



NORTHERN ILLINOIS PROTON TREATMENT AND RESEARCH CENTER  
GROUNDBREAKING CELEBRATION  
JUNE 19, 2008

777 Discovery Drive  
DuPage National Technology Park  
West Chicago, Illinois



NORTHERN ILLINOIS  
PROTON TREATMENT  
& RESEARCH CENTER

Today's groundbreaking ceremony represents both the literal start of an exciting, new construction project and a symbolic new start for NIU in the world of advanced medicine. Proton therapy is a groundbreaking move forward in cancer treatment, providing patients of all ages with a treatment option that eradicates disease without weakening the body. For Northern Illinois University, this project illustrates the power of cross-disciplinary research and multi-institutional partnerships. Combining the strengths of well-respected programs in physics, the health sciences and regional outreach, NIU has been the catalyst for groundbreaking discussions and agreements between and among dozens of clinical, regulatory and business partners throughout the Chicagoland region.



We believe this is an important role for public higher education. As centers of knowledge, we multiply our impact by extending the expertise of our teaching and research faculty through projects such as this one. Two years from now, patients at the Northern Illinois Proton Treatment and Research Center will benefit not only from advanced cancer treatment, but also from the many proton therapy-specific nursing, education and allied health programs under development at NIU. Attending to the mental, emotional, spiritual and educational needs of NIPTRC patients is a challenge we embrace, and faculty from virtually every college at NIU are currently engaged in study and program development in support of our proton therapy project.

In addition to treatment, research and holistic patient support, NIU is deeply involved in creation of new academic programs to educate a new generation of medical, technical and support professionals. Critical staff shortages in medical physics, nursing, medical device engineering and other areas are being addressed by new program development at NIU. These are just a few examples that illustrate the transformational nature of our proton therapy initiative: NIPTRC and its related programs have the capacity to touch dozens of disciplines, hundreds of faculty and thousands of students. I am enormously proud to be part of this initiative, and hope you share our excitement. This project is, in a word, nothing short of groundbreaking.

A handwritten signature in black ink that reads "John G. Peters". The signature is written in a cursive, flowing style.

John G. Peters  
President, Northern Illinois University

Two years from now, the citizens of Illinois and surrounding states will have convenient access to advanced cancer treatment that would not exist without the boundary-breaking partnership known as interdisciplinary research. Reaching outside their conventional areas of study, medical doctors and particle physicists worked together to create a new use for highly concentrated proton beams: cancer treatment that spares surrounding tissue while fighting tumors with pinpoint accuracy. Today we celebrate the birth of a new resource where professionals from many different fields will advance science, create new jobs and improve quality of life for countless individuals.



The marriage of medicine and atomic science illustrates a new direction in strategic planning at NIU, in which traditional academic strengths are matched with pressing needs in our region. I am very proud to be part of a governing board that has both embraced this challenge and subjected its promise to intense scrutiny. At the heart of our commitment to proton therapy is a fundamental belief in the transformational power of cross-disciplinary research, education and training. The Northern Illinois Proton Treatment and Research Center will save lives, but it will also make new discoveries, train new medical professionals and provide countless new opportunities for those who have dedicated their lives to the healing arts.

Nearly a century ago the famous orator William Jennings Bryan said of the future, "Destiny is not a matter of chance—it is a matter of choice. It is not a thing to be waited for, it is a thing to be achieved." As a long time advocate of change in health care, the opportunity to be involved in this project has sometimes felt like destiny. More often, though, being part of a catalyst endeavor that couples institutional momentum with human need has seemed like a rare privilege. For that, and for all those dedicated men and women who have made this day possible, my fellow trustees and I offer heartfelt thanks for a job well done.

Only with bold steps can greatness be achieved.

A handwritten signature in black ink that reads "Cherilyn G. Murer". The signature is written in a cursive, flowing style.

