

Fall 2019



*Dr. Hsu shows Dr. Bonaccio how the 3D VR headset works.*

### “Look what we’ve started. This is so exciting.”

Dr. Larson Hsu, board-certified radiologist and Staff Physician in the Department of Diagnostic Radiology, is showing Dr. Ermelinda Bonaccio, Chair of Diagnostic Radiology, how to use the 3D virtual reality (VR) headset he’s programmed. Special controllers in her hands allow her to grab a 3D model she’s seeing and pull it toward herself, then turn it around and upside down. Dr. Hsu made this 3D model from a CT scan of a patient’s cancer. It’s an exact model of his left lung with a lower lobe metastasis, which the surgeon will remove tomorrow.

### **Generous donor giving to the Roswell Park Alliance Foundation has allowed the Department of Diagnostic Radiology to equip Dr. Hsu’s lab with this transformative program.**

VR can make a huge difference for surgeons by showing them the real-life intricacies of cancerous tumors and patient anatomy, and how each has affected the other. In this case, they can see how this lung tumor has eaten into the patient’s airways, what kinds of blood vessels

are involved and what might be at risk once excision begins.

Dr. Hsu is passionate about finding ways to use 3D technology to make surgery more predictable. As VR becomes more commercially available in the video game industry, he started thinking about utilizing it in medicine as well. “I had been playing with virtual reality quite a bit. I had made art in virtual reality, too, and I thought, What if I can take these 3D models from the computer screen, bring them into virtual reality and see them right in front of me? That’s what we are doing here.”

He compares the process to painting, taking a 2D CT scan and transforming it into an interactive 3D model using FDA-approved software, tablet and pen. Surgeons can then use the VR headset before surgery to explore what awaits them inside a patient’s body and use portable headsets in the OR itself as a guide as they move through surgery.

Dr. Hsu is working on another fascinating way to use 3D models, too: a 3D printer also made possible by donations to the Alliance Foundation.

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# CIMAvax Gives Jerry Hope After Lung Cancer

## Clinical Trials at Roswell Park Made Possible by Donor Support

Jerry walks out of his tai chi class in the senior center feeling relaxed and refreshed. The 76-year-old widower keeps an activity level that beats most people half his age: golf, kayaking, line dancing, total body workouts and tai chi, along with other classes and outings with Grand Island's Golden Age Center. And he does this while living with COPD and lung cancer.

Jerry's relationship with Roswell Park began in 2008 when he was diagnosed with esophageal cancer. After radiation, chemo and surgery to remove 8 inches of his esophagus, he was declared cancer free. But because he worked for 33 years in a coal-fired electricity plant and had been a smoker till age 50, his doctors knew too well that this might not be the end of his cancer story, and kept him under close monitoring.

Unfortunately, they were right. In 2018, one of his routine screenings showed lung cancer, and it had already metastasized into his left hip.

Even with that, Jerry's outlook was positive. "I've been through it once before, and I'm an affirmative type of person. I just said, OK, let's do something about this. Let's get at it, whatever we had to do."

They began treatment with chemo, which left him with a rash, fatigue and no hair. But then he learned he qualified for the CIMAvax-EGF clinical trial taking place at Roswell Park.

CIMAvax is a lung cancer vaccine developed at the Center for Immunology in Havana, Cuba. It works by targeting a growth factor in the blood — called EGF — that cancer cells need to survive. CIMAvax essentially starves the cancer by depleting EGF.

**Roswell Park has an exclusive partnership with Cuba, meaning it's the only place in the U.S. where these clinical trials are available. Donor giving has played a huge part in making that possible.**

"We completed phase I of the clinical trial around summer 2018. In September 2018, we started phase II to verify our findings in phase I formally in a larger group of patients," says Dr. Grace Dy, Chief of Thoracic Oncology, Jerry's doctor and principal investigator on the trial. "When chemotherapy stopped working for Jerry, he was generous with his time in participating in this clinical trial. He's been on the CIMAvax vaccine for over a year now, and we're very pleased his cancer remains under control and that he's able to maintain a good quality of life."

