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## Mothers, schools & **AUTISM** spectrum disorder

*Matt Ward, a young artist with ASD, and his mother, Nancy Alar.*

*Photo: Jeff Miller, University Communications*

**As** children with autism spectrum disorder (ASD) transition to adulthood, many see improvements in their symptoms. But the degree of improvement can vary greatly. Could these differences depend on experiences while growing up? If so, could well-designed interventions provide a lifetime of meaningful progress for individuals with ASD?

Researchers at the Waisman Center's Lifespan Family Research Program (LFRP), led by Marsha Mailick, PhD, and Jan Greenberg, PhD, have been working for several years to answer these questions. Ashley Woodman, previously a postdoctoral researcher in the LFRP, looked at how three different behaviors of individuals with ASD changed over time: 1) challenging behaviors, such as being uncooperative or disruptive, 2) the severity of autism symptoms and 3) independence in activities of daily living, from making a sandwich to handling finances.

Researchers found two groups: One group showed consistent improvement with time -- reduced ASD symptoms, fewer challenging behaviors and increased abilities to perform daily activities. The behavior of the individuals in the second group didn't change much over time.

Why did the symptoms of one group improve?

Turns out, maternal positivity—or how optimistic and encouraging a mother is in relation to her child—increased the chance that an individual with ASD would belong to the group that showed consistent improvement of behaviors and symptoms.

*"This research is a message of hope that says families can truly make a difference in the lives of individuals with autism"*

**- Marsha Mailick**

Also, those who had experienced any form of inclusion in school were between three and five times more likely to be a member of the group that showed behavioral improvements, compared to those who hadn't spent any interval in an inclusive school environment.

Mailick says that the study is evidence that investing in inclusive education has decades-long pay-off for society and highlights the importance of long-term research for science and public policy. "This research is a message of hope that says families can truly make a difference in the lives of individuals with autism," says Mailick.

*To read the unabridged story, please visit  
[waisman.wisc.edu/newsletter.htm](http://waisman.wisc.edu/newsletter.htm)*



# Following newborns: So they may thrive

Jaden and Jalissa Cassidy with Maria Stanley, MD

Photo: Clark Kellogg

**Jaden** Cassidy is three years old and a whirlwind of energy. He bursts into the exam room, jumps on the exam table, flings off his jacket and cowboys boots and whirls around with a beaming smile, expecting—and getting—an enthusiastic round of applause.

Jaden's vibrant nature masks the difficult journey he and his family and friends have had just to be able to celebrate his third birthday. While pregnant with him, Jayden's mother, Jalissa Cassidy, went into early labor, delivering her son after just over 32 weeks of pregnancy. Jaden needed life-saving surgery and was in the neonatal intensive care unit (NICU) for 69 days.

Since then Jaden and Jalissa have visited the Newborn Follow-Up Clinic at the Waisman Center several times. Led by Maria Stanley, MD, the Waisman Center Newborn Follow-Up Clinic is a partnership with UW Health and the American Family Children's Hospital (AFCH), and one of 13 interdisciplinary clinics at the Waisman Center.

*"Our number one purpose is to support the children and their families after discharge from the NICU,"*  
- Maria Stanley

More than 6,000 infants across Wisconsin are born prematurely—before 36 weeks of pregnancy. Infants who are born prematurely often face multiple developmental and medical challenges. "We see kids with a range of complications related to prematurity," says Stanley, "and also kids with a range of medical issues that led to NICU stays for them."

To treat and care for young children with a broad range of medical needs, the clinic team needs to have diverse skills and expertise. "We are so fortunate to have a team of highly experienced experts in a range of disciplines, all working together to provide excellent care," says Stanley. "At the newborn clinic I could talk with specialists from diverse areas about all the concerns that I had,"

says Jalissa, "and always, someone was able to sit down with me, make suggestions and help me find my independence as a mom and help me support my child so he thrives after everything he had been through."

And that's the whole point, says Stanley. "Our number one purpose is to support the children and their families after discharge from the NICU," she says, "and that includes helping parents understand their child's development, and connecting them to support systems and resources."