Cherilyn G. Murer, J.D., C.R.A.  
Chair, NIU Board of Trustees

# ABOUT THE FACILITY

## THE PROMISE OF PROTON THERAPY

Beginning in 2010, the Northern Illinois Proton Treatment and Research Center will offer a cutting-edge new



Photo courtesy Midwest Proton Radiotherapy Institute

treatment option to cancer patients in Illinois and throughout the Midwest.

The center will be devoted to treating patients with an advanced form of radiotherapy

known as proton therapy, which is currently unavailable in Illinois. The noninvasive therapy is the treatment of choice for certain pediatric and adult cancers.

Proton therapy uses a particle accelerator—in this case, it will be a superconducting cyclotron—to generate a beam of protons traveling at two-thirds the speed of light. With great precision, oncologists can deposit protons within tumors while sparing adjacent healthy tissues and organs.



Photo courtesy Midwest Proton Radiotherapy Institute

*Preparing for proton therapy treatment at Midwest Proton Radiotherapy Institute (top). The gantry (directly above) revolves 360 degrees around a patient so the proton beam can be delivered at any angle, precisely hitting the tumor. The patient feels nothing during the treatment.*

Image by VOA Associates Incorporated



Located at 777 Discovery Drive in the DuPage National Technology Park, about 30 miles west of Chicago, the Northern Illinois Proton Treatment and Research Center will be a world-class facility—not only for the treatment of cancer but also for research and professional training in the growing field of particle therapy.

The \$159 million facility will boast:

- 110,000 square feet of space, including areas for research, training and education.
- two 190-ton gantries, each able to rotate around the patient, delivering proton beams at optimal angles.
- two fixed-beam rooms, four separate treatment rooms and one dedicated research room.

When fully operational, the proton therapy center will have the capacity to treat as many as 1,500 patients a year.



Image by VOA Associates Incorporated

# ABOUT PROTON THERAPY

## A BRIEF HISTORY OF PROTON THERAPY

Proton therapy isn't new, nor is it an experimental treatment.

Using protons for cancer therapy was first proposed in 1946 by Robert R. Wilson, who later in life would become the founding director of Fermi National Accelerator Laboratory.

Treatments on patients began on a limited scale in the 1950s both in the United States and in Europe.

New technologies developed or perfected in the late 1970s, such as magnetic resonance imaging, provide high resolution pictures of tumors, allowing doctors to take full advantage of the precision of proton therapy.

In the 1980s, Fermilab assisted in building and assembling the country's first hospital-based proton treatment system for Loma Linda University Medical Center in California. Its proton therapy center opened in 1990.

Today, proton radiation beams have been used to treat tens of thousands of people worldwide. The treatments are covered by most U.S. insurance providers, including Medicare.

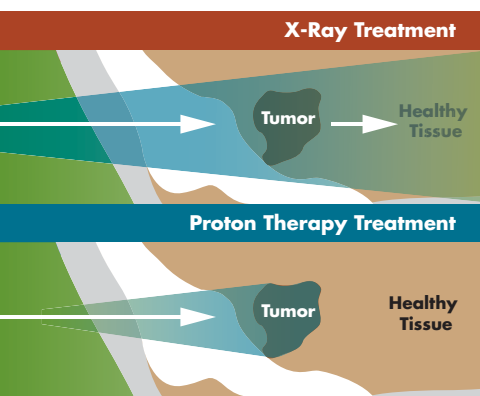
## ADVANTAGES OF PROTON CANCER THERAPY

### *Precise targeting unique to charged particles*

- Radio-surgical precision
- Reproducible treatments

### *Fewer acute and chronic side effects*

- Increased dosage possible
- Reduced normal tissue damage
- Decreased risk of radiation-induced tumors (important to pediatric oncology)