**"This vaccine could be a game-changer," says Dr. Kelvin Lee, the Jacobs Family Endowed Chair in Immunology, who initiated the relationship with Cuba that brought the vaccine to Roswell Park. "It could impact hundreds of thousands of patients in the United States, and potentially millions of individuals worldwide."**

It doesn't stop at lung cancer, either. EGF is present in many kinds of cancer, so CIMAvax has the potential to help many patients. There's another exciting possibility, too: prevention. Doctors have

found that EGF is active in the lungs of some people who are at high risk for lung cancer but haven't developed it yet, meaning CIMAvax could be used to stop it from ever growing in the first place. Further clinical trials will help us find out for sure.

What does it mean to Jerry that this clinical trial was available to him?

"Oh, boy, it means the world to me. It's so much easier to go through immunotherapy than chemotherapy. Chemotherapy kind of tears you up a little bit. CIMAvax gave me a more positive outlook."

At his last scan, his cancer wasn't shrinking, but it wasn't growing, either, and that sounds great to him.

"Because of Roswell Park, I am alive," he says. He has a way of keeping things short and simple. "I have a much better quality of life. I wouldn't be here now if it wasn't for the CIMAvax, and CIMAvax wouldn't be here without the donors. Thank you very much!"

In addition to the activities that keep him busy each week, this spring Jerry surprised his daughter in California for her birthday; this summer he took a trip to Long Island with his son and his other daughter; and this fall he'll be visiting an old friend in Ohio and traveling to Nashville with the senior center.

"I'd also like to get some more kayaking in and biking," he smiles.

“ Because of Roswell Park, I am alive. I have a much better quality of life. I wouldn't be here now if it wasn't for CIMAvax, and CIMAvax wouldn't be here without donors. ”

– Jerry, lung cancer patient



Jerry is grateful for the chance to receive CIMAvax.



## Rachel's Story: HOW DONOR GIVING MADE HER BONE MARROW TRANSPLANT POSSIBLE

Only when her doctors told her she was going to die without one did Rachel understand how critical a bone marrow transplant was.

Just two months before hearing these words, the RN had rarely been sick a day in her life. A South Dakota native now living in Lewiston, New York, she loved reading and traveling but especially being with her family: her husband, three teenaged children and three cats. Then, in December 2017, she developed an odd fever that hit every night for eight straight days.

Although she looked fine, her white blood cell count proved otherwise, reading at 120,000, or 10 times higher than a normal count. The always-healthy nurse was diagnosed with acute myeloid leukemia.

That was a Friday. On Monday, the oncologist told her to go straight to Roswell Park, without even stopping at home. She was admitted right away.

Dr. Elizabeth Griffiths, a leukemia expert in the Department of Medicine, started talking to Rachel about a bone marrow transplant (BMT), but Rachel was worried about graft-versus-host disease (GVHD), where donated cells attack the donor's body. So they started her on chemotherapy. After several weeks of treatment, she was able to go home. But then her white blood cell count spiked to 199,000.

Dr. Griffiths admitted her again and told her, in no uncertain terms, that there was no more time for wait-and-see. Now, two months after her diagnosis, Rachel had to have a bone marrow transplant, or she was going to die.

Most white blood cells are produced in the bone marrow. Leukemia is cancer of bone marrow and/or other tissues that produce blood. So when the bone marrow malfunctions like it did in Rachel, sometimes the only hope for survival is to replace it with a transplant from a donor.

Finding a donor means finding someone whose HLA, or human leukocyte antigens, match the patient's. HLA are proteins found on most cells in your body. Matching HLA is critical to the growth and development of healthy new blood cells and in reducing the risk of GVHD, Rachel's initial fear. The more similar the HLA, the better the chance of a successful transplant.

Doctors first look for a match among the patient's siblings. When that fails, they turn to the public. Fortunately, organizations like Be the Match help patients connect with volunteer donors around the world. But it's not cheap, and insurance often doesn't cover the cost of testing those potential matches.

