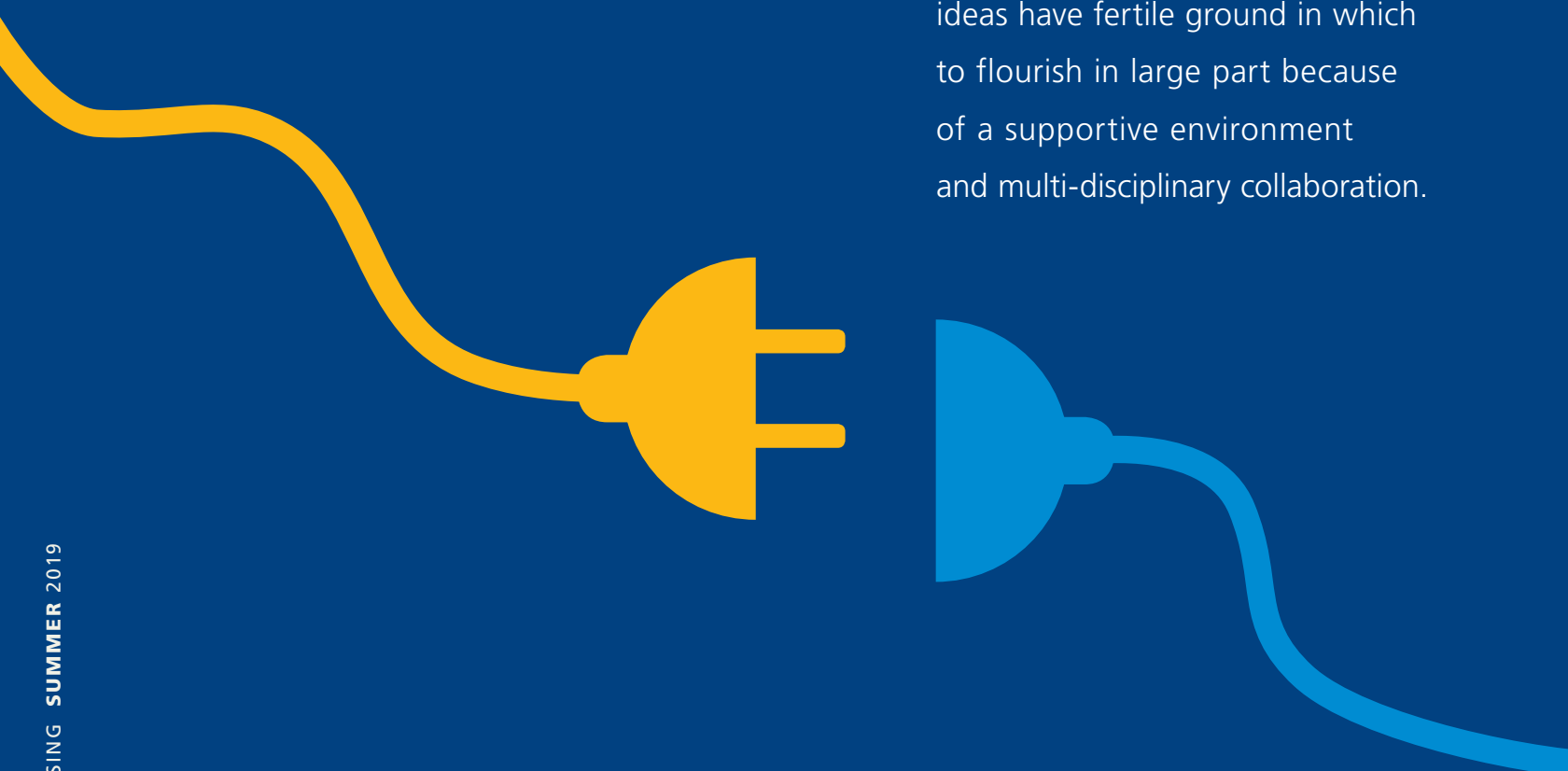


# Powering Innovative Connections

Innovation in nursing happens at multiple levels, but it all starts with an idea. Some ideas are simple and grow from a practical need a nurse might face in clinical care. Other ideas may be more complex, and involve the use of technology or computer algorithms and databases to assist the research of a nurse scientist. In all cases at **Duke School of Nursing (DUSON)**, ideas have fertile ground in which to flourish in large part because of a supportive environment and multi-disciplinary collaboration.



## Health Innovation Lab

Three years ago **Ryan Shaw, PhD'12, RN**, associate professor and Elizabeth C. Clipp Term Chair of Nursing and director of the Duke Health Innovation Lab (HIL) at DUSON, needed a place to test new technology in a clinical environment. He created the HIL to provide structure and a physical home for clinicians, nurses, doctors and even engineers and computer scientists to explore their ideas in a practical setting.

