Dawson and is leading the A+ Health study. He has seen firsthand the benefits of early intervention and treatment, as well as the difficulty of correctly diagnosing children who have both autism and ADHD. His son, Grayson, now 8, has both disorders. Unlike most children, Grayson was diagnosed first with autism, at age 2 ½. He had been developing normally, talking and engaging, and then at age 2, he stopped talking.

The autism diagnosis caught Kollins, an international expert in ADHD, by surprise. “I've never studied or worked clinically with kids on the spectrum, so I was kind of clueless there,” he says. “But I knew all along that he had ADHD symptoms. From a treatment perspective, we were immediately very aggressive with behavioral interventions.” Then, when Grayson was in first grade, Kollins and his wife decided to try giving him medication. They didn’t tell his teacher, but after the second or third day of going to school with medication, she knew. “We got a note that said, ‘Today Grayson lined up, stayed in line, listened to directions, stayed on his mat...I know you were thinking about medication. How is that going?’”

In preparing for A+ Health, which has begun enrolling the first of what will be a large population study including a diverse cohort of several thousand children from across Durham and the surrounding communities, the research team has worked closely with colleagues in pediatric primary care to integrate new screening tools developed by Dawson and...
Guillermo Sapiro, PhD, a Duke engineer and computer scientist, into the clinics. “We’ve had to be very thoughtful to engage with the primary care physicians from the beginning as partners,” Kollins says. “They’ve helped us design the study around their workflows. I feel really good that we’ve developed the relationships so that it’s going to run as smoothly as it possibly can.” Elana Perrin, MD, Division Chief for Duke Pediatric Primary Care, is a key member of the research team, along with Jeff Baker, MD, and several other pediatricians.

Over the five years of the study, every child who comes to a Duke pediatric primary care clinic for an 18- to 24-month check-up will be invited to participate in the longitudinal study, called “A+ Health”. As children are followed longitudinally, the research team will monitor their development and screen and evaluate children for a wide range of neurodevelopmental disorders, including autism, ADHD, developmental delay, and language delay. This population health study will generate a large data set that will be analyzed by a team of data scientists, headed up by Scott Compton, PhD, and Sheng Luo, PhD.

Dawson says it’s an unprecedented opportunity to understand the early symptoms of neurodevelopmental disorders, both behavioral and medical, such as sleeping and eating problems. Children who are showing early symptoms of neurodevelopmental disorders will be evaluated by Naomi Davis, PhD, Rachel Aiello, PhD, and Julia Schechter, PhD, who are clinical psychologists with expertise in diagnosis of autism and ADHD.

“We’ll be able to look back and say ‘What were the symptoms that were present at 18 months that may have made it difficult for the pediatrician to recognize autism symptoms?’” says Dawson. “We’ll learn a lot more about the early symptoms for a child who has both autism and ADHD. We’re also going to learn what ADHD looks like in a very young child.” Currently, ADHD can’t be diagnosed until a child is at least age 3 and usually older. By screening and following children starting with the 18- to 24-month check-up, Duke researchers hope to find markers that will allow for earlier ADHD diagnosis and intervention.

The study will also deploy a novel digital screening tool developed at Duke. The current standard of care for autism is a paper questionnaire filled out by parents. However, about half of the children identified as having autism by this questionnaire don’t actually have the disorder. That leads to children being put on waiting lists for formal screening, causing delays in reaching children who are in real need, not to mention unnecessary anxiety for parents.

The new tool is designed to be administered either at home by parents using a smartphone, or in the clinic by staff using a smart tablet. The tool consists of a series of engaging movies and games that children participate in while their behavioral responses are recorded using the sensors in the device, such as the phone’s camera. The recordings are analyzed by a Duke engineering team headed by Sapiro using specially developed software applications. It’s a more quantitative, objective approach that can complement a physician’s or parent’s observations.
Another arm of the project is focused on disseminating research findings into the community. This includes raising awareness in schools, in community resource programs, and among pediatric practitioners across the region as well as a website and briefing papers for members of Congress. Kenneth Dodge, PhD, a leading expert in early childhood and policy, is spearheading the dissemination effort.

The Duke faculty working on the project are excited about the potential of A+ Health and the entire ACE project to change clinical practice.

“In five years, the field is going to recognize that this study is really important,” Kollins says. “I have a visceral connection to understanding what it’s like to have a kid who’s affected like this. We have a real opportunity to help other families like mine, who may not have the resources or knowledge. I hope we can change things for them.”

A+ Development: Understanding Development in Autism and ADHD

In the A+ Development project, Dawson and her colleagues, Kim Carpenter, PhD, Mike Murias, PhD, and Maura Sabatos-DeVito, PhD, will comprehensively compare children who have typical development, those who have ADHD, those who have autism, and those who have both.

Why do 50% of children with autism also have ASD? Are these separate conditions or one condition? How does having both ASD and ADHD affect children’s ability to learn and develop social skills? The interdisciplinary research will be looking at patterns of attention, cognition, social behavior, and brain activity based on EEG recordings. The team will also conduct eye tracking studies to better understand how children process information. This project is also using digital technology to better describe the early symptoms of autism and ADHD in infants, including patterns of motor behavior, attention, and other behaviors. The goal is to use technology to better quantify early differences in behavior in infants that could predict the later development of autism and ADHD.