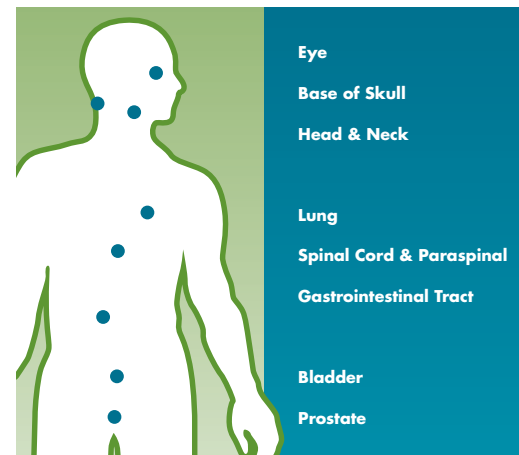


Source: Midwest Proton Radiotherapy Institute

*Protons deposit their radiation differently than X-rays (as illustrated at left). Compared to an X-ray beam, a proton beam has a low "entrance dose," a high dose designed to cover the entire tumor and no "exit dose" reaching healthy tissue beyond the tumor.*

## TYPES OF CANCER TREATED WITH PROTON THERAPY

- Uveal Melanoma (eye)
- Skull-base Sarcomas (head)
- Craniopharyngioma (brain)
- Gliomas - selected, boosts (brain)
- Large AVM (brain)
- Meningiomas (brain)
- Pituitary - functioning, retreatment (brain)
- Acoustic Neuromas (ear)
- Paranasal Sinus Carcinoma (sinus/nasal)
- Nasopharyngeal Carcinoma (throat)
- Paraspinal Tumors (spinal)
- Prostate
- Pediatric Malignancy
- Metastases – selected



Source: Midwest Proton Radiotherapy Institute

## OTHER PROMISING AREAS FOR TREATMENT

- Breast irradiation
- Lung
- Rectal carcinoma
- Advanced gynecological disease

## EXISTING PROTON CENTERS

- Midwest Proton Radiotherapy Institute at Indiana University, *Bloomington, Indiana*
- Loma Linda University Medical Center, *southern California*
- M.D. Anderson Cancer Center's Proton Center, *Houston, Texas*
- Francis H. Burr Proton Therapy Center at Massachusetts General Hospital, *Boston, Massachusetts*
- The University of Florida Proton Therapy Institute, *Jacksonville, Florida*

## Kelly Crawley's Story

It was the night of Halloween 2005, and Linda and Jim Crawley of suburban Detroit were experiencing a parent's worst nightmare.

Just a few weeks earlier, Linda Crawley had first noticed something different about her 3-year-old daughter Kelly. It wasn't anything particularly alarming, but Kelly's left eyelid was droopy. Worried that it might be an infection, Linda took her daughter to a pediatrician, who found a white spot under Kelly's eyelid.

When antibiotics didn't work, the Crawleys brought Kelly to see two specialists. The eye continued to swell, and on Halloween morning they ended up in the emergency room. After 14 hours and an MRI scan, doctors delivered the news: "Your daughter has cancer."

Kelly had an aggressive type of Rhabdomyosarcoma, a soft-tissue cancer. The tumor was located in a particularly delicate spot, near the left eye and pituitary gland, which secretes hormones necessary for a child's growth.

Within a week, Kelly had begun chemotherapy. She also would need radiation treatments. Doctors at her Michigan hospital talked to the Crawleys about their options, and asked if they would be willing to travel out of state for a type of radiation known as proton therapy.

A key benefit of proton therapy is its precision, which in Kelly's case was crucial. With standard radiation, Linda



Crawley says, there would be more risk of damage to the eye, brain or pituitary gland.

"This seemed like the best option," Linda says. "It was the safest, most effective treatment for a 3-year-old."

Mother and daughter spent late 2005 and early 2006 at the Midwest Proton Radiotherapy Institute in Bloomington, Ind., where Dr. Allan Thornton administered proton therapy treatments over a course of six weeks.

"It was the worst and the best experience of my whole life," says Linda, remembering the desperation of having a child with cancer and the comfort of knowing she was in good hands.

"I've never met finer people in my whole life. They embraced Kelly, and she fell in love with the nurses and the doctors."

Linda now says her daughter has been cancer-free since September 2006.

