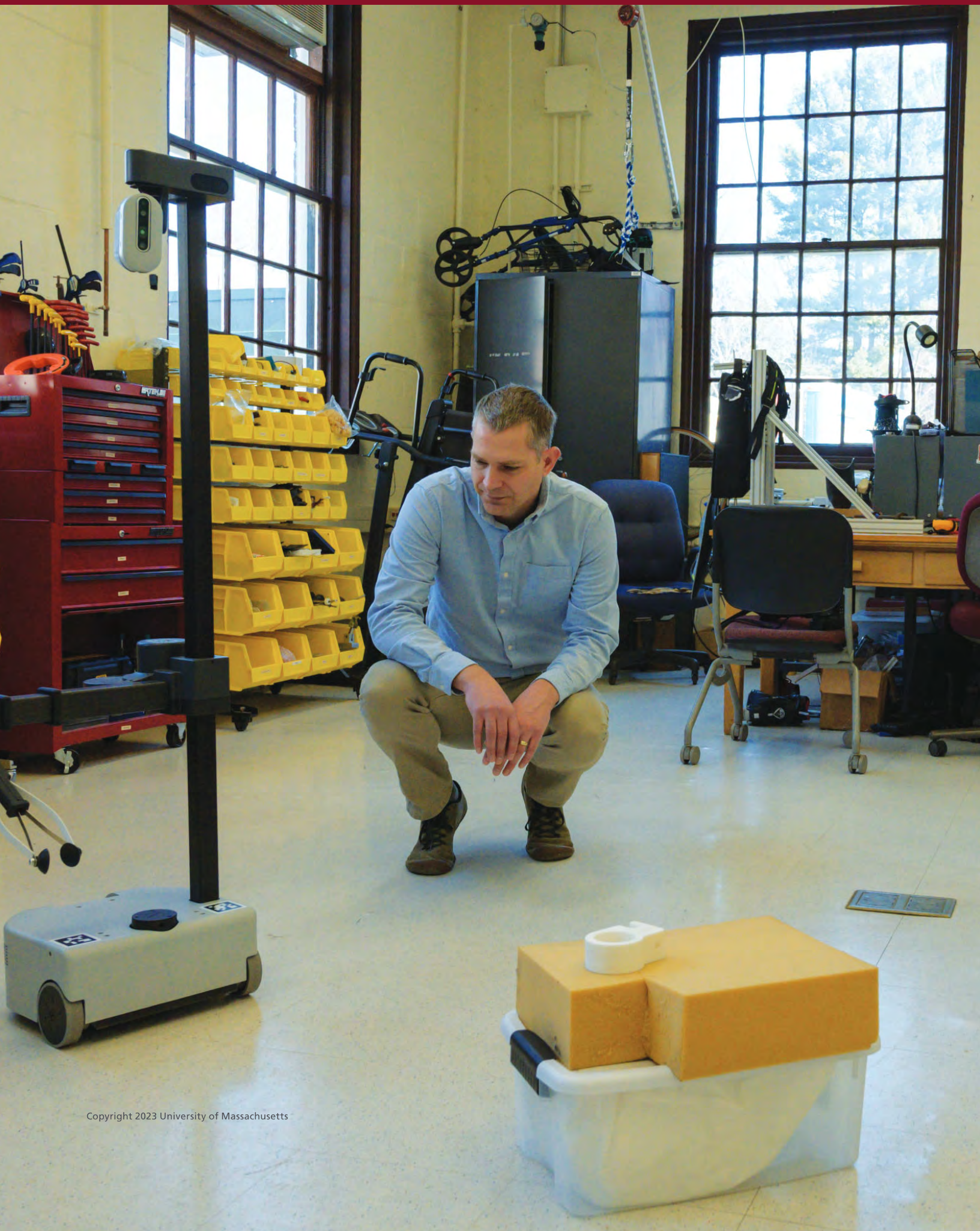
UMassAmherst

Elaine Marieb Center for Nursing and Engineering Innovation

ANNUAL REPORT 2022



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Elaine Marieb Center Annual Report 2022

TABLE OF CONTENTS

Center Co-Director Frank Sup and undergraduate researcher Kathryn Pacheco '22 programming Stretch by Hello Robot to grasp objects as part of a project to evaluate robot assistants for nurses

Photo by: Jon Crispin

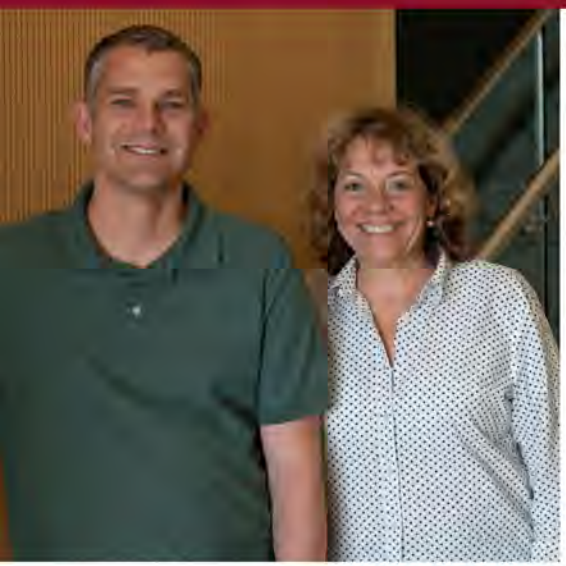


Photo by: Jon Crispin

Letter from the Center Co-directors

> "Empowering students with hands-on experiences in collaborative research is at the heart of the Center's commitment to nurturing the next generation of healthcare innovators."