“We hope to better understand how and why autism and ADHD so frequently co-occur and how we can identify children very early who have one or both of these conditions” Dr. Carpenter says.
A+ Treatment: Developing Better Treatments for Children with Autism and ADHD

Previous studies have shown that children who have both ASD and ADHD don’t respond as well as children who have ASD alone to behavioral interventions. Duke researchers have hypothesized that ADHD symptoms make it more difficult to pay attention to important cues and interaction that is part of a typical behavioral intervention, such as the Early Start Denver Model. This study will evaluate whether stimulant medication for children who have both ADHD and autism enables them to more fully benefit from behavioral interventions for autism.

A 2013 Duke study led by Kollins, director of Duke’s ADHD Program, showed that 3-5 year olds with ADHD responded well to stimulant medication. The medication helped them comply in the school environment and improved their quality of life and academic achievement.

“We’re trying to show that if these kids with both autism and ADHD really are different, we need to create an individualized treatment to maximize their response,” says Linmarie Sikich, MD. “If they receive a stimulant medication that improves their attention overall, will they benefit more from behavioral intervention for autism?”

Sikich says that treating just autism without addressing ADHD symptoms creates a self-perpetuating cycle.

“If you lack the ability to focus your attention, it’s going to make your ability to attend to social cues much worse, and it’s going to be more likely that you won’t be able to respond to the behavioral interventions for autism,” says Sikich. “That’s why we want to treat the ADHD symptoms first.”

She and her colleagues, Tara Chandrasekhar, MD, and Marina Spanos, PhD, will oversee a double-blind placebo-controlled trial with a cohort of preschool aged children through age 8. Half of the children will receive a stimulant medication plus behavioral therapy, and half will receive a placebo with behavioral therapy. The behavioral therapy involves coaching parents in the Early Start Denver Model (ESDM), which was developed by Dawson and her colleague Sally Rogers, PhD, and is used world-wide to improve outcomes of young children with autism. Drs. Jill Lorenzi and Lauren Franz, faculty members who are certified ESDM therapists, will be providing parent-coaching in ESDM to all parents who participate in the study. Dawson and Murias will be assessing how the treatments affect children’s brain activity and attention patterns.

“We are predicting that the children who receive medication and therapy will be able to sustain attention and engage in the intervention more effectively, but also that they will have better outcomes—better language outcomes, better social skills,” says Sikich.

She adds that one positive impact of the study is that the Duke Center for Autism and Brain Development will be able to provide free behavioral intervention to about 80 children in the Durham community. Duke researchers hope to be able to show that by recognizing symptoms of autism and ADHD earlier, some of the negative outcomes associated with having both disorders can be reduced, and the children will gain the full benefit of interventions to ameliorate their autism symptoms.
Generous Donation Establishes the Marcus Center for Cellular Cures

In May 2018, Duke University School of Medicine announced the establishment of the Marcus Center for Cellular Cures. The new center will bring together physicians and faculty from across medicine and engineering at Duke to develop cellular and biological therapies for autism, cerebral palsy, stroke, and related brain disorders. The center recognizes years of generous support from The Marcus Foundation, an Atlanta-based philanthropic organization.

Joanne Kurtzberg, MD, the Jerome S. Harris Professor of Pediatrics and director and scientific officer of the Robertson Clinical and Translational Cell Therapy Program at Duke (shown above), will direct the new center. Ravi Bellamkonda, PhD, Vinik Dean of the Pratt School of Engineering, and Geraldine Dawson, PhD, director of the Duke Center for Autism and Brain Development, will serve as associate directors.

“This center, enabled by the generosity of the Marcus Foundation, will allow us to bring cellular therapies into 21st century medicine,” said Kurtzberg. “It represents the culmination of over three decades of work at Duke in transplantation and cellular biology, and it will be a catalyst to continue to accelerate the translation of these discoveries into the clinic.”

The new Marcus Center will focus on four areas:

- Clinical trials to develop and evaluate cellular and tissue-based therapies
- Learning to harness the body’s own mechanisms used for cellular repair
- Manufacturing and delivery of cells, tissues, and biomaterials
- Creation of non-invasive imaging to monitor cell distribution and function inside the body

The center will expand on past and current research at Duke funded by the Marcus Foundation, including a large program of research led by Kurtzberg and Dawson that is studying the efficacy of cord blood and other cell therapies for the treatment of autism and cerebral palsy. Dawson and Kurtzberg published an open-label clinical trial as well as a follow up study that showed improvement in social and language skills, attention, and brain function of children who participated, based on EEG and magnetic resonance imaging. A phase 2, double-blind placebo-controlled study is currently underway to compare the efficacy of autologous cord blood versus allogeneic, or donor cord blood, vs. a placebo. The study cohort includes 180 children, and it will be completed in early 2019.

“Currently there are no FDA-approved biomedical treatments for autism,” said Dawson. “Our goal is to develop effective treatments that can significantly improve outcomes for individuals with autism and other developmental disorders.”

Bellamkonda cited the increasingly robust collaboration between engineering and medicine at Duke, noting that “Duke engineers are excited to be a part of the new Marcus Center and will help develop novel technologies for cell manufacturing and scale-up, co-transplantation biomaterials designed to enhance cell survival and phenotypic stability, and novel non-invasive imaging techniques to monitor and optimize cell therapies and cures.” Dr. Guillermo Sapiro, also an engineer, and Dawson are developing and testing novel digital methods for monitoring clinical trial outcomes that could be administered remotely to children participating in clinical trials conducted at Duke.