**This is where generous donations to the Roswell Park Alliance Foundation have come in. "They help us cover the cost of tissue typing, which helps identify a potential donor for a patient who needs a blood or marrow transplant to cure their disease," says Dr. Philip McCarthy, Director of Roswell Park's Transplant and Cellular Therapy (TCT) Center and the doctor who oversaw Rachel's BMT. In 2018 alone, donations funded 68 searches resulting in 68 matches for our patients.**

Donor support also helps the TCT team find matches faster, which can make all the difference in these situations, says Dr. McCarthy. "With this kind of donor support, we can offer a faster time to providing curative therapy and potentially save more lives. If we can't get to them in time, their disease could get beyond our ability to treat or control. We may miss our only window of opportunity."

Rachel's donor was found in Europe. In March of 2018, the TCT team performed Rachel's bone marrow transplant. After the procedure, the doctors and staff monitored her for several weeks to make sure her numbers got back to a good level and her body was healing.

A year and a half later, Rachel is doing great. She's working again at the hospital where she's been for almost 16 years. And she's grateful for the role donations to the Roswell Park Alliance Foundation played in her story.

**"That donors have helped provide this testing is just amazing. I can't stress enough the importance of not having to worry about trying to finance a donor search.** When you get a cancer diagnosis, it is so much to process. I know I was shocked — in complete disbelief at first. You're confused, tired, scared, ill from treatment, and you just want to put on a brave face for loved ones. There is just no way someone could be organizing a way to get the funds for a donor search.

"And in my case, time was of the essence. I am forever grateful to my team at Roswell Park. They were there for me and advocated for me when I wasn't sure what to do."

Since 2018,  
68 tests have  
been completed,  
resulting in all  
68 patients  
being matched,  
all thanks to  
donor funding.

# Supporting Mental and Emotional Health in the Lives of Kids with Cancer and Blood Disorders

**I**t's early morning in the Katherine, Anne and Donna Gioia Pediatric Hematology Oncology Center. Brandee Aquilino, PsyD, MA, is in her office looking at her schedule and preparing for her day. In her role as the Medical Psychologist with the Department of Pediatrics, Brandee helps children and families deal with their medical struggles and with the thoughts and feelings that come both with treatment and after.

In other words, she helps children and their families through the hardest things they've ever faced.

She works closely with doctors and other medical providers, as well as with her team members: Medical Social Worker Kristen Fix; Manager of the Integrative Wellness Program Doug McDaniel; and Child Life Specialist Jessica Wadium. Thanks to donations, the Roswell Park Alliance Foundation supports the salaries of Brandee's, Doug's and Jessica's positions through its Quality of Life Program.

Every day brings new challenges and new joys, and sometimes new losses. Through every moment, Brandee is finding ways to help children and their families make their way through tremendous difficulties.



## A Day in the Life of Brandee Aquilino, Child Psychologist

### 8:00 a.m. Grief Counseling

Brandee starts her day by sitting down with a mother who is devastated by the recent loss of her 16-year-old daughter to cancer. Brandee provides her with emotional support and grief-focused psychotherapy, helping her to process thoughts and feelings surrounding every parent's worst fear.

### 9:30 a.m. Coping

She answers a page to meet with a 19-year-old patient who is having difficulty coping with his diagnosis and treatment. Brandee spends time counseling him on his own and then provides his mother with family-focused counseling.

### 10:45 a.m. Parent Counseling

A parent is struggling with the terrible news that their child relapsed. Brandee sits with the family, offering emotional support and counseling that helps them adjust and cope with the fear, anxiety and life changes that accompany starting treatment again, as well as the child's poorer prognosis.

### 12:30 p.m. Treatment Compliance Intervention

There's a family facing a lot of stressors that have made it difficult for them to get to their child's leukemia treatment appointments. Brandee provides family-focused counseling and support to help them develop ways to cope with these issues and develop a plan for improving compliance.

### 1:13 p.m. School and Peer Counseling

A school psychologist calls Brandee to schedule a session with a patient's elementary school class. Brandee will talk to the students, help them understand why their classmate has been missing school and prepare them for his return by explaining why he might look or behave differently when he returns to class.