The purpose of the Elaine Marieb Center for Nursing and Engineering Innovation (founded in 2021) is to support formal, ongoing, and deliberate collaborations between the fields of nursing and engineering. Our goal is to provide the next generation of nurse-engineer teams with the innovative skills needed to forge new frontiers in healthcare.

In 2022, the Center was successful in accomplishing several of our collaborative project goals and disseminating the results. Examples include multiple conference presentations, collaboration with the Institute for Safe Medication Practices (ISMP) and independent healthcare technology authority ECRI, the First Annual Symposium, and the Center Pilot Awards.

In addition to fostering interdisciplinary partnerships, the Center provides undergraduate and graduate students with hands-on experience in product development. There is private laboratory space for the Center in the Institute for Applied Life Sciences (IALS) that provides a quiet place for students to work. There is also space in the IALS open laboratory that supports research and product testing, as well as seamless interdisciplinary collaboration. These resources provide students with the practical skills and experience needed to prepare them to be leaders in healthcare innovation.

We have also expanded our interdisciplinary collaboration across campus through participation in the IALS Undergraduate Core Summer Internship Program. Our nurse-engineer summer internship teams worked on projects including IV smart pumps, a more patient-friendly bedpan, and robotics in nursing.

The Center has provided financial resources for nursing and engineering innovation. This includes supporting graduate fellowships, seed funding for research and development pilot projects, and the First Annual Symposium.

Our work as co-directors of this new Center draws upon our collective experiences working in critical care nursing, human factors, academic research, and industry medical device development. This Center reflects our collective passion for promoting interdisciplinary partnerships and fostering innovative mindsets. We are honored to be a part of the foundation of this Center and are eager to continue to support the projects that our students, faculty, and partners create.

This annual report provides an overview of the Center, highlights our achievements, and showcases the amazing work of our student-faculty teams. We will continue to actively develop the Center's infrastructure and capabilities and are proud of what we have accomplished so far.

Sincerely,

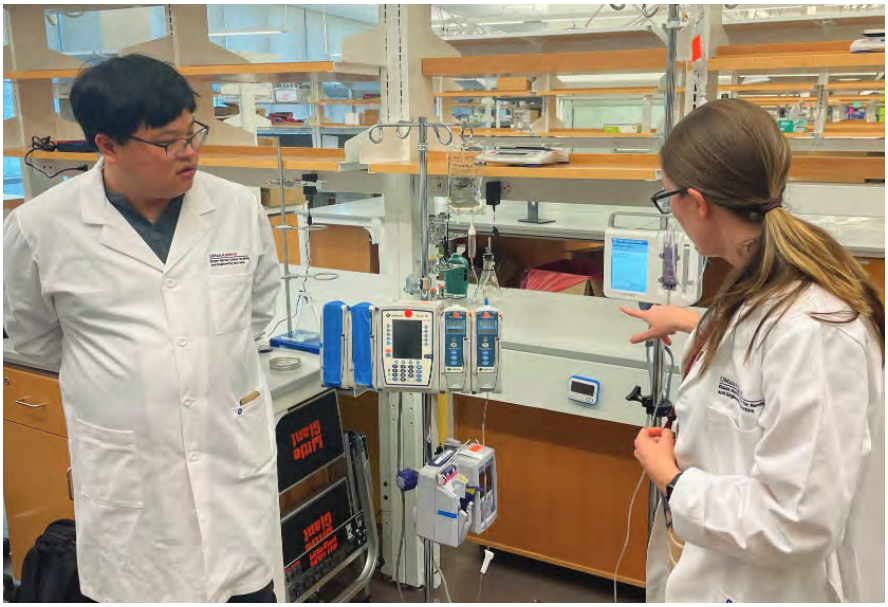
Karen K. Giuliano

Frank C. Sup IV

Dr. Karen Giuliano

Dr. Frank Sup

Our Vision



The Elaine Marieb Center for Nursing and Engineering Innovation supports Nurse-Engineer partnerships to tackle everyday healthcare problems. Nurses touch more products and are part of more services than any other healthcare professional, making them the ideal clinicians to address everyday problems in healthcare.

However, unlike engineers, too often nurses are not empowered to innovate and do not always see themselves as having the ability, the support, or the power to lead. Most engineers, while tasked with innovation, are often unfamiliar with healthcare at the operational level. The ability to quickly and effectively develop and test healthcare innovations requires both nursing and engineering skill sets. The Center harnesses the strengths of both disciplines to facilitate rapid and meaningful improvements in healthcare.

The Center is designed to prepare nursing and engineering students to lead in healthcare innovation through clinical, academic and industry collaborations. We hope the Center will serve as a model for other universities and institutions ready to advance innovation and entrepreneurship.

above: Seonhun Lee, MS, graduate researcher and PhD candidate, and Jeannine Blake, PhD RN

Center Co-Directors Frank Sup, PhD, and Karen Giuliano, PhD RN; with Nicole Anderson, RN MBA; and Gregory Thomas, MBA, planning the Elaine Marieb Center's mission

Photo by: Jon Crispin

The Mission

> "The ability to quickly and effectively tackle everyday challenges in healthcare requires both nursing and engineering expertise."

Untap the unique insights of nurses and engineers to address healthcare challenges at the forefront of patient care

Forge new pathways in interdisciplinary research and education to create an open forum for sharing and learning

Empower nurses and engineers to lead healthcare innovation for a healthier and more equitable future

The Nurse-Engineer Approach is a powerful, integrated, real-time collaboration aiming to identify healthcare problems, iterate potential solutions, evaluate outcomes, and balance trade-offs to optimize system performance and patient care.

Center Achievements

In 2022, The Elaine Marieb Center for Nursing and Engineering Innovation made significant progress in the development of operational infrastructure and in support for our research and innovation activities.