Research Highlights

Grant Explores Anxiety-Autism Connection

More than half of children with autism experience over-sensitivity to sensory stimuli. Whether it’s the sound of a toilet flushing, the feel of a clothing tag, or other auditory, tactile, visual, or social stimuli, for these children the experiences are distracting and can create difficulties in everyday life.

Kimberly Carpenter, PhD, a Duke neurobiologist and assistant professor of psychiatry and behavioral sciences, hypothesized that this over-responsivity to stimuli could be a risk factor for the development of anxiety disorder, a condition shared by half of all children with autism.

“I wanted to explore whether the sensory responsivity could be a pathway by which kids with autism were developing anxiety,” she says.

With her co-investigators, Geri Dawson, PhD, and Grace Baranek, PhD, she helped oversee a three-year study, enrolling 69 preschool-aged children with autism and about 50 without autism. The study included parent questionnaires and comprehensive interviews with parents about their child’s behaviors as well as play-based assessments to measure autism symptoms and sensory processing difficulties. It also employed EEG to observe brain responses to sensory stimuli and eye tracking to explore relationships with attention.

“One of the things we wanted to understand was whether there was a brain mechanism that underlies the sensory responsivity, so we used EEG to examine the brain’s ability to filter out sounds,” says Carpenter.

She says preliminary results of the study indicate a strong correlation between the level of sensory over-responsivity and the number of anxiety symptoms children have.

“If we’re able to identify these kids early in life, there may be interventions to help them learn how to deal with that over-responsivity before it turns into full-blown anxiety. That would be the ultimate goal,” she says.

The play-based assessments used in the study were designed by study collaborator Baranek, who is now associate dean, professor, and chair at the University of Southern California Chan Division of Occupational Science and Occupational Therapy. One was a sensory processing assessment that measures children’s response to objects such as a Slinky, a plastic puffer...
The study investigating the role of sensory overresponsivity in the development of anxiety is funded by the U.S. Department of Defense. Data collection was completed in late 2017, and the data is currently being analyzed. Carpenter and her colleagues are currently working on the first publication from the study, which will highlight findings on the relationship between sensory overresponsivity and anxiety. The team is also studying how these processes are related to other outcomes, such as adaptive behavior and problems with sleep, mood, attention, and other psychiatric disorders.

Carpenter holds an undergraduate degree from the University of North Carolina at Wilmington and completed her PhD in neurobiology at UNC-Chapel Hill. The focus of her PhD was emotion regulation and brain imaging in adults with high-functioning autism. But her true passion is understanding autism in young children and the brain mechanisms behind the anxiety and other co-morbid psychiatric conditions many of them experience. That led her to Duke for her postdoctoral fellowship.

Carpenter’s interest in autism and associated disorders stems from an experience she had during and after college, when she spent close to 4 years caring for a boy with autism.

“I had never even heard of autism at the time,” she says. “But he really became part of my family, and I became part of his. When he got irritated or anxious, his social interactions decreased, his repetitive behaviors got worse, and it just really impacted his functioning overall. I wanted to understand what caused that and how you could alleviate those symptoms.”

Annual Report July 1, 2017 – June 30, 2018
Jordan Hashemi is not a trained autism expert. Far from it...he recently received his Duke PhD in electrical and computer engineering. He works on campus as a research associate with mentor Guillermo Sapiro, PhD, the Edmond T. Pratt Jr. School Professor of Electrical and Computer Engineering.

But shortly after Hashemi came to Duke from the University of Minnesota, Sapiro introduced him to faculty in the Duke Center for Autism. They all quickly realized the potential for a collaboration to bring autism diagnosis and evaluation into the digital age.

Hashemi's specialty is machine learning and its uses in real-world applications and research. Duke autism clinicians were looking for a more objective, precise, and accurate method of detecting risk markers for autism and evaluating the progress of children undergoing treatment.

Currently the standards for screening and diagnosis consist of behavioral observations by specially trained autism experts as well as paper questionnaires completed by both caregivers and autism experts.

When conducting diagnostic evaluations, “clinicians have to rate the child’s behavior in real time while interacting with the child,” says Hashemi. “They look at the child’s response. Did the child smile after this happened? Did the child make eye contact when presented with a toy?” Hashemi says having to simultaneously make clinical judgements about behaviors while interacting with the child can lead to missing information or lack of granularity.

“Instead of just noting whether the child disengaged with an activity when their name was called or did they not, the computer can detect precisely how long it took for them to turn their head. We are able to use our digital tools to show that children with autism show subtle differences in motor speed, for example, they responded an average of two seconds after their name was called, whereas children without autism were disengaging at an average of about one second. So that’s an example of how these tools can aid in the current assessments and maybe find possible new markers for autism,” says Hashemi.

Hashemi says objective and scalable digital tools could also be a boon to communities that lack access to autism experts.

Mobile autism screening tools are being developed in-house at Duke. One app includes engaging movie stimuli that children watch while their reactions are recorded on the camera built into an iPhone. The movies—of toys such as a hopping mechanical bunny or of human-to-human social interactions—are then analyzed by Sapiro, Hashemi and their team using landmarks on the face for the eyebrows, eyes, nose, and mouth. The landmarks move as the child’s facial expressions and head and eye movements change in response to the stimuli, and it is possible to measure the precise correspondence between various stimuli and the occurrence of a facial expression or other motor behavior.

“During Apple’s launch of ResearchKit, ours was one of the featured studies,” says Hashemi. Duke researchers were able to recruit 1,700 families who downloaded the iPhone app and used it with their children at home. The team analyzed over 4,000 videos of children engaging with the app.