### 2:42 p.m. Treatment Anxiety

Brandee is paged to come help a 16-year-old with anxiety who is having a panic attack in the Gioia Center. She provides emotional support and implements coping strategies to help him relax, then talks about this with the medical team so his procedure will be more successful.

### 3:36 p.m. Crisis Management

A teenage patient who has been battling severe depression needs urgent attention. Brandee is paged to provide emergency intervention in person for the patient and parents.

**Around 5 p.m.**, Brandee returns to her desk to update her records and review her schedule for the next day before going home. But even when she leaves, she remains available by phone to the people who need her. 24 hours a day.

**Brandee knows that nighttime is the worst time of all for some of the patients and families who rely on her. Anxiety hits hard. Grief, harder. It is all crisis management as these children and their families go through the hardest things they've ever known.**

**"Parents whose children are sick have the most difficult and heartbreaking job. It makes mine feel easy," she says. "The hardest part for me is I can't make it go away."**

## Quality of Life Programs at Roswell Park

We want to make sure we do everything possible to reduce worry and stress so our patients can focus on their fight when needed and focus on other things – or nothing at all – whenever possible. With the help of donations, Roswell Park provides dozens of quality of life programs every year that support non-medical needs and diversions for patients and their loved ones, ranging from the beautiful art you see around the hospital to yoga classes and legal assistance.



Roswell Park's Quality of Life Fund is supported by the Ralph C. Wilson Jr. Foundation and the generosity of our donors.

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Dr. Hsu sees it as another critical component in the future of cancer surgery.

With a 3D-printed, patient-specific anatomical model, doctors can not only see but feel exactly how a tumor surrounds and intertwines with an organ. They can feel the same things their fingers will actually touch when they operate on the patient. There's more involved in getting a printer set up right now, and it comes with higher costs, but in a few years, he believes insurance will cover them.

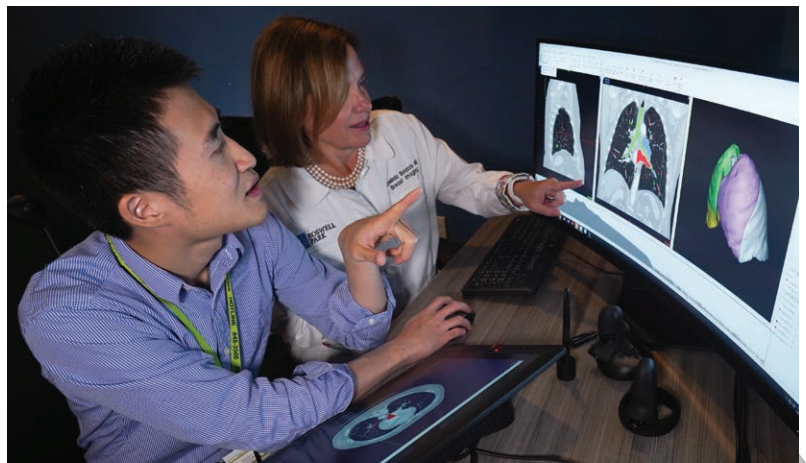
Both methods are pretty amazing. "Once we have a 3D model, the potential is endless," Dr. Hsu says.

There's another benefit, too: Seeing 3D models of their cancer can help patients understand what's going on with their disease and the potential impact of surgery. It can mean peace of mind when making a life-changing decision.

**All this will make Roswell Park a pioneer in the use of 3D technology, Dr. Hsu says. He believes he's holding the future in his hands.**

"Look what we're doing thanks to donor dollars!" he says. "I'm excited about the evolution of this rapidly developing technology."

**To see examples of 3D VR models created by Dr. Hsu, visit [www.bit.ly/Roswell3D](http://www.bit.ly/Roswell3D).**



*Dr. Hsu and Dr. Bonaccio talk about how much more they can learn about the patient's tumor before surgery thanks to 3D VR.*