Center Infrastructure Development

- The Center began to lay the groundwork for key operational, budgetary, and marketing infrastructure
- Developed short-term budgets and completed a five year financial plan
- Completed the design and launch of a website with an outside vendor
- Initiated our founding group of affiliated interdisciplinary faculty from across UMass
- Began the development of a clinician database to assist us with product development and usability projects
- Established our initial group of industry partners
- Established LSL 670B for the Center Product Usability Lab with a 3-year agreement with IALS
- Established additional lab space in the 5th floor IALS open laboratory for product testing and other Center research activities

Research and Innovation

- Engaged both graduate and undergraduate nursing and engineering students in Center activities and projects
- Held the First Annual Symposium on September 13th which was attended by over 200 participants from both within and outside of UMass, including our industry partners
- Supported student and faculty members in initiating their own projects
- Supported 3 undergraduate honors thesis projects and the work of three doctoral students
- Developed a research relationship with the Baystate Medical Center Nursing Science team to enable collaborative projects and studies
- Presented the IV smart pump research program to the internationally renowned ISMP/ECRI, and were invited to advise ECRI on their current IV smart pump testing standards
- In the first Center Pilot Award Updates, a select group of UMass Nursing and Engineering faculty gathered to network, introduce their collaborative nurse-engineer research, and hear presentations from the Pilot Awardees on the progress of their projects
- Awarded an IALS-Manning Grant to a nurse-engineer team to support the development of a product which we expect to patent

> “The first annual symposium of the Elaine Marieb Center for Nursing and Engineering provided new ways to collaborate and solve healthcare problems, and the energy in the room was amazing. I enjoyed hearing about the groundbreaking future projects.”
>
> Marie Rohan ’74, College of Nursing Alumna

Shiyang Wang ’22 and Liujian Mao ’22 in conversation with College of Nursing Alumna Marie Rohan ’74 during the 2022 Center Symposium

Photo by: Jon Crispin

The First Annual Symposium | September 2022

Photos by: Jon Crispin

On September 13th, 2022, the Elaine Marieb Center for Nursing and Engineering Innovation held its First Annual Symposium. In attendance were UMass Amherst students, staff, and faculty from the College of Nursing and the College of Engineering, as well as industry experts and academics from across the nation. The audience participated in a panel discussion and listened to talks given by the Center co-directors, Dr. Karen Giuliano and Dr. Frank Sup, Massachusetts State Senator Jo Comerford, and Baystate Medical Center's Chief Nursing Officer Joanne Miller DNP RN, the afternoon keynote speaker. Dr. Miller gave an inspirational talk about the healthcare challenges that hospitals must balance and navigate, examples of the creative approaches that have been used at Baystate, and the value of nurse-engineer teams for addressing problems in healthcare. Also, from Baystate Health, Nurse Scientist Cidalia Vital, PhD RN shared her perspectives as part of the IV smart pump panel.

The focus of the symposium was cutting-edge healthcare innovation fueled by the excitement of Nurse-Engineer collaboration. Throughout the day, the Elaine Marieb Center's Pilot Project Award recipients and others discussed their research in a poster review session; projects included non-contact, pain-monitoring devices for adults, and hand-held tablets to assist with lifestyle changes for people who suffer from osteoarthritis. The panel discussions offered insights into challenges that participants have encountered throughout their careers. For example, engineers were frequently tasked with opposing constraints while designing products for broad-based international use. Nurses often had to bypass instruction manuals for products due to severe time limitations. These challenges ultimately led to solutions in the form of innovative products and techniques that simplified the lives of both patient and end-user nurses.

The Nurse-Engineer panel was led by Mike Ackerman, PhD RN, Director of Ohio State University's Master of Healthcare Innovation. Other guests included Sangeeta Agarawal, PhD RN and CEO/founder of HelpsyHealth, a non-profit foundation and app for people who have been diagnosed with cancer. The holistic app includes an AI chatbot and access to expert case managers, navigators, nutritionists, and psychotherapists. Since its inception, HelpsyHealth has seen a significant improvement in symptoms, quality of life, and cost savings to the patient (about 40% of cancer patients go bankrupt within their first two years of treatment). Sangeeta exemplifies the Nurse-Engineer role by using her combined expertise in nursing and computer science to improve patient care.

top, clockwise: Hari Balasubramanian, PhD; Ellen Benjamin, RN; Erik Andersen, MS RN; Mike Ackerman, PhD RN; Yeonsik Nok, PhD; Sangeeta Agarawal, PhD RN; and Elizabeth Sayles, RN preparing for the Nurse-Engineer panel session

left to right: Yeonsik Noh, PhD; the Nurse-Engineer Panel; Sangeeta Agarawal, PhD RN; and Joanne Miller, RN.