Our team at Duke is developing mobile autism screening apps. Our feasibility study is encouraging.

–@GeriDawson
Hashemi, who is in Duke University’s Bass Connections program, which emphasizes interdisciplinary, cross-campus collaborative studies, says the project brought together people from across the university and health system. In fact, the project team received the Blue Ribbon Teamwork Award, given annually by the university provost’s office.

“The moral and financial support we received was outstanding,” says Sapiro, his mentor. “The Duke Health System gave us two developers for several months, plus they had people helping us navigate how to get the data through the health system. The provost’s office gave us financial support we never anticipated.”

Hashemi says he came to Duke because of its reputation for encouraging interdisciplinary collaboration, and that this project, now in its third year, has been a prime example.

“We would have anywhere from eight to 15 people around the table. We’ve had electrical engineering, computer science, psychiatry, psychology, people from the autism center, pediatricians...from ground zero,” he says, “we were working together on a weekly basis, talking about how we design the project so it’s optimal for us, optimal for the processing side, and optimal for detecting the behaviors that the autism center wanted to extract.”

Papers on both tools were published this year in peer-reviewed scientific journals. The in-clinic tool was featured in Autism¹, and the at-home tool was published in Nature – Digital Medicine².

After recently receiving his PhD in Engineering and Computer Science at Duke, Hashemi began a postdoctoral fellowship at the Duke Center for Autism and Brain Development where he will focus his effort on developing apps for monitoring symptom improvement for various clinical trials being conducted at the Center.


Clinical Services

Duke Autism Clinic Expands its Capacity to Serve Patients and Their Families

The Duke Center for Autism provides a wide range of clinical services for individuals with autism and other developmental disabilities, ranging from infants to young adults. Services include diagnostic and psychiatric evaluations, parent coaching in early intervention, social skills training, cognitive behavioral therapy, transition planning, and medication management.

The past year has marked a time of significant growth for the clinical programs at the center. As part of a collaborative effort between Duke Hospital and the Duke Department of Psychiatry and Behavioral Sciences, we expanded the number of providers at the Duke Autism Clinic to include a multidisciplinary team comprised of psychology, psychiatry, nursing, and social work providers. This team works closely with clinical teams across the Duke Health System, including the Duke Pediatric Emergency Department and pediatric subspecialties such as neurology, gastroenterology, and medical genetics. Our goal is to help coordinate a comprehensive assessment and treatment plan that is family-centered and addresses both behavioral and physical health needs.

Collaboration with leaders from Duke Hospital and Duke Children’s Hospital and Health Center has been critical to increasing the Duke Autism Clinic’s services for the Durham community and beyond. The clinic has been renovated to accommodate a greater number of patients and provide a welcoming and comfortable place for families. One feature of the new clinic is a colorful mural that winds throughout the clinic and features lighthouses, trains, wildlife, and North Carolina scenes from the mountains to the sea. “The mural is very memorable for kids,” says Lin Sikich, MD, a psychiatrist in the clinic, “and it emphasizes our goal to be a statewide resource, because it goes from the mountains to the sea.” The mural was painted by Dianne Renee Gove.

To better serve families in rural communities across the region, the center is also participating in an ongoing initiative focused on providing telephone consultation services to pediatricians and other medical professionals in six counties north of Durham. Social workers staff the service and provide information about community resources. They can also connect the caller with a Duke child psychiatrist within 30 minutes for a telephone consultation. “The goal is to help families who may not be able to travel to Duke as well as to support providers and build capacity in primary care,” says Nicole Heilbron, PhD, who oversees clinical services and training programs at the Duke Center for Autism. “Many states have similar services, and we’re pleased to spearhead this service in North Carolina.”

DJ Svoboda, an autistic adult, cuts the ribbon at the grand opening of the new Duke Autism Clinic. Also shown above are Jessica Simo, Nicole Heilbron, Jeff Langdon, Geri Dawson, Moira Rynn, Gary Maslow, and Jen Ellis.
One feature of the new clinic is a colorful mural that winds throughout the clinic and features lighthouses, trains, wildlife, and North Carolina scenes from the mountains to the sea.
In higher income countries, many children and families are benefiting from these early intervention strategies. But most of the world’s children, who live in low- and low-middle-income countries, are not so fortunate.

In Cape Town, South Africa, where Duke Assistant Professor of Psychiatry and Global Health Lauren Franz, MBChB, MPH, is leading an early intervention pilot study, children with autism don’t become eligible for government education services until age 7. Franz says it’s a missed opportunity to improve long-term outcomes for these children and their families.

The study is funded by the National Institutes of Mental Health, and work is done in collaboration with the Center for Autism Research in Africa, headed by Professor Petrus de Vries, at the University of Cape Town and the Western Cape Department of Education. Usually, the Department of Education sees children with autism when they turn 7. But a few schools are providing intervention services in early child development classrooms or through early childhood home visitation programs. Franz and her colleagues are exploring partnerships with these groups, who see children ages 2-6 years, to train non-specialist early childhood development workers to coach parents in the use of early intervention strategies at home. Franz was born in South Africa, where she received a medical degree from Stellenbosch University.

