A growing number of students and recent alumni are getting an early start at startups, using the skills they gained at McCormick and other Northwestern schools—as well as the assistance of the University’s growing suite of entrepreneurship classes and resources—in money-making endeavors. The Farley Center for Entrepreneurship and Innovation, an incubator space in downtown Evanston, and five NUvention courses bring together students from across the University to start businesses.

Why the startup frenzy? Not all students are destined to be chief executives at 20, but they can all benefit from the skill set that entrepreneurship builds, such as problem solving, communication, and business savvy. And for those who do catch the startup bug, well, Facebook founder Mark Zuckerberg has already demonstrated how far college-student entrepreneurs can go.

**Ask students what keeps them busy outside the classroom and you’re likely to get a wide variety of answers.** From lab researchers to lacrosse champs, code writers to sorority sisters, Northwestern has them all—even claimants to a title for which many high achievers have to wait until middle age: CEO.

*Students begin building their own businesses even before graduation*

A tale of three companies

Above: The NuMat team (left to right): Omar Farha, Ben Hernandez, Chris Wilmer, and Tabrez Ebrahim.
NuMat Technologies took first place—and $100,000—at the US Department of Energy’s inaugural National Clean Energy Business Plan Competition, part of the Obama administration’s Startup America Initiative.

**PAVING THE WAY FOR CLEAN-ENERGY VEHICLES**

A PhD candidate in chemical and biological engineering, Chris Wilmer never imagined he’d be standing in a photo op at the White House holding an oversized check. But there he was on June 13, as his NuMat Technologies was announced as the winner of the first-ever US Department of Energy’s National Clean Energy Business Plan Competition. NuMat had bested five other regional prize-winning teams—Stanford’s, Columbia’s, and MIT’s among them—in this segment of the Obama administration’s Startup America Initiative. The prize was $100,000 in cash and $80,000 worth of in-kind services, including technical, design, and legal assistance.

The national competition was the fifth business-plan contest NuMat had won in as many months. From the grand prize at the Rice Business Plan Competition to a GOOSE Society Investment Prize, Wilmer and his three partners had already netted more than $1 million in cash and in-kind services; attracted national media attention from *Fortune*, *Crain’s Chicago Business*, and *BusinessWeek*; and been invited to ring the closing bell at the NASDAQ not once but twice.

The fast rise can be traced in part to Wilmer’s competitive fever; he entered and won more than 19 competitions during his McCormick career. It was an Innovative Minds grant, awarded by the law firm Perkins Coie in February 2011, that connected Wilmer with a potential collaborator interested in pitching a business around research Wilmer had done as a PhD candidate in the lab of Randy Q. Snurr, professor of chemical and biological engineering. The research was on porous crystals called metal-organic frameworks that are capable of storing natural gas and could make it possible to easily use the clean energy in cars. Perkins Coie intern Tabrez Ebrahim, a student in the JD-MBA joint program of the Kellogg School of Management and the School of Law, reached out to Wilmer about collaborating. They decided to enter the Clean Energy Challenge, an annual business competition that awards cash prizes to top Midwest clean-tech entrepreneurs. The grand prize winner would also earn the chance to compete in the US Department of Energy challenge.

The pair decided on a name—“NuMat,” short for “Northwestern University Materials”—and a spin on the stock company name NuCo—but otherwise “we had no idea what our business model was,” says Wilmer. “We went into the competition saying, ‘There are these materials called MOFs, they have all these different applications, and we plan to make a business around them somehow.’ That was good enough to get us through the first round, and from there it just kept building.”

Wilmer and Ebrahim knew they would need more hands on deck, so they invited Ben Hernandez, also pursuing a JD-MBA at Northwestern, and Omar Farha, a research associate professor of chemistry in Weinberg College, to join the company. Hernandez brought years of business experience to the team; Farha’s “supercritical activation” technology, developed in the lab of Joseph T. Hupp, professor of chemistry in Weinberg, gave NuMat a unique competitive advantage.

Unlike many successful startups, NuMat hasn’t brought on a seasoned leader; Wilmer (chief technology officer) and Farha (chief scientific officer) spearhead research, while Ebrahim (chief operating officer) and Hernandez (chief executive officer) steer the business end. Wilmer says the partners have grown into their roles. “As we’ve accrued contest winnings, engaged legal counsel, and executed other important business activities, we’ve matured a lot,” he says. “We’re all much more knowledgeable about business and the process by which technology is commercialized.”