Yeonsik
Noh

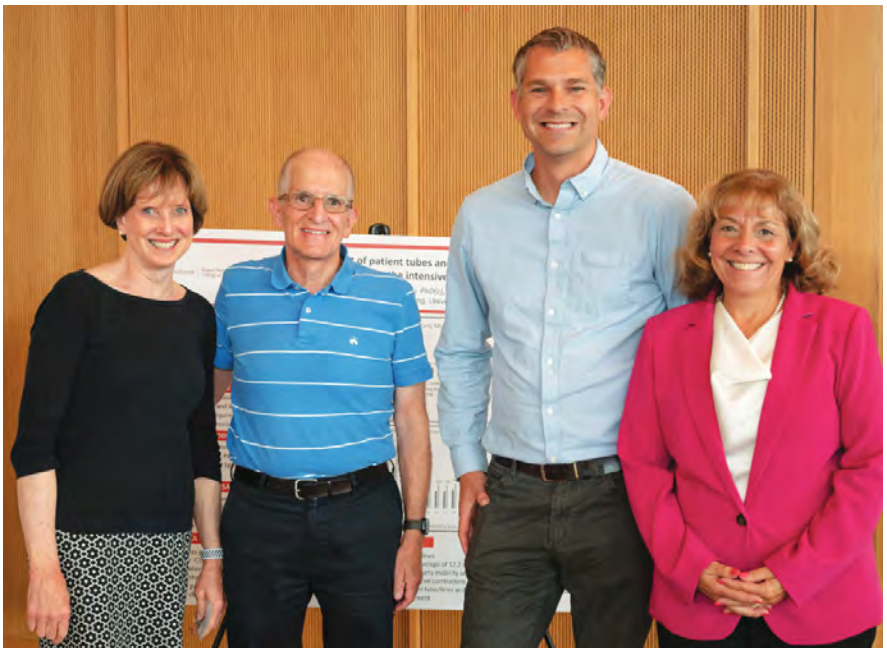
top to bottom: Govind Srimathveeravalli, PhD; Karen Giuliano, PhD RN with Steve Weisner, PhD of Nihon Kihoden; Neal Wiggerman of Baxter International seated with Girish Ganghadaran, PhD of Spacelabs

right: Teresa Hluchyj '77 and Michael Hluchyj '76 (donors of original Center seed gift) with Dr. Sup and Dr. Giuliano

Photos by: Jon Crispin

The Industry-Academics Partnerships Panel was led by UMass's own Govind Srimathveeravalli, PhD, a Mechanical and Industrial Engineering Assistant Professor and Elaine Marieb Center affiliated faculty member. Panelists discussed the importance of keeping open lines of communication between industry and academia. Neal Wiggerman, PhD and research scientist in Human Factors and Ergonomics at Baxter International, is an engineer who works with nurses to make the design of medical products as efficient and effective as possible. He discussed the use of ethnographic research, called immersion at Baxter, in which over five hundred hours were spent shadowing nurses while designing Baxter's latest hospital bed. "Nurses are serial problem-solvers," stated Dr. Wiggerman. "They Macgyver things, but the engineers have the luxury of looking at the system level. I think the two work together very well. The nurse is always the patient advocate, so having a nurse on your design team throughout the process is very important." Dr. Giuliano discussed her IV Smart Pump research program, and Dr. Sup reviewed his team's research on robot assistants for nurses in hospitals. Other topics introduced by the day's speakers included two-handled cups designed for adults with dysphagia (difficulty swallowing) and tranquility rooms in which nurses can relax, enjoy aromatherapy, and refocus during hectic and sometimes very stressful days.

The Annual Symposium highlighted the concept of the Nurse-Engineer and introduced our mission of untapping, forging, and empowering innovative healthcare solutions as a result of collaboration between nurses and engineers throughout the research and design process.



Jeannine Blake, PhD, and Dr. Karen Giuliano, PhD RN presented to patient safety organizations

Institute for Safe Medication Practices (ISMP) and ECRI

In July 2022, Dr. Karen Giuliano and Dr. Jeannine Blake were invited to travel to Philadelphia to present their research to a group of leaders from ISMP and ECRI, two patient safety organizations who have recently merged. For over 30 years, ISMP has been a global leader in patient safety as the first non-profit organization dedicated to the promotion of safe medication practices. ECRI is well-known for conducting independent evaluations on the effectiveness of medical devices. ECRI evaluations are used by hospitals and other healthcare institutions to assist in making decisions regarding the selection, purchase, and use of medical instruments, equipment, and systems. Since sharing their research, Giuliano and Blake have been invited to advise ECRI on their current IV smart pump testing standards, which form the basis for ECRI product recommendations. Data generated from their program of IV smart pump research out of the Elaine Marieb Center for Nursing and Engineering Innovation has provided knowledge that will be used to inform revisions in current ECRI testing standards for IV smart pumps by adding clinically relevant setups to their test protocol. This is an important change, as it will provide hospitals with additional evidence-based data upon which to make their IV smart pump purchasing decisions.

Jeannine Blake Receives American Society for Engineering Education Fellowship

Jeannine Blake, PhD RN, a researcher in the lab of Assistant Professor Juan Jiménez of the Mechanical and Industrial Engineering (MIE) Department at UMass Amherst, has received a prestigious eFellows award from the American Society for Engineering Education (ASEE). The eFellows program awards early-career PhD researchers a university-based two-year fellowship with an annual salary. Dr. Blake's award will support her research to improve the safety of intravenous (IV) smart pumps by addressing usability issues and related flow-rate inaccuracy. As a critical care nurse, Dr. Blake cared for many patients whose complex care required multiple concurrent infusions alongside many other high-risk treatments, all of which were managed by her as the nurse. Accurate delivery is extremely important for patient safety, and data support that current practices are associated with a high degree of IV medication error. The delivery of IV medication is one of the highest-risk interventions in U.S. acute care, with an estimated 500,000 hospitalized patients harmed annually by preventable medication errors. Dr. Blake states, "Our central hypothesis is that clinically relevant setup practices of IV Smart Pump systems result in high rates of flow-rate inaccuracy and alterations in IV smart pump pressure outputs. We expect these errors can be ameliorated through human factors and engineering design principles."

Samvit Pisal '22 BSN

Elaine Marieb Center Honor Students

The UMass Honors program allows undergraduate students to conduct in-depth individual research projects. In the College of Nursing, honors student Samvit Pisal '22 BSN collaborated with senior mechanical engineering students to create and deliver a customized wheelchair for a child receiving in-home care. Samvit and the team used their understanding of the evolution of wheelchairs to design and develop a unique device quickly and efficiently. Joshua Zelikman '23, also a nursing honors student, studied nurses' perceptions of robots in healthcare. He found that nurses believe robots can be beneficial in reducing their workload by performing routine tasks but have concerns about patient perceptions and the training required to work alongside and with robotic systems effectively. His work highlights the need for future robotics development to focus on the requirements of nurses and patients, including adequate training for nurses. Avery Minkin '23, a mechanical engineering honors student, is using motion capture technology to assess how nurses' physical movements can impact their work's effectiveness. Avery aims to gather data from nursing students using cameras and wearable motion trackers to improve nurse training programs. Specifically, Avery is focusing on injections, using the technology to provide feedback to nurses on their technique.