Six-year-old Kelly plays T-ball, is on a swim team, "is connected at the hip" to her older sister Lindsay and adores her new baby sister Stephanie. Kelly recently completed kindergarten, where she was the second tallest student in her class.

"I don't think anybody would know anything was ever wrong," her mom says. "She's a normal, thriving child and is doing wonderfully."

## Greg Ford's Story

At age 12, Greg Ford was diagnosed with ependymoma, a rare condition that caused tumors to form in his spine. Subsequent surgery and full-spinal radiation made him terribly sick but succeeded in wiping out the cancer.



At age 40, the tumors returned.

Over the next seven years, Ford underwent chemotherapy and three more surgeries. "Chemotherapy didn't work for me," says the Wheaton, Ill., father of three. "I've

had some incredibly difficult treatments where I thought I was going to die."

Already walking with the aid of canes, Ford was advised that further surgery could leave him paralyzed. With the tumors still growing, he turned to proton therapy in late 2005, undergoing treatments at the Midwest Proton Radiotherapy Institute (MPRI) in Bloomington, Ind.



Photo courtesy Midwest Proton Radiotherapy Institute

Ford had a second round of treatments for another small spot in early 2007. At last check, the proton therapy had successfully curtailed the tumor growth.

"Proton therapy certainly has been a miracle for me," Ford says. "I don't think it can come to Chicagoland soon enough."

# NORTHERN ILLINOIS PROTON TREATMENT AND RESEARCH CENTER

## ALLAN F. THORNTON, M.D. MEDICAL ADVISER



Dr. Thornton is medical director of the Midwest Proton Radiotherapy Institute (MPRI) in Bloomington, Ind., the nation's third proton therapy program. Prior to joining MPRI in 2002, he was the director of the Central Nervous System Radiation Oncology Division and Proton Radiosurgery Program at Boston's Massachusetts General Hospital. A graduate of the University of Virginia School of Medicine, Dr. Thornton completed his residency at the Ontario Cancer Institute at Princess Margaret

Hospital in Toronto. He has served as assistant professor at Harvard Medical School, Massachusetts General Hospital, Department of Radiation Oncology, and as an instructor at the University of Michigan Medical Center, Department of Radiation Oncology.

*“Proton therapy derives its advantages from the inherent precision of the charged-particle beam, complemented by its unique ability to stop the beam at a predefined distance. This stopping characteristic, known in the physics community as the Bragg peak, can be controlled to within one millimeter precision and may also be shaped to the contour of the tumor.”*

— Dr. Allan Thornton

## JOHN LEWIS, PH.D. EXECUTIVE DIRECTOR, NIPTRC, LLC



John Lewis is a veteran Northern Illinois University professional who has championed community engagement throughout his career. As associate vice president for NIU Outreach, Lewis has led a team of professionals in building partnerships that generate research, entrepreneurial solutions, support services and educational programs and delivery systems. He holds a Ph.D. in economics from the University of Missouri-Columbia. He previously served as a senior research associate at NIU's Center for Governmental Studies, specializing in economic-development and health-care research. He also serves as an adjunct professor, teaching the economics of health care within NIU's College of Health and Human Sciences.

## Shaun Barker's Story

Arriving each day to the Midwest Proton Radiotherapy Institute (MPRI) in Bloomington, Ind., wearing his Superman cape, 6-year-old Shaun Barker completed 32 proton therapy treatments earlier this year.

At the age of 3, Shaun was diagnosed with a benign brain tumor that his mother, Fallon, calls a monster. The tumor, which wraps like a snake around his optic nerve, was so big it damaged the pituitary gland. It has caused balance and growth problems, as well as a loss of vision in Shaun's right eye and diminished vision in his left.



Photo courtesy Midwest Proton Radiotherapy Institute

Despite having seven surgeries—including one that lasted 26 hours—the tumor continues to recur and fill with fluid.

The kindergartner's treatment options included more surgery or radiation therapy. In children, traditional photon radiation can damage developing healthy tissue and cause problems years down the road.