With help from Stanley and her team, Jaden and Jalissa are both doing well. Jayden still has to come in for clinic appointments, so his health and development can be monitored. But for now, he has more important things to do: there are fingernails that need painting!

To learn more about the Newborn Follow-Up Clinic please visit [waisman.wisc.edu/clinics-newborn.htm](http://waisman.wisc.edu/clinics-newborn.htm)

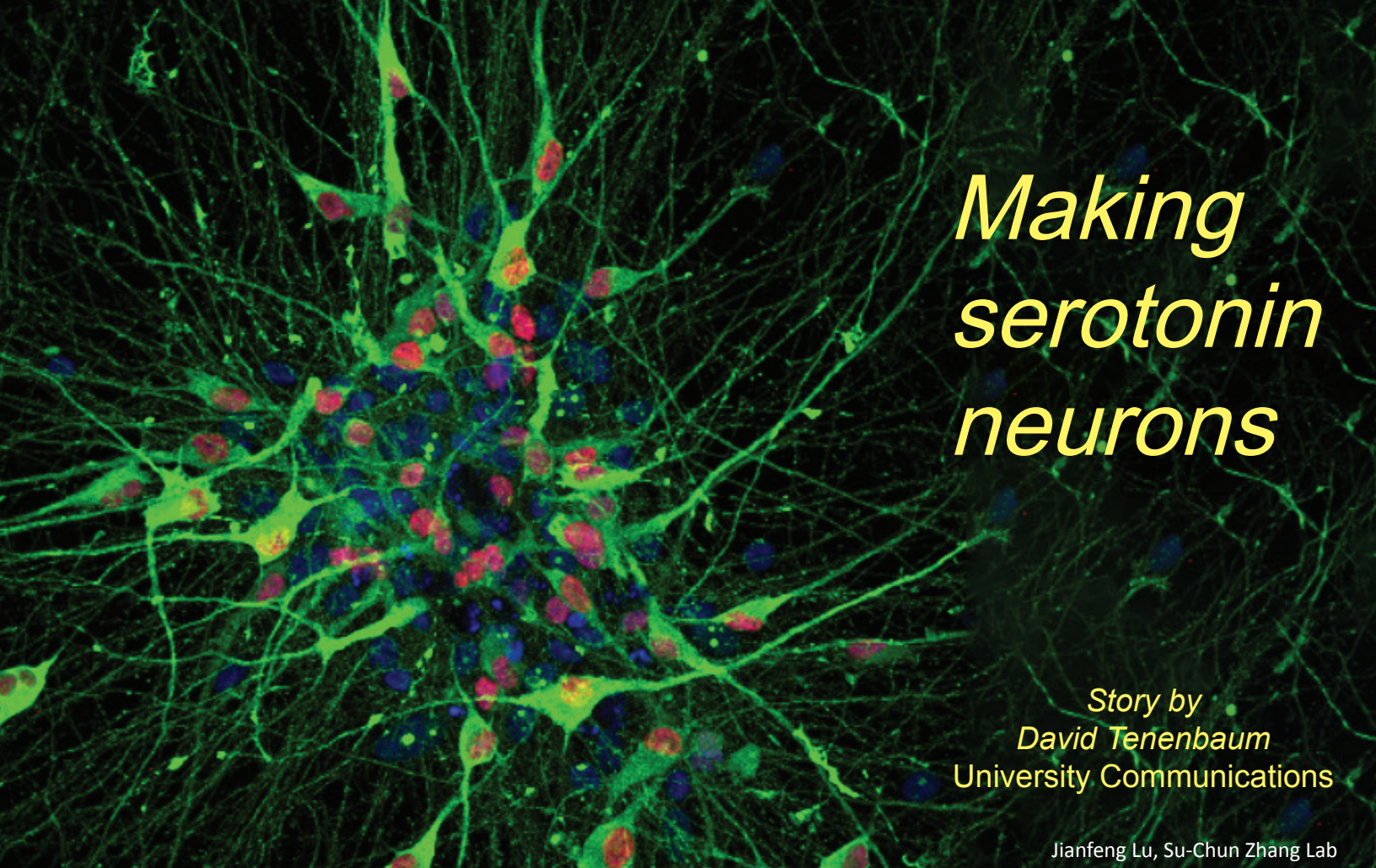


## FROM THE DIRECTOR

It is my pleasure to welcome you to the inaugural issue of *Waisman Intersections*. Through this quarterly newsletter I hope you will get to know us better and see how innovative research and compassionate clinical services intersect at the Waisman Center. You will also meet a few of the individuals whose generous support helps us pave the way for discovery and hope. Please enjoy this issue of *Waisman Intersections* and remember: you can always read the unabridged stories at [waisman.wisc.edu/newsletter.htm](http://waisman.wisc.edu/newsletter.htm).

Warm wishes,

Albee Messing, VMD, PhD  
Professor of Neuropathology  
Director, Waisman Center



# Making serotonin neurons

Story by  
David Tenenbaum  
University Communications

Jianfeng Lu, Su-Chun Zhang Lab

**Su-Chun** Zhang, a pioneer in developing neurons from stem cells at the Waisman Center, has created a specialized nerve cell that makes serotonin, a signaling chemical with a broad role in the brain.

Serotonin affects emotions, sleep, anxiety, depression, appetite, pulse and breathing. It also plays a role in serious psychiatric conditions like schizophrenia, bipolar disorder and depression.

“Serotonin essentially modulates every aspect of brain function, including movement,” Zhang says. The transmitter is made by a small number of neurons localized on one structure at the back of the brain. Serotonin exerts its influence because the neurons that make it project to almost every part of the brain.

The fact that serotonin neurons are found only in a tiny, specific part of the brain made it challenging to create them, says Zhang. “We had to instruct the stem cells to develop into one specific fate, using a custom-designed sequence of molecules

at exact concentrations. That’s especially difficult if you consider that the conditions needed to make serotonin neurons are scarce, existing in one small location in the brain during development.”