Healthcare Heroes Award

The Elaine Marieb Center for Nursing and Engineering Innovation received the 2022 BusinessWest Healthcare Heroes award in honor of the Center's innovative and collaborative Nurse-Engineer work. They noted co-director Dr. Karen Giuliano's IV Smart Pump research program and co-director Dr. Sup's exploration into the use of robotics to assist nurses in the hospital environment. Peter Reinhart PhD, director of the Institute for Applied Life Sciences (IALS) introduced Dr. Sup and Dr. Giuliano at the BusinessWest Awards Banquet, which was held on October 27th at the Log Cabin in Holyoke, Massachusetts. Like the Elaine Marieb Center, IALS is dedicated to translating groundbreaking research into innovative healthcare products, technologies, and services. States BusinessWest, "Better research resulting in better patient care is the goal, whether it's IV pumps, robotics at the hospital bedside, or any number of other ongoing projects at the Center, from cloud-based home-healthcare monitoring to wearable sensors that record body movement to access chronic pain. [The] Center is not only generating some impressive outcomes, but is paving a new way for diverse minds to collaborate and improve the patient experience across the globe."

top left: Memnun Seven, PhD RN; Karen Giuliano, PhD RN; Frank Sup, PhD; and Peter Reinhart, PhD at the Healthcare Heroes awards ceremony

top right: Karen Giuliano, PhD RN accepting the Healthcare Hero award with Frank Sup, PhD

Photos by: Jon Crispin

Center Pilot Award Updates

On December 8th, the Elaine Marieb Center for Nursing and Engineering Innovation's most recent Pilot Award recipients met at the Institute for Applied Life Sciences conference center on the UMass Amherst campus to share updates on their collaborative research projects. Faculty from the College of Nursing and the College of Engineering were invited to learn more and promote further collaborations between the two colleges – and to introduce themselves and their research foci at the event. Juan Jiménez, PhD presented his team's research into IV Smart pumps, safety standards, and flow rate inaccuracy. His team is working on a new product that would mitigate factors known to cause inaccuracy, which can have unwelcome effects on patient care. Joohyun Chung, PhD RN, and Xian Du, PhD discussed their team's plans for and research into unobtrusive and easily wearable pain-monitoring devices for adults with Alzheimer's disease and related dementias, who often suffer from chronic pain without being able to communicate their symptoms. These devices will ensure that their pain does not go unnoticed and unresolved by those responsible for their care. Yeonsik Noh, PhD reviewed his team's cloud-based home healthcare platform, which monitors factors such as electrocardiogram and electromyogram, heart rate, respiration, and temperature. The platform's cloud-based nature makes it easily scalable, enabling healthcare providers to remotely monitor a large number of patients in their own homes and respond accordingly. Jeungok Choi, PhD RN, and her team studied the use of tablets with a video conferencing tool to encourage lifestyle changes in older Chinese adults suffering from osteoarthritis. Their findings determined that tablets, combined with culturally sensitive awareness, are highly effective in ensuring long-term adherence to lifestyle changes that ordinarily fail to be consistent.

top: Juan Jiménez, PhD discussing the IV smart pump at the symposium

above: University of Massachusetts Graduate Cidalia Vital, PhD, RN, Nurse Scientist at Baystate Medical Center, and Joanne Miller, DNP, RN, NEA-BC, Chief Nurse Executive Baystate Health and Chief Nursing Officer Baystate Medical Center

Photos by: Jon Crispin

Baystate Health Collaboration

The Center is delighted to announce our formal interdisciplinary collaboration with Baystate Health. This collaboration is important for improving patient care because it will help our Center bring healthcare innovation from our laboratories at the University of Massachusetts Amherst to the point of patient care at Baystate. Center Co-Directors Frank Sup and Karen Giuliano are working closely with Baystate Medical Center (BMC) Nurse Scientist Dr. Cidalia Vital and additional BMC staff on several active research projects. Examples include a survey of practicing nurses on their perceptions of healthcare robotics funded by UMass, a study on flow rate accuracy of IV smart pumps during actual clinical use funded by a Baystate Health Learning Health Systems Award, and a group of UMass engineering Capstone students are working with BMC and using a systems approach to study the problem of patient falls. In another project, Baystate Health human resources Vice President of Operations Patricia Samra and UMass engineering faculty Dr. Hari Balasubramanian are working on a big data project designed to optimize staff nurse satisfaction and retention.

And in the summer of 2023, IALS undergraduate nurse-engineer teams will work at BMC on real-world clinical issues, including safe patient handling, medication dispensing safety and efficiency, pressure injury in critical care, patient mobility, and additional work on IV smart pump flow rate accuracy.

We are excited to combine the expertise of our Center with Baystate Health — our collaboration will enable us to bring improvements to the front lines of care as quickly as possible.