Studies have shown that early intervention can significantly reduce the severity of autism symptoms such as deficits in language, social skills, and cognitive abilities, as well as maladaptive behaviors.
She then completed an internship in Namibia and a community service year in rural KwaZulu-Natal. After that, she relocated to the U.S., where she trained in public health, psychiatry, child and adolescent psychiatry, and global health. Franz was able to return to South Africa with her husband and two children through a one-year Duke Global Health Institute Faculty in Residence Program. She also received support from the Duke Center for Autism and Brain Development.

The study, which is now in its third year, is based on the Early Start Denver Model (ESDM), a comprehensive early intervention approach for children ages 12-60 months developed by Geraldine Dawson, PhD, and Sally Rogers, PhD. ESDM encompasses a developmental curriculum that defines skills across multiple developmental domains and provides teaching procedures and materials. In the caregiver coaching version of ESDM, during every day interactions with their child, caregivers are coached on strategies that help support growth in their child’s social communication. Training materials being used in South Africa for caregivers and non-specialist providers are the same as those being used in the U.S.-based community ESDM dissemination project.

“The key to the success of our project,” says Franz, “is creating a sustainable local supervision structure that can support the implementation of evidence-based treatments.” Franz has now trained three certified ESDM therapists—the first such therapists on the African continent. These

“The key to the success of our project is creating a sustainable local supervision structure that can support the implementation of evidence-based treatments.”
– Lauren Franz, MBChB, MPH

Recognizing our Postbaccalaureate Research Trainees that Moved on this Year to the Next Phase of Their Careers...

- Rimsha Afzal
  MA Program in Bioethics and Science Policy
  Duke University

- Payal Chakraborty
  PhD Program in Epidemiology
  Ohio State University

- Kendyl Cole
  MS Program in Occupational Therapy
  University of North Carolina – Chapel Hill

- Jada Gibbs
  Premedical Program
  Harvard University

- Elizabeth Glenn
  PhD Program in School Psychology
  University of Oregon

- Greeshma Magam
  MD Program
  St. George’s University

- Pooja Parmar
  Physician Assistant Program
  Duke University

- Hannah Riehl
  PhD Program in Child Study and Human Development
  Tufts University

- Molly Ruble
  Doctorate in Occupational Therapy Program
  Virginia Commonwealth University

- Torin Thielheim
  MD Program
  University of Miami Miller School of Medicine
Therapists will provide supervision for non-specialist early childhood development workers in the Department of Education as they coach caregivers in ESDM intervention strategies.

One of these certified therapists, Dr. Nokuthula Shabalala, says it is rewarding to witness a growth in confidence in parents. “It is uplifting to see changes in the child, in the parent-child relationship, and to watch a parent becoming less despondent and more hopeful within a short space of time,” she says.

Another therapist, Noleen Seris, finds the ESDM parent coaching approach particularly attractive. “This model makes it possible to provide children with many hours of intervention, in a way that is positive, gentle, and places emphasis on the parents getting to know their child,” she says.

Therapist Marisa Vijoen spoke of some of the challenges of working in South Africa. “The diversity in South Africa makes working with children and families both challenging and rewarding,” she says. “There are vast differences in language, socio-economic status, family structure, religion, living circumstances, level of education... What works really well with one child and family may be completely unsuccessful with another. As professionals, we often drop the ball by not placing ourselves in the shoes of the families we work with...a ‘one-size-fits-all’ approach does not necessarily work.”

Franz believes lessons learned from early intervention work in South Africa could translate back to the U.S., where many communities face similar disparities and lack access to early intervention services. “The idea, really, is to create an intervention platform for delivering high quality, evidence-based services with local, non-specialist providers,” says Franz. “That way you can really increase the community reach and narrow the treatment gap in resource-limited settings. This kind of model could be implemented in any such setting—even in Durham, North Carolina, where access to evidence-based early intervention services is often limited. In many parts of the United States, we don’t have the trained manpower to meet the needs of our own communities.”

Franz has been active throughout the African continent this past year. She received a travel award from the Duke Global Health Institute (DGHI) to visit Kilimanjaro Christian Medical Center (KCMC) in Tanzania, a DGHI partnership location, where she led a clinical conference on autism in Africa. She was later selected for a DGHI faculty pilot program and will soon begin a pilot study titled “Building a South-to-South Collaboration in Autism Spectrum Disorder” with colleagues at KCMC and the University of Cape Town. In addition, she visited Makerere University College of Health Sciences in Uganda to attend their first International Non-Communicable Diseases Symposium. Dr. Franz was also the keynote speaker at the first conference on Neurodevelopmental Disorders in Children in Kigali at the University of Rwanda.

A South African parent receiving ESDM coaching and child

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The early intervention pilot study in Cape Town, South Africa, has been an excellent fieldwork opportunity for students in the Duke Global Health Institute’s Master of Science in Global Health (MScGH) program.

Kevin Ramseur is one of four such students. He spent 10 weeks in Cape Town working on a thesis with Lauren Franz, MBChB, MPH, as his mentor. Ramseur’s thesis explored caregiver-child joint activity routines and caregiver perceptions of the acceptability of a caregiver coaching approach.

In addition to analyzing data for his thesis, Ramseur spent time in the Division of Child and Adolescent Psychiatry at the University of Cape Town, observing South African Early Start Denver Model (ESDM) therapists coaching caregivers in ESDM strategies, in preparation for the pilot study where non-specialist early childhood development workers would be trained to coach caregivers.