Although other scientists have matured stem cells into something resembling serotonin neurons, the case is much more conclusive this time, says first author Jianfeng Lu, a scientist at the Waisman Center. “Previously, labs were producing a few percent of serotonin neurons from pluripotent stem cells, and that made it very difficult to study their cells.”

**“Serotonin essentially modulates every aspect of brain function, including movement,”**

**- Su-Chun Zhang**

To confirm that the new cells act like serotonin neurons, “we showed

that the neurons responded to some FDA-approved drugs that regulate depression and anxiety through the serotonin pathway,” Zhang says.

Although cells derived from stem cells are commonly used to test drug toxicity, Zhang is aiming higher with the serotonin neurons. “We think these can help develop new, more effective drugs, especially related to the higher neural functions that are so difficult to model in mice and rats,” he says.

Because the neurons can be generated from induced pluripotent stem cells, which can be produced from a patient’s skin cells, “these could be useful for finding treatments for psychiatric disorders like depression, where we often see quite variable responses to drugs,” says Lu. “By identifying individual differences, this could be a step toward personalized medicine.

“I’m like Su-Chun. I don’t want to just make a publication in a scientific journal. I want our work to affect human health, to improve the human condition,” says Lu.

To learn more about the stem cell research at the Waisman Center please visit [waisman.wisc.edu/scrp.htm](http://waisman.wisc.edu/scrp.htm)

# UPCOMING EVENTS

## Waisman Center Day with the Experts

*Cochlear Implants*

**SATURDAY, JUNE 4 at 9 a.m.**



[waisman.wisc.edu/events-experts-ci2016.htm](http://waisman.wisc.edu/events-experts-ci2016.htm)

## *Friends of the Waisman Center* 21<sup>st</sup> Annual Spring Benefit Concert



## The 24<sup>th</sup> Annual *Friends of the Waisman Center*

# GOLF

## Benefit

at Bishops Bay

**MONDAY, July 18**

[waisman.wisc.edu/events2016-GolfBenefit.htm](http://waisman.wisc.edu/events2016-GolfBenefit.htm)

## FACULTY AWARD

Xinyu Zhao, PhD, Waisman Center investigator and professor in the Department of Neuroscience, was awarded a Vilas Faculty Mid-Career Investigator Award in January 2016.