In July NuMat logged another achievement: along with Northwestern, the company was part of a team that won $1.5 million in funding for natural gas vehicle technologies from the US Department of Energy Advanced Research Projects Agency–Energy.

The company is a source of pride on campus. “NuMat has set a new benchmark for success among student and faculty startups at the University,” said Farley Center director Michael Marasco. “It’s exciting to see enthusiasm in fields like clean tech that haven’t recently held the same cachet as web app companies. It adds rich diversity to our growing student and alumni portfolio and should encourage future teams to take that first step out of the lab or classroom.”

With one year remaining at McCormick, Wilmer is preparing to defend his dissertation and applying for faculty positions. “I want to help NuMat develop into a large company and see it solve important world problems,” he says, “but my ultimate goal is a professorship. Ultimately I’d like to spin out more companies as a university professor.”
THE 38TH TIME IS THE CHARM

Young entrepreneurs make their share of mistakes—and Mert Iseri (combined studies ’11) and Yuri Malina (integrated science ’12) were no exception. The pair, cofounders of the student group Design for America, have spent three years working on SwipeSense, a hand-sanitizer dispenser that hospital employees can wear on their belts. The goal is to reduce hospital-acquired infections, which kill 90,000 people per year in the United States.

It’s a noble idea, but the execution took some work. Early prototypes were clunky and didn’t work quite right. “One time I met with a potential investor, and he asked if I had a SwipeSense with me,” recalls Iseri. “I said, ‘Yes, I do!’ I handed it over and next thing I knew, it’s leaking all over his pants. He was wiping at it, saying, ‘Is this going to stain?’”

Now, after 38 iterations of SwipeSense, Iseri and Malina have something to be proud of: a sleek, white plastic design with a growing reputation in the medical device community.

SwipeSense got its start at the beach during the 2009 Summer Studio of Design for America, now a nationwide network of interdisciplinary student teams using design to create local and social impact. Partnering with NorthShore University HealthSystem’s Evanston Hospital, a Northwestern Design for America group had observed doctors, nurses, and hospital staff to gain insights about hand-hygiene practices. But the crucial idea came when group members Malina and Iseri took a nighttime break at the Evanston waterfront, and Iseri wiped his sandy hands on his pants. “If you’re a five-year-old on a playground and your hands get dirty, what’s your impulse? You wipe them on your pants,” Malina says. “What if hand washing in a hospital setting were that easy?”

Now, after 38 iterations of SwipeSense, Iseri and Malina have something to be proud of: a sleek, white plastic design with a growing reputation in the medical device community.

Following up on their idea after the Summer Studio ended, Iseri and Malina set off to create the perfect prototype of a device that dispenses hand sanitizer when you swipe your hand across it. They started small, following the “lean methodology” of startup companies developed by Silicon Valley entrepreneur Eric Ries. The business approach relies on scientific experimentation and interaction with customers to meet the demands of the customer base without large upfront funding.

It took 40 hours to make each prototype using computer modeling with Arduino, an open-source electronics prototyping platform; 3D printing; and sanding and gluing. That may seem like a lot of time, but “it would have taken a year to do it 10 years ago,” Malina says. “We never had more than five SwipeSenses at any time,” Iseri adds. “There’s no need to invest in developing something until you have feedback from your customers.”

Meetings with clinicians and hospitals suggested changes, such as a tracking system that uses a wireless Internet connection to track each time the wearer sanitizes his hands; hospital officials could use the data in reports to health officials or in case of lawsuits. Malina and Iseri also nixed the swipe-dispensing motion for a simpler, more reliable push mechanism.

In January SwipeSense was one of 10 health-related startups to receive funding from Healthbox, a division of the Chicago-based new business incubator Sandbox Industries. Malina and Iseri were awarded $50,000 in seed money, as well as business advising, legal assistance, and three months of office space in downtown Chicago. They had the chance to pitch their business to investors at an “investor day.”

Now working in Northwestern’s incubator space in downtown Evanston, Iseri and Malina are raising their first round of funding—$1 million—from a handful of angel investors and venture funds to help bring SwipeSense to hospitals across the country. They are in the midst of their first trial with Northwestern Memorial Hospital: they will spend four weeks monitoring hand-washing practices of nearly 100 nurses to get a baseline before introducing their device for comparison. They plan to conduct pilots at a total of six Chicago-area hospitals to prove the impact of their technology and land their first customers.