"It's a place to be able to ideate, prototype and test concepts," Shaw said, noting that before the lab, there was a limited support

process to follow through on ideas being generated by nurse faculty and clinicians. "There was no pathway if you did invent something, or you found a new way to deliver care to know what to do next. If your concept was successful, then what did you do? Who could you talk with for advice about whether or not you could move forward with a patent prototyping or feasibility testing in the hospital?"

The HIL, in conjunction with the School's Business Development Office and resources like the Duke Innovation & Entrepreneurship

"It's a place to be able to ideate, prototype and test concepts."

**Ryan Shaw, PhD'12, RN**

*Ryan Shaw, PhD'12, RN, works with ABSN students on TRINA, a collaborative robotics project between the DUSON's Health Innovation Lab and the Pratt School of Engineering*



Marybeth Tetlow, MSN'17 explains her invention, Line Snugglers to Duke University President Vincent E. Price. Line Snugglers was tested and refined through DUSON's Health Innovation Lab.



“It was a simple concept, but it was something that really needed to be shared across the entire hospital and across the country.”

Ryan Shaw, PhD'12, RN

Initiative (Duke I&E), the Office of License and Ventures (OLV) and the Global Digital Health Science Center at Duke, now facilitate that pathway not just for students and faculty at DUSON, but for scholars and practitioners across Duke as well.

The lab helps test viability by assisting with setting up clinical trials of innovative ideas. One such idea, the Line Snuggler, has reached the patent pending stage with Shaw's help. A Duke pediatric nurse, **Marybeth Tetlow, MSN'17**, created a waterproof sleeve to house the multiple lines and tubes that would often get tangled or soiled by young ICU patients. “It was a simple concept, but it was something that really needed to be shared across the entire hospital and across the country,” Shaw said.

Shaw is currently working with **Samuel Fox, E'18**, who is creating an improved bed with special fabric that will help keep inclined patients from sliding down. The device also is a mechanism to help move the patient up

in bed if they do slide, a common problem that can cause complications such as skin abrasions or unnecessary discomfort for patients. (see *Behind the Scrubs*, page 2)

With this concept, nurses came into the HIL to provide the engineer with direct feedback on his idea, so that he could then refine and further test the product.

Collaboration across disciplines, a Duke tradition, becomes important when the innovation moves into other phases of development, Shaw said. “For example, I might point you to the DUSON Business Development Office for additional support, or to Duke I&E or OLV for more advanced business planning or to identify possible funding sources,” he said. Both offices are sources of educational support, such as instructions about the process of how to get a patent, or what it means to license intellectual property.

Through DUSON, the HIL and Duke I&E are currently working to create a graduate certificate in innovation and entrepreneurship, which already exists at the undergraduate level at Duke, that can be offered to nursing students.

“As a campus-wide initiative, Duke I&E helps form relationships that might be more difficult for faculty and those at individual schools to create themselves,” said I&E director **Jon Fjeld, PhD**, who teaches in the Fuqua School of Business and is also executive director of the School’s Center for Entrepreneurship and Innovation.

“The School of Nursing has always seemed very interested in the subject of innovation and entrepreneurship,” Fjeld said, noting that he recently used TAMS, a data-driven teaching management system born at DUSON and part of the School’s business development efforts, that is now used at nearly two-dozen schools nationwide, as a class project in the MBA program.



*Fjeld*

In a similar vein, he hopes to help create a course at DUSON that would bring teams from different schools together to work on focused projects. One such example is the Duke Elder Family/Caregiver Training (DEFT) Center, created by **Cristina Hendrix, DNS, GNP-BC, FNP, FAAN**, associate professor at DUSON that facilitates caregiver training for elderly patients’ post-hospitalization (see story on page 12). Fjeld envisions this innovative program as the type of project that would be useful for students in his course.

“Bringing people from outside nursing into the School of Nursing to help identify problems, imagine solutions and then push those solutions forward—that’s what engagement should look like,” Fjeld said.

Duke I&E also supports the efforts of an annual event, the Innovation Jam, created and managed by the Duke Institute for Health Innovation (DIHI) in which DUSON participates. “[The Innovation Jam] is a way to stimulate enthusiasm for innovation and also identify some early funding and advice for promising projects,” Fjeld said. He is optimistic about what those future projects might be, as DUSON and Duke I&E develop their collaboration. “If we have this conversation in two years, I believe we’ll be talking about lots of exciting things that we’ve done together.”

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**Jon Fjeld, PhD**

“...to help create something that’s potentially more effective, and test those ideas in a research setting.”