CORE Summer Internship

This past summer was the first time the Center took part in the IALS CORE summer internship program. Four Center undergraduates participated in a paid opportunity at the UMass Institute for Applied Life Sciences. The Elaine Marieb Center's team of four research interns (Valerie Casimir '25, Braedon Feddersen '23, Anushree Patil '24, and Jessica Smith '23) focused on three primary projects: a more accurate IV smart pump, an improved bedpan for patient comfort, and robots as assistants to nurses. Gina Georgadarellis, MS; and Seonhun Lee, MS, served as graduate student advisors. With direct supervision from Jeannine Blake, PhD RN; Frank Sup, PhD; and Karen Giuliano, PhD RN, the students gained experience in and an appreciation for interdisciplinary research. The nursing students benefitted from the engineering perspective and the engineering students from the nursing perspective. Says Anushree, "We had many interesting discussions about what any technical solution might do for patients at the point-of-care." In particular, she found that the interdisciplinary collaboration facilitated detail orientation, stating "It's really good for precision." She noted that having a nursing perspective has saved time and unnecessary effort. In addition to the project and laboratory experience, interns also engaged in the development of 'Soft Skills for the Workplace' training, introduction to entrepreneurship, presentation, publication and networking opportunities, job search training, and group time and interaction with interns from all the IALS sponsoring labs.

CORE Summer Interns Braedon Feddersen '23, Valerie Casimir '25, Anushree Patil '24 and Jessica Smith '23 at the IALS Summer Intern Conference

Photo by: Jon Crispin

Valerie Casimir ’25 and Jessica Smith ’23 practice with a robot assistant to assess a simulated patient

Photo by: Jon Crispin

Center Faculty, Staff, and Students

AFFILIATED FACULTY

Hari Balasubramanian, PhD
Associate Professor
Dept. of Mechanical and Industrial Engineering

Professor Balasubramanian is a recipient of the National Science Foundation's CAREER award who has collaborated with Massachusetts General Hospital, Baystate Medical Center of Springfield, MA, and the University of Massachusetts Medical School of Worcester, MA. His research includes mathematical modeling applied to healthcare in order to improve patient flow and reduce patient delays in outpatient, inpatient, and emergency room settings.

AFFILIATED FACULTY

Carrie-Ellen Briere, PhD RN
Assistant Professor
Elaine Marieb College of Nursing

Professor Briere is a neonatal nurse who focuses on the biology of human milk and its involvement with infant health, growth, and development. The Briere Human Milk Research Laboratory analyzes the milk's bioactive components and seeks to understand how they interact within a biological systems perspective in order to improve infant health. Dr. Briere's research includes the investigation of milk delivery, especially with regard to preterm and ill neonates.

AFFILIATED FACULTY

Muge Capan, PhD
Assistant Professor
Dept. of Mechanical and Industrial Engineering

Professor Capan's research focuses on data science, statistical analysis, and decision modeling in healthcare to develop smart and connected clinical decision support systems. Examples of her work include developing stochastic models to identify optimal treatment policies, utilizing clinicians' perceptions in clinical risk display decisions, and evaluating rapid response interventions using quantitative risk scoring systems enhanced by nursing insights.

AFFILIATED FACULTY

Jeungok Choi, PhD RN
Associate Professor
Elaine Marieb College of Nursing

Professor Choi seeks ways to improve healthcare communication for people with low literacy skills. Her research has determined that appropriate pictographs (simple line drawings) alongside simplified text can improve cognitive learning processes and enhance engagement in deeper understanding. In particular, tablet and web-based pictograph images and text have proven effective for low- literacy older adults with hip replacement surgery.

AFFILIATED FACULTY

Joohyun Chung, PhD RN
Assistant Professor
Elaine Marieb College of Nursing

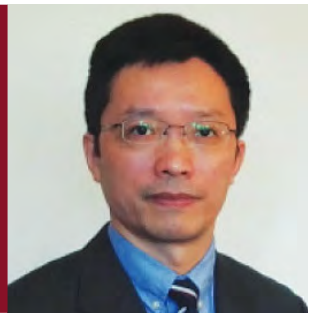
Professor Chung's research includes nursing informatics, machine learning, biostatistics, extensive experience with big data, and the design of nursing research itself (including research instruments). Recently, she has been working on unstructured data in nursing documentation from the electronic health record system using natural language processing.

AFFILIATED FACULTY

Tracey Cobb, RN
Clinical Instructor
Elaine Marieb College of Nursing

Professor Cobb has practiced in a variety of settings and institutions and has extensive experience in pediatric nursing. Her background includes adult medical/surgical, inpatient psychiatric, and pediatric care. Her areas of interest include the interplay of nursing and engineering, robotics in patient care, family and child development, and palliative care.

AFFILIATED FACULTY



Xian Du, PhD
Assistant Professor
Dept. of Mechanical and Industrial Engineering

Professor Du's research focuses on the scale up of flexible electronics printing processes from lab to industry using high-precision in-line inspection and pattern recognition technologies for large surface quality control. He also works on automatic, high-resolution, accurate, and robust imaging tools for medical devices for noninvasive detection and description of biomarkers.

AFFILIATED FACULTY

Chaitra Gopalappa, PhD
Associate Professor
Dept. of Mechanical and Industrial Engineering

Professor Gopalappa's research focuses on developing mathematical and computational models necessary for capturing the interactions between multiple interrelated diseases and social determinants of health, with the goal being disease prediction, prevention, and effective control analyses. Outside collaborators include the US Centers for Disease Control and Prevention, the World Health Organization, and the International Agency for Research on Cancer.

Center Faculty, Staff, and Students

AFFILIATED FACULTY

Cynthia Jacelon, PhD, RN-BC
Associate Dean of Research, Professor Emerita
Elaine Marieb College of Nursing

Dean Jacelon was a rehabilitation clinical specialist for many years, focusing on promoting function in older individuals. As a Fellow of both the American Academy of Nursing and the Gerontological Society of America, she held numerous leadership roles within the profession, including President of the Association of Rehabilitation Nurses, Director of the PhD program, and Executive Dean at the UMASS College of Nursing. She is currently the Associate Dean of Research at the College of Nursing.