“Over the course of 6-8 weeks of watching the same people, you could really see changes in the interactions between the caregiver and child,” says Ramseur. “I can think of one woman specifically.” The woman was shy and reluctant to engage in a bubble-blowing routine with her child. But after a few sessions, “the mother really came out of her shell, came into her own as a parent able to deliver ESDM strategies to her child. I could see her begin to understand, if her child makes this sound, it means to keep going with the game. They began to enjoy the game together,” says Ramseur.

What stood out for him was the growth in confidence of parents who participated in the coaching sessions. “They gained confidence in their ability to connect with their child,” says Ramseur. He adds that he also accepted a basic tenet of global health through his experience in Cape Town.

“In order to understand what’s going on globally, you have to immerse yourself in the community,” he says. “I don’t think it’s right for people to make decisions from an outsider’s perspective. It’s very important for me to understand my role as partner and ally for people in communities who are then going to make decisions for themselves.”
Postdoctoral Trainee Spotlight

Latasha Woods, PhD, NCSP, was working as a school psychologist in Tupelo, MS, when she got a frantic call from school administrators. The school year had just started, and a six-year-old boy enrolled in kindergarten was definitely not prepared to be there.

“He was bolting from the classroom. He was not toilet trained. He was nearly non-verbal. I think he had less than five words he was using. And he was frightened,” she says.

When she went to the classroom, she observed that the child had autism. She started the process for an evaluation, but in the meantime had to help his family understand why he was struggling.

“They just didn’t know,” she says. Even though the child had exhibited signs of autism previously while in daycare, the family didn’t understand the symptoms. They were familiar with intellectual disability, but not with the symptoms of autism. And, though they had been advised to consult a specialist, they hadn’t had the means to afford it.

“I had to help the school figure out a plan so that this child would not be excluded from an education,” says Woods. “For me, understanding the loss that child suffered in terms of the services he could have been receiving, was so profound. After that, I decided I wanted to support families with understanding the critical need for early intervention and early diagnosis.”

So, after a decade as a nationally certified school psychologist, Woods decided to enroll at UNC-Chapel Hill to receive her PhD in school psychology. She went on to complete a pre-doctoral clinical internship at the Emory University School of Medicine (Pediatrics) through the Marcus Autism Center in Atlanta, GA. She joined the Duke Center for Autism and Brain Development in 2017 and is now working as a clinical associate while completing a post-doctoral fellowship in psychology.

Woods conducts patient evaluations to determine if a child, teen, or young adult has autism. She also trains psychology doctoral candidates in how to conduct patient and caregiver interviews and administer behavioral and cognitive assessments, as well as diagnostic assessments.

Woods noted that one of the most meaningful parts of her work is conducting psychotherapy with individuals who have been recently diagnosed with autism. She also works with parents to help them understand how to manage the behavior of their children and teach children coping skills.

“I help them acquire the skills that are going to improve their function in day-to-day activities,” she says.

She appreciates the fact that her flexible schedule as a post-doc allows her time to support families after their child has received a diagnosis of autism.

“I do a lot of calling and checking in with families, particularly when the diagnosis has caught them by surprise,” she says. For families who come to Duke from other areas of North Carolina, she can recommend community-based resources, which often can be scarce in more rural areas.

Thinking back to her encounter with the six-year-old in Tupelo years ago, Woods says she is encouraged that autism awareness and understanding has increased substantially. Children are being diagnosed earlier. She says there is still a great deal of work to be done to improve early diagnosis and treatment for all children.

“I think that’s part of the reason I specialized in autism,” she says. “I saw so many children who weren’t diagnosed until they got to school. And then seeing other children who were diagnosed at age 2 or 3—they’ve participated in therapy services designed to improve their social communication skills, including the use of functional language and social engagement. These kinds of early interventions that are matched to a child’s unique needs and build upon their strengths help improve both short- and long-term outcomes.”

“EARLY INTERVENTIONS THAT ARE MATCHED TO A CHILD’S UNIQUE NEEDS AND BUILD UPON THEIR STRENGTHS HELP IMPROVE BOTH SHORT- AND LONG-TERM OUTCOMES.”
Dong Dan, a visiting graduate student from South China Normal University, spent the 2017-2018 academic year working with on several research projects at the Duke Center for Autism. Throughout her year, she observed assessments, gained research expertise, and provided a unique perspective to our center staff, trainees, and faculty regarding the development of autism research among other cultures.

What is it like for a child to receive an autism diagnosis in China? Where do the families usually go to receive this? What do they usually do once they receive that diagnosis?

In China, autism is mainly diagnosed by doctors. It takes about two months to get the official diagnosis. After the diagnosis, the parents will take the children to the intervention center for treatment. Our targeted training institutions for the treatment of autism are often privately-owned.

How has watching clinical evaluations in a research setting informed your understanding of autism and its diagnosis? Is there anything unique you have learned specific to being in a research setting compared to a therapy or clinical setting?

I have a clear understanding of the social and behavioral characteristics of children with autism in the evaluation process, their differences from other children, and the points at which professionals and family members need to intervene. I learned how to use a variety of professional scales, how to interact well with children in the assessment process, and what reactions from the children are important to focus on.

In clinical assessment, we always focus on individual patients to diagnose their symptoms and determine the appropriate treatment. However, I feel that in research evaluations, in addition to assessing the children's strengths and weaknesses, researchers can collect data to determine necessary services based on the clinical diagnosis. I think if we want medical progress, clinical practice and scientific-based research are inseparable.

Have you noticed any specific differences in terms of how autism is perceived, diagnosed, or treated in the US compared to China?