Fallon opted for the more precise proton therapy, which she hopes will successfully destroy the tumor wall. “Proton beam therapy came out way ahead of the other two options,” Fallon says, adding that her son had fewer doctor visits in the months following his treatment.

“It's already, in my opinion, worth it,” Fallon says. “He doesn't have to miss field trips at school because he has a doctor appointment. He actually is able to be a kid for a while.”

## Kelsey Borg's Story

Kelsey Borg woke up one morning in February of 2004 with an excruciating headache.

It was so severe that her parents, Terry and Betty, rushed their 14-year-old daughter to the emergency room. While en route, Kelsey noticed that if she tilted her head at a certain angle, the pain would ease.

By the following day, Kelsey was in surgery, as doctors worked to relieve pressure from fluid caused by a brain tumor. The surgery successfully relieved Kelsey's pain,



Photo by NIU Media Services

but the Borgs were faced with difficult treatment decisions.

Because of the tumor's location, surgery to remove it wasn't an option. Conventional photon radiation, the Borgs were told, could damage the optic nerve, thalamus and pituitary and thyroid glands. Kelsey could suffer

memory loss and experience learning difficulties.

"We had to find a way to minimize the collateral damage," Terry Borg says. Kelsey's doctors, and her father's own research, led them to proton therapy, though at the time it was only available for pediatric cases at two centers nationwide.

That summer, Kelsey and her mom checked into a Ronald McDonald House near Boston's Massachusetts General Hospital, where Kelsey underwent about 30 proton therapy treatments over six weeks.

"Every day, we got on the shuttle and traveled to the hospital, where the medical staff began performing the miracle of making my daughter well," Betty says.

Kelsey says the proton therapy was painless—she even listened to music during treatments.

"You don't feel anything," she says. "It was just a half an hour out of your day that you didn't do anything.



## Stuart Cooper's Story

Stuart Cooper's grandfather and father both succumbed to prostate cancer—his father at the age of just 68. And in November 2004, the 51-year-old Cooper found himself dealing with a diagnosis of



Photo courtesy Midwest Proton Radiotherapy Institute

the disease in its early stages and searching for the right treatment.

After conducting extensive research, Cooper chose proton therapy.

He traveled from his New York home across country to Loma Linda University Medical Center in California. The treatments were painless and the side effects negligible, he says. Most importantly, he has had no recurrence of the disease since being treated in early 2005.

"Finding my way to Loma Linda and going through proton treatment has been a defining moment in my life," says Cooper, an alumnus of the Northern Illinois University College of Law. "To be cured, to talk about it to people, and then to see that NIU, my alma mater, is planning a center, it has come full circle. It's a remarkable treatment."

Other than that, my mom and I went all over Boston doing everything we possibly could. We went on duck boats, on old trolley tours and shopping.

"I didn't really have any side effects," she adds. "That was one of the reasons we went with proton therapy—because it is supposed to have minimal side effects."

The treatments reduced the size of the tumor and halted its growth, the Borgs say. And Kelsey resumed the normal activities of a teenager. She served on student council, became a tutor and peer mediator and was inducted as a member of the National Honor Society.

In the spring of 2008, Kelsey graduated from high school with high honors. She will attend Northern Illinois University to study speech-language pathology—a career dream she has had since eighth grade.

"She's like any other 18-year-old," her father says. "This hasn't gotten in her way at all."

## PARTNERS AND ADVISERS

**NIU** NORTHERN  
ILLINOIS  
UNIVERSITY

and the Northern Illinois Research Foundation



### CONSULTANTS

**Carol Johnstone, Ph.D.**  
Fermi National Accelerator Laboratory

**George Coutrakon, Ph.D.**  
Loma Linda University Medical Center

**Allan Thornton, M.D.**  
Midwest Proton Radiotherapy Institute

**Marcum Martz, Ph.D.**  
Medical College of Wisconsin

**Don Farley, Ph.D.**  
Loma Linda University Medical Center

**Bharat Mittal, M.D.**  
Northwestern University