AFFILIATED FACULTY

Juan Jiménez, PhD
Assistant Professor
Dept. of Mechanical and Industrial Engineering

Professor Jiménez is a recipient of the Graduate Education for Minorities Fellowship, Ruth L. Kirschstein National Research Service Award, the National Institutes of Health K25 Mentored Quantitative Research Career Development award, the National Science Foundation CAREER award, and the Biomedical Engineering Society Innovation and Career Development Award. His current research focuses on experimental cardiovascular biomedicine as well as biomedical implantable devices; past research includes turbulence and the conduction of the highest Reynolds number wake measurements ever recorded.

AFFILIATED FACULTY

Ravi Karkar, PhD
Assistant Professor
Manning College of Information and Computer Sciences

Professor Karkar's research foci include designing, developing, and evaluating tools that enable people to gather data and interpret personal aspects of their medical condition in the context of their day-to-day lives, taking the research from lab studies into the hands of individuals in need. His work creates opportunities for individualized interventions that can be more effective and appropriate than one-size-fits-all population-based interventions. He collaborates closely with clinical researchers to build targeted tools to support patients in better understanding and managing chronic conditions.

AFFILIATED FACULTY

Raenn LeBlanc, PhD DNP
Associate Clinical Professor
Elaine Marieb College of Nursing

Professor LeBlanc is a clinical practitioner in gerontological nursing and palliative care, researcher, and personal caregiver. Their research includes the impact of social processes on health outcomes and equity as well as the design of equitable and accessible technologies. In addition, they have collaborated with engineering teams that address personal health monitoring technologies. They hold the Seedworks Endowed Associate Clinical Professorship of Social Justice in Nursing at the Elaine Marieb College of Nursing.

AFFILIATED FACULTY

Yeonsik Noh, PhD
Assistant Professor (joint position)
Dept. of Electrical and Computer Engineering
Elaine Marieb College of Nursing

Professor Noh's research utilizes the Nurse-Engineer approach to proper disease and symptom management and therapy, including the development of wearable health-monitoring devices and personalized healthcare in daily life. His latest research focuses on the development of underwater biometric devices by using polymer electrodes as the basis for a body sensor network; this research will contribute to monitoring and analyzing bio-related parameter during aquatic activity.

AFFILIATED FACULTY

Shannon C. Roberts, PhD
Assistant Professor
Dept. of Mechanical and Industrial Engineering

Dr. Roberts is the co-director of the Human Performance Laboratory. She received her PhD and MS in Industrial Engineering from the University of Wisconsin–Madison and her BS in Mechanical Engineering from MIT. Dr. Roberts is a trained Human Factors engineer with experience studying and evaluating the interaction between humans and systems with a focus on improving safety.

AFFILIATED FACULTY

Govind Srimathveeravalli, PhD
Assistant Professor
Dept. of Mechanical and Industrial Engineering

Professor Srimathveeravalli's research group studies multi-scale biological response to electromagnetic fields, leveraging knowledge gained from applications in tumor ablation, immunotherapy, tissue engineering and drug delivery. His group has yielded two patents and 50 peer-reviewed publications and is supported by grants from the National Institutes of Health, Department of Defense Congressionally Directed Medical Research Program, and others. In addition, Dr. Srimathveeravalli has served as a consultant for multiple medical device companies.

AFFILIATED FACULTY

Gregory Thomas, MBA
Executive Director
Berthiaume Center for Entrepreneurship

Director Thomas's work at the Berthiaume Center promotes entrepreneurial engagement and innovation within the UMASS Amherst community. He teaches courses in entrepreneurship and works with constituents on campus (as well as throughout the Commonwealth) to develop and execute partnerships. A 33rd degree Mason, Shriner, and active member of Kappa Alpha Psi and Sigma Pi Phi, Gregory also serves on many community and industry boards, local and global advisory councils, and is an adjunct instructor at the Massachusetts Institute of Technology's National Science Foundation sponsored Innovation Corps Program.

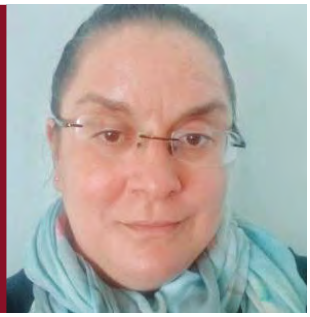
Center Faculty, Staff, and Students

AFFILIATED FACULTY

Karen Utgoff, MBA
Director
I-Corps at UMass Amherst
Director
Venture Development at the Institute for Applied Life Sciences

Director Utgoff helps UMASS researchers translate their knowledge, discoveries, and inventions into product concepts with the potential to improve human health and well-being. In addition to her roles at UMASS, she is an adjunct instructor in the New England Regional Innovation Node Spark Program at the Massachusetts Institute of Technology and the National Science Foundation's National I-Corps Teams Program. She is also a long-time volunteer forMassChallenge and the Cleantech Open Northeast.

STAFF



Genevieve Sawyer, BA AOS
Center Coordinator

With a background in freelance food writing, professional baking, and sociology, Genevieve appreciates innovative approaches to nursing and engineering. Previously Academic Department Coordinator for Amherst College's Film and Media Studies (FAMS) and Grants programs, she now works behind the scenes as the Center Coordinator to keep the Center on track in all of its processes. She is pleased to see nurses take on a more critical and collaborative role in research and product development with their engineering colleagues.