“When we actually have the data that says SwipeSense reduces infection, that’s when this is going to really take off,” Malina says. Team SwipeSense has already been contacted by hospitals in the United States, the United Kingdom, the Middle East, and North Africa. “Infection really is a global issue,” Iseri says, “and the way to fix it is hand sanitizing.”
FOR KIDS WITH DIABETES, A BEAR-Y HELPFUL TOOL

Understanding how your body reacts to certain foods can be difficult for an adult, let alone for a four-year-old. Jerry the Bear can help. Created by Hannah Chung (mechanical engineering ’12), Iseri, and Malina as Design for America’s first-ever undertaking, and now owned by Chung and Aaron Horowitz (combined studies, mechatronics and user interaction design ’12), Jerry the mechatronic bear helps teach children how to manage type 1 diabetes. A screen on the bear’s belly shows when his glucose level is low; Jerry perks up when he is fed certain foods or given an insulin shot. He can even make comments such as “I feel great!” and “You’re really good at this!”

In 2009 Jerry the Bear's creators won the “most creative” award in the Diabetes Mine Design Challenge, which asked teams to create new tools for improving life with diabetes. The project really got under way when Horowitz came on board a year later.

Both Chung and Horowitz had personal experiences motivating them: Chung’s father and grandparents have type 2 diabetes, and her grandfather died from hypoglycemia. Diagnosed with a hormone deficiency as a child, Horowitz was subjected to regular shots for years, leaving him sympathetic to the plight of diabetic children and their families.

“When your child has diabetes, you might only get 30 minutes with the doctor, and the lessons you learn there have critical consequences,” Horowitz says. “Behavior changes by building habits, and that's not something that happens in 30 minutes.” Jerry the Bear reinforces the lessons over and over in a fun way.

Today’s Jerry, with a huggable body and toolkit backpack, is the result of three years of trial and error. In the early iterations the bear would tell you and his eyes would droop when he was feeling poorly. The child, whose target age was three to seven, could feed him one type of food to boost his glucose by 10 points or give him a fake insulin injection to lower it. A finger-pricking mechanism was added, allowing the child to test Jerry’s glucose levels. Jerry was trying to do too much. “The toy became too complex,” says Chung. “We had to research and determine what was most important.”

As they refined their product, Chung and Horowitz got a huge boost: the Betaspring business accelerator program, in Providence, Rhode Island, admitted their startup company, Sproutel, last February. Chung and Horowitz, who were halfway through their senior year at McCormick, made arrangements to get credit for the experience and graduate on time. The youngest team in the program, Chung and Horowitz say they offered “youthful idealism” to other participants. They sometimes wore bear pajamas at conferences and during testing sessions with kids.

During their 12 weeks in Providence, Chung and Horowitz practiced pitching their product, met with potential investors, and improved Jerry the Bear. They pared the lessons Jerry imparted down to basics, focusing on the importance of recognizing symptoms and carbohydrate counting. They made the game more fun and educational, developing a 10-level interactive curriculum and adding a variety of food cards for bananas, cereal, and toast, all of which affect Jerry differently. They narrowed the target age to four to seven.

“The original Jerry wasn’t so fun. The entire game was taking care of the bear,” says Horowitz. “Now it’s a level-based game where the goal is to master the skills. In order to beat the game, you have to master the disease.”

Chung and Horowitz are currently working on the eighth iteration of Jerry the Bear, which will feature a touch screen and a link to a mobile application so a parent can monitor a child’s progress. The toy will be manufactured in China, and Horowitz will make his first voyage outside the United States this fall to meet with partners in Hong Kong.

Although the operation remains small and Horowitz says they’re still “mastering the Excel sheet,” there is growth. Orders have started coming in for the $200 bear, and a full launch is planned for summer 2013. In the meantime, Chung and Horowitz are raising a seed round from investors, and the company is eyeing similar products to combat asthma and childhood obesity. Chung was named among the “15 Women to Watch in Tech” by Inc. magazine, and Horowitz was invited to give a talk at TEDx Providence.

There have also been some touching moments for Jerry’s team. At a children’s diabetes conference in Orlando in July, Chung introduced kids to Jerry. A few weeks later, Chung had two envelopes in children’s handwriting in her mailbox, both addressed to Jerry the Bear. Both children “told Jerry they missed him, and they couldn’t wait to see him again,” Chung says. “Moments like those are, without a doubt, the most memorable.”

Sarah Ostman