As one of the first countries in the world to study autism, the United States has devoted a great deal of manpower and resources to the study of autism. A relatively well-established network of research and treatment resources has been created for children with disabilities through legal and government work. However, China started to research autism relatively late and still has a long way to go. Our targeted training institutions for the treatment of autism are mainly privately-owned. This can make it difficult to ensure that they all follow established standards. Unlike the United States, there are no specific regulations and rules on the implementation of an IEP (Individualized Education Plan) in China, nor any specific bills on special education. The lack of relevant laws and regulations can lead to lack of access to intervention within the rehabilitation system in our country. The government also provides few financial subsidies. Although poor families can apply for subsidies, this funding does not meet the treatment costs.

Unlike the United States, which provides special education in public schools, only special education institutions can provide special education for autism in China. Public schools seldom accept children with autism. Due to the fact that China has a large population and many other practical problems, the development of autism treatment and research has been relatively slow. However, we firmly believe that we will speed up our progress.
May 15, 2017. It is a date that immediately springs to mind for Raghav, a bright young man who is on the autism spectrum. That’s the date he started his job at the Duke Center for Autism and Brain Development.

Harnessing the Talent of People on the Autism Spectrum: Employing Adults with Autism

Raghav, who is 22, works five days a week from 9 am to noon. He sanitizes toys used for developmental assessments, files paperwork, sends out birthday cards to patients, organizes books, and does other office tasks, all while learning names and making friends with staff and patients across the organization.

“Raghav is exceptional in a lot of different ways,” says Dr. Jill Lorenzi, a clinical psychologist who works at the center. “He is really committed to his work. He’s been a ray of sunshine, greeting people in the waiting rooms in the morning and the families and people at the front desk.”

Dr. Lorenzi notes that seeing firsthand how Raghav is able to work well at the Center provides evidence to parents that their children can be successfully employed, and hopefully, inspires others at Duke to hire people with disabilities.

Lorenzi says it’s a tremendous challenge for people on the spectrum to find employment.

“Until fairly recently, we didn’t think about what happens when a person with autism grows up,” she says. “We’ve been very focused on early intervention and helping kids succeed in school. But if we don’t help them become adults and productive members of society, we really haven’t done our job.”

She says studies have shown that employment is the most important factor for good mental health and continued development.

“Beyond just getting a paycheck, it is an opportunity to continue learning, to socially connect with other people, and to develop a sense of self-worth,” says Lorenzi.

Dr. Heilbron, Associate Director, Duke Center for Autism and Brain Development, says it is important to address potential barriers to ensure
Raghav sterilizes toys so they are ready for the next patient.

that individuals are able to access opportunities in the work environment. “As an employer, we need to consider ways to match individuals to environments in which they can flourish and demonstrate their strengths as well as grow through new challenges,” says Heilbron. “It’s also very important to provide support so that if unexpected things do come up, employees know there are people to turn to for help and guidance.”

In Raghav, the Center has found someone who more than fits his environment.

“He’s an absolute delight,” says one of the staff members who works with Raghav. “He shows up on time, cares a lot about the quality of his work, is very thoughtful of other staff members, and shows a lot of care about the people he works with. I hope that he may be changing perspectives of people around Duke.”

Tara Chandrasekhar, MD, a child and adolescent psychiatrist at the Center, says neurodiversity is a growing priority across Duke University, one that the Center for Autism is committed to promoting. During Autism Awareness month in April, the center co-hosts a neurodiversity event with DIBS. Leaders from across the School of Medicine and Duke University attend, along with people with autism, families, and staff, to hear speakers who are on the spectrum or closely affected by it talk about their personal experiences.

“Having Raghav here is part of our broader mission at Duke and beyond,” says Chandrasekhar. “We want to celebrate neurodiversity and appreciate that there are lots of different ways of being in this world...each unique person brings something special.”

Raghav, who speaks five languages, including Hindi, Spanish, French, Italian, and German, just completed a program for students with learning disabilities at Clemson University in spring 2018. To the delight of his coworkers at the Duke Center for Autism, he is returning to work at the Center this summer. As for Raghav, there’s no doubting his commitment.

“I really enjoy what I do here,” he says. “I love to work independently, and here I am surrounded by just lovely people who care and help and support me.”
On April 12, 2018, the Center commemorated Autism Awareness Month with an event co-sponsored by the Duke Center for Autism and Brain Development, the Duke Institute for Brain Sciences, and the Department of Cultural Anthropology. Dr. Roy Richard Grinker, Professor of Anthropology, International Affairs, and Human Sciences at The George Washington University, author, and parent of a person with autism, gave an illuminating talk on the effects of stigma in autism and other conditions. Dr. Grinker was optimistic about how education and greater public awareness have improved acceptance and reduced stigma for people on the autism spectrum.

The event was held at Love Auditorium on Duke University’s West Campus and saw attendance of close to 200 guests. Dr. Grinker shared valuable insights on several factors that may help reduce the stigma associated with mental illness and other conditions. These included increased transparency and media coverage of high-profile persons who have mental illnesses or other conditions, shifting towards a “spectrum” rather than “categorical” mentality, and appreciating the economic and financial advantages of the diverse skillset of individuals with developmental, medical, and creative differences.

“My daughter is very good at jigsaw puzzles, yet somehow one piece is always missing. For all of us, one piece is always missing.”