**Dori Steinberg, PhD, MS, RD**

### Digital Health

One of DUSON’s largest areas of innovation and collaboration revolves around the trend of digital health and data management. DUSON works closely with Duke’s Global Digital Health Science Center, whose mission includes how best to leverage mobile technologies, and **Dori Steinberg, PhD, MS, RD**, associate professor at DUSON, is associate director of the center. Mobile technologies can be as simple as a website, mobile apps, text messaging or using connective devices like blood pressure cuffs, glucose monitors, and scales, Steinberg said.

“A lot of what our Center is trying to do is to work with the market as it currently is to help create something (with those technologies) that’s potentially more effective, and test those ideas in a research setting,” Steinberg said.

Accessible technology can be a double-edged sword, with endless information that can often be overwhelming and difficult to manage, but at the same time, can also help individuals with their self-care needs. “As technologies become more available, health care is rapidly moving

“At Duke, we want to give our students and faculty opportunities to solve very complex kinds of issues.”

**Marion E. Broome, PhD, RN, FAAN**

into the hands of all types of consumers, said **Marion E. Broome, PhD, RN, FAAN**, DUSON Dean and Ruby F. Wilson Professor of Nursing.

With almost half of the nation’s population suffering from a chronic disease, each person must actively manage their illnesses. As technology evolves, health care professionals may not always fully understand all of the technology patients and families could be using to monitor and improve their health and illnesses, Broome said. “Those people who are developing devices and technology day in and day out are engineers and programmers,” she said. “This is why reaching out to other disciplines is important to nursing innovation, and the reverse can be true as well, for engineers and programmers who are looking for

real-world problems to solve,” she said. “That’s why we have interdisciplinary collaboration, in order to identify those clinical examples,” Broome said. “At Duke, we want to give our students and faculty opportunities to solve very complex kinds of issues. That’s why faculty in other schools here at Duke often come to DUSON.”

Mobile phone apps are a common and excellent way to connect with underserved populations who need help with daily management of their chronic health conditions, such as diabetes, hypertension and obesity. Steinberg has a background in nutrition and her research focuses on using these apps to improve health outcomes.

“(With apps) patients are tracking their steps and they’re tracking their diet,” she says of the population that uses fitness or nutrition apps. “But they don’t know what to do with that information. So the innovation here is that we help those patients make better sense of the data they are collecting and provide them with the support to really make the effective life changes they need to achieve and sustain their results.”

Using a technology platform known as “Prompt” to gather the data from the various personal devices, the Global Digital Health Science Center creates logic algorithms that make use of the data in different ways. For example, a participant who has increased their number of steps they take each day might receive automated text messages congratulating them for their results and encouraging them to continue their progress. Or, if a participant using a diet app that logs a meal that is high in

*Dori Steinberg, PhD, MS, RD, associate professor and associate director of the Duke Global Digital Health Science Center*



fat, the algorithm could offer healthier food options for the next meal in order to better balance the patient's nutrition.

"The innovation is not necessarily the creation of a new tool that can collect your data, but really how to take that data and make it effective for actual change. The next stage is where we can implement that data into systems so it's really useful to patients and their health care providers," she said. Resources like the HIL can help with that process.

"What I'm doing is trying to help the individual better change their behaviors and make the apps they are using more useful to them. We don't necessarily need to make more apps that collect data, we need to do better with the data that we already have."

Beyond proliferation of various apps, another concern for Steinberg is that many health apps aren't approved by the FDA. Currently, there is a push to have more scientists and health care professionals working on the development teams for these new technologies. And while there are certainly areas where new apps and technologies are waiting to be discovered, Steinberg believes a big part of nursing innovation is taking what's already there and launching new ideas from that platform.

The ultimate goal in any health care innovation, no matter how simple or complex, is improved health outcomes for patients. Digital technologies that help patients help themselves, while gathering data for electronic health records so caregivers can access it more effectively, brings the process full circle, Steinberg said. "There's a lot of initiative at Duke to try and do that to help people make sense of the data and to make it easier for the physician or nurse to access it." ■



*Health Innovation Lab Director, Ryan Shaw, PhD'12, RN and Glenn Masty, Project Manager, Duke Health Facility Planning, Design and Construction, review the future home of the Health Innovation Lab housed in the new Interprofessional Education and Care Center building which will be connected to the current School of Nursing.*

MAKE YOUR MARK ON

# Health Innovation

A naming opportunity is available in the new education building, which is scheduled to open this fall.

The Health Innovation Lab will be located on the second floor of the new building and will sit adjacent to the Interprofessional Education space. The lab will serve as the home base for collaborations among students and faculty from DUSON and across Duke as they develop and test new products and innovative ideas.

Alumni and friends have the chance to be a part of these innovations by making a gift to name the lab.

A gift of \$1 million will name the lab and will support research that creates new ideas, innovations, products, procedures, or interventions and health system changes to benefit the health of individuals and populations.

For more information, contact Anita Stallings, associate dean for development and alumni affairs, at (919) 684-8862.