This prestigious award provides \$100,000 in flexible funding over two years, which can be used for research, publication, project assistantships, or other expenses related to scholarly activity.

Zhao focuses on understanding the molecular mechanisms that regulate neural stem cells and neurodevelopment. Her research team aims to apply their discoveries toward developing treatments for neurological disorders and injuries.

To learn more about Zhao's research please visit:  
[waisman.wisc.edu/pi-Zhao-Xinyu.htm](http://waisman.wisc.edu/pi-Zhao-Xinyu.htm)



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# Thoughts of Gratitude: David Busta



David Busta with Su-Chun Zhang, MD, PhD, at the Waisman Center, Fall 2015

**For 13 years**, one small town in northern Wisconsin has been buzzing with excitement on the Saturday after Thanksgiving.

That's when the David Busta Basketball Tournament and Silent Auction brings together hundreds of people in Chetek, WI, to raise funds and help further the research of Su-Chun Zhang, MD, PhD, at the Waisman Center. Over the years this event has raised more than \$400,000 in support of the Waisman Center.

On August 24, 2002, David Busta, BA '97, suffered a severe, life-altering spinal cord injury from a fall. The subsequent physical and mental challenges that he faced fueled a determination to help propel forward research on spinal cord injuries and potential therapies.

While searching for an organization to support, Busta turned to his alma mater, the University of Wisconsin-Madison, and in the Waisman Center has found a natural partner in his quest to support research on spinal cord injuries and treatments.

"It was important to me that the money we raised went directly to research," says Busta, "and I believe that when the Waisman Center finds a cure, their approach will be the most natural and complete way to

recover abilities lost due to a spinal cord injury."

It is also important to Busta that research at the Waisman Center benefits not only the search for a cure for spinal cord injuries, but also other neurodegenerative conditions such as ALS, Alzheimer's and Parkinson's disease.

"David's contributions provide meaningful and vital resources to the Waisman Center and help us advance scientific discoveries," says Albee Messing, VMD, PhD, director of the Waisman Center. "We are incredibly grateful to David, his family and the community who participate in his fundraising efforts for their generous support."

With Busta's support, Su-Chun Zhang's lab has made several research breakthroughs related to stem cells and potential therapies for spinal cord injuries.

One recent discovery is a novel method to 'edit' the DNA in stem cells as they transition—or differentiate—into various kinds of cells, such as nerve cells. This innovative technique will allow scientists to understand the nuances of how stem cells differentiate into nerve cells and potentially make it easier to replicate the process in

the lab and treat diseases, disorders and injuries. "David's enthusiasm and dedication inspires us every day as we search for ways to treat conditions such as spinal cord injuries," says Zhang. "His significant, long-term support has really helped me pursue many different research avenues."

*"I hope to someday be able to tell everyone who has contributed to our cause, 'Here's how you helped find a cure'"*

*- David Busta*

Busta hopes that people leave the tournament and silent auction knowing a little more about how supporting research at the Waisman Center can help better the lives of the many. "I hope to someday be able to tell everyone who has contributed to our cause, 'Here's how you helped find a cure,'" he says.

You can learn more about David Busta, and the Basketball Tournament and Silent Auction at [bustabenefit.org](http://bustabenefit.org)

To give to the Waisman Center, please visit [waisman.wisc.edu/giving.htm](http://waisman.wisc.edu/giving.htm)



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## A Call for Art

Encompassing a breadth of subject matter and artistic media, the **Harvey A. Stevens International Collection of Art by People with Developmental Disabilities**, showcases unique and visually powerful pieces that encourage people of all abilities to express themselves and expand their world through art. The collection is maintained by the Friends of the Waisman Center, who are expanding the collection through an international Call for Art by individuals with disabilities. For more information, please contact Teresa Palumbo at [palumbo@waisman.wisc.edu](mailto:palumbo@waisman.wisc.edu) or 608.263.5837.

Pictured here:  
*Amor Perfeito* by David, Brazil