– Roy Richard Grinker, PhD
Center Hosts *Baseball Bonanza* with Duke Baseball

Over 50 children and their families gathered at the Jack Coombs field on Duke's West Campus on May 5th, 2018 to participate in the *Baseball Bonanza*. This year’s annual sports clinic was led by Duke Baseball coaches and team members in collaboration with the Duke Center for Autism. Participants practiced catching, throwing, base running, and batting at four separate drill stations. At the end of the event, families had the opportunity to watch the talented Duke baseball players put on a home run derby. The event received news coverage by ABC 11 and Spectrum News.

“Wow!! What an amazing event...one thing that sticks out is the genuine care factor that was demonstrated by the team, coaches, staff and volunteers. The human factor was huge! I most certainly appreciate it as the mother of beautiful child on the spectrum.”

– Parent of participant
The United Nations Annual World Autism Awareness Day event promotes the awareness and acceptance of autism while providing an opportunity for scientists, policy makers, educators and other leaders from all over the globe to examine the progress in increasing awareness and access to autism services worldwide. The theme of this year’s event, held on April 5, 2018, was “Empowering Women and Girls with Autism.” Important topics addressed by speakers included empowerment of persons with autism, policy change, stigma, under-diagnosis of girls with autism, and employment.

Dr. Dawson has attended the UN event for the past several years. One of the biggest changes in the event over the past decade, she observed, is that, “now the event is led by persons with autism and other disabilities,” pointing to this year’s address by Julia Bascom, Executive Director of the Autistic Self Advocacy Network. “This shift itself recognizes the importance of empowering people with autism to have a voice and shape the discussion and priorities regarding supports and services for people on the spectrum,” Dawson said. Even still, she added, “the discrimination faced by persons on the spectrum is significant and includes economic, employment, education, and healthcare discrimination.”

Even with the progress that has been made, the stigma of autism remains a significant issue not only in the U.S., but worldwide, Dr. Dawson noted. “There is often misunderstanding about autism, and this affects access to education, healthcare, and employment.”

The program at the United Nations which Dawson attended was titled “Autism Advantage: Return on Investment,” and focused on employment of persons on the spectrum. It was attended by business leaders, academics, self-advocates, government and NGO leaders from around the world. Business leaders from Bank of America, SAP, JP Morgan, Google, Microsoft, IBM, and many other companies attended to find out how best to recruit and retain persons with autism in their companies. Among the program speakers were Mark Vanderbosch, Dean, Ivey Business School; U.S. Senator Tom Harkin, and Thorkel Sonne, Founder, Specialisterne. Thorkel inspired SAP to create its “Autism at Work” program, which has set a goal of employing autistic persons for 1 percent of its workforce. The Duke Center for Autism and Duke’s Fuqua School of Business have been collaborating with the SAP Autism at Work program for several years now.

Dawson is excited about the momentum she sees in the area of employment of persons with disabilities. “Businesses are now viewing employment not as an act of goodwill but rather as a way of enhancing their businesses,” Dawson said. “It’s increasingly recognized that diversity in the workplace stimulates creativity and innovation. By accommodating the needs of those with disabilities, a company can reap the benefits of a diverse workforce.”

Dawson and Saima Wazed Hossain of Bangladesh (at right), whom Dawson described as a “globally renowned champion for the cause of autism spectrum disorder,” and who was appointed in April 2017 as a World Health Organization Goodwill Ambassador for Autism in the South-East Asia Region.
Community

Duke Hosts Autism Employer Summit

On May 22, 2018, Duke hosted an Autism Employer Summit in McClendon Auditorium at Duke’s Fuqua School of Business. Nearly 100 attendees participated in the event, including human resources leaders from local companies and businesses, representatives from non-profit and non-governmental organizations (NGOs), educators, parents of adults with autism, and adults on the spectrum. The focus of the event was to help community members and representatives from local companies better understand how to successfully employ adults on the autism spectrum.

The event was moderated by Duke Center for Autism’s Dr. Tara Chandrasekhar (pictured on far left in photo). Speakers included Duke faculty and José Velasco and Jewell Parkinson from international software company SAP, who presented on SAP’s impressive “Autism at Work” program and how it is leveraging the talents of individuals on the spectrum and providing employment opportunities for hundreds of adults with autism around the globe. The event concluded with an engaging panel discussion and question and answer session with audience members. Panelists included (left to right in photo) Raghav Swaminathan, an adult with ASD who works at the Duke Center for Autism; Jewell Parkinson, Head of Human Resources for SAP North America; Jeffrey Day, an adult on the spectrum and self-advocate; Marleen Sotelo, Director of Programs and Operations for the Els Center of Excellence; José Velasco, Global Lead for SAP’s Autism at Work Program; and Gregg Ireland, founder of Extraordinary Ventures in Chapel Hill. Each panelist offered a unique and personal perspective on how to promote employment of those on the autism spectrum.

“The Duke Center for Autism was thrilled to host our second Autism Employer Summit at Duke! Jose Velasco and Jewell Parkinson, head of HR for SAP, were inspiring!”

– @GeriDawson

Autism Employer Summit panel: Tara Chandrasekhar (moderator), Raghav Swaminathan, Jewell Parkinson, Jeff Day, Marleen Sotelo, José Velasco, and Gregg Ireland
Thank You

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Duke Health Development and Alumni Affairs
710 West Main Street, Suite 200
Durham, NC 27701
Attn: Lynda Heaney
Each year the Duke Center for Autism partners with a Duke sports team to hold a youth sports clinic. The photos featured on the front and back covers are of children that participated in our May 2018 “Baseball Bonanza.”