POSTDOCTORAL FELLOW

Jeannine Blake, PhD RN
Postdoctoral Fellow

Dr. Blake is a nurse scientist with a background in biochemistry and critical care nursing, who received her PhD in 2022 from the Elaine Marieb College of Nursing at UMass Amherst. She is currently a Post-Doctoral Research fellow at the Elaine Marieb Center for Nursing and Engineering Innovation and the Department of Mechanical and Industrial Engineering. Her mission is to improve patient outcomes and nursing workflow by disrupting the status quo using innovative research methods and device development strategies. Jeannine's research focuses on the safety of intravenous smart pumps through the study of fluid flow accuracy and usability.

GRADUATE STUDENT

Nicole Anderson, RN MBA
Business Innovation Fellow

With an MBA from the UMass Isenberg School of Business, a 19-year clinical background in critical care nursing, and experience in medical product development, Nicole is passionate about innovation to improve patient outcomes, workflow efficiency, and nursing satisfaction. She has a deep interest in nurse-engineer collaboration and was a Business Innovation Fellow at the Center throughout 2022.

GRADUATE STUDENT

Ellen Benjamin, RN
Graduate Student Researcher

Ellen is a registered nurse and doctoral candidate in her fourth year at the Elaine Marieb College of Nursing, UMass Amherst. She has 8 years of clinical experience as an emergency department nurse at Baystate Medical Center and studies emergency patient flow management. Ellen's research applies qualitative methodologies to bring understanding to the complexities of patient flow processes and the hidden work of emergency nurses.

GRADUATE STUDENT

Gina Georgadarellis, MS
Graduate Student Researcher

Gina is a doctoral candidate in the Department of Mechanical and Industrial Engineering at the University of Massachusetts Amherst. She joined the Mechatronics and Robotics Research Lab in 2021 and is working with the Elaine Marieb Center for Nursing and Engineering Innovation. Her project focuses on the usability and perception of robotic technology within the clinical setting.

GRADUATE STUDENT

Seonhun (Hoon) Lee, MS
Graduate Student Researcher

Seonhun is a doctoral candidate in the Department of Mechanical and Industrial Engineering at the University of Massachusetts Amherst. Specializing in robotics research at the Center, Hoon works on functionality to discover what robots in hospitals will be able to accomplish as nurse assistants. He has found that collaborating with nurses provides him with a fresh perspective on how to work with the functionality of robots.

UNDERGRADUATE STUDENT

Joseph Berthiaume '23
Program Assistant

Joe is a Communications Major at the Isenberg School of Business. He assisted with the organization of the Annual Center Symposium of 2022 and created the first annual report. Joe was instrumental in building the official website, kickstarted the development of a database of external stakeholders (including area university nursing and engineering contacts) and continues to provide communications support to the Center.

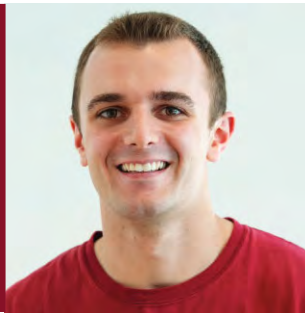
Center Faculty, Staff, and Students

UNDERGRADUATE STUDENT

Valerie Casimir '25
CORE Summer Intern

An undergraduate student at the College of Nursing, Valerie worked on the IV Smart Pump project to develop new safety standards and make IV Pumps more effective for end-user nurses. She found that interdisciplinary work with engineers demonstrated the creative aspect of product development while broadening her collaboration skills, allowing her to see things from a new vantage point.

UNDERGRADUATE STUDENT



Braedon Feddersen '23
CORE Summer Intern

An undergraduate student at the College of Engineering, Braedon worked on the IV Smart Pump to improve safety standards and make IV Pumps more usable and effective for end-user nurses. He found that nurses' perspectives have allowed him to think outside the typical engineering framework and incorporate usability into his work.

UNDERGRADUATE STUDENT

Anushree Patil '24
CORE Summer Intern

An undergraduate in the Department of Electrical Engineering at the College of Engineering, Anushree worked on two Center initiatives, creating a better bedpan for patients, and working with robotics in the hospital setting, including wound image capturing and robotic oral care for patients. As an engineering student, she found that working with nurses allowed her to achieve her research and design goals.

UNDERGRADUATE STUDENT

Jessica Smith '23
CORE Summer Intern

An undergraduate student at the College of Nursing, Jessica worked on the development of robotics intended to assist nurses in the hospital setting. In addition, she helped with the design of a new bedpan. She found the interdisciplinary aspects of the job to be enlightening; working with engineers gave her a better understanding of her own discipline.

Center Publications, Presentations, and Research

Publications

A. B. Amin, S. Wang, U. David and Y. Noh, Applicability of Cloud Native-based Healthcare Monitoring Platform (CN-HMP) in Older Adult Facilities, 2022 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC), Glasgow, Scotland, United Kingdom, 2022, pp. 2684-2688.

Baker, D., Giuliano, K. K., Thakkar-Samtani, M., Scannapieco, F. A., Glick, M., Restrepo, M. I., Heaton, L.J. Frantsve-Hawley, J. (2022). The association between accessing dental services and nonventilator hospital-acquired pneumonia among 2019 Medicaid beneficiaries. Infection Control & Hospital Epidemiology, 1-3.

Baker, D. L., & Giuliano, K. K. (2022). Prevention practices for nonventilator hospital-acquired pneumonia: A survey of the Society for Healthcare Epidemiology of America (SHEA) Research Network (SRN). Infection Control & Hospital Epidemiology, 43(3), 379-380.

Benjamin, E., Roddy, L., & Giuliano, K. K. (2022). Management of patient tubes and lines during early mobility in the intensive careunit. Human Factors in Healthcare, 2, 100017.

Blake, J. W., Giuliano, K. K., Butterfield, R. D., Vanderveen, T., & Sims, N. M. (2021). Extending tubing to place intravenous smart pumps outside of patient rooms during COVID-19: an innovation that increases medication dead volume and risk to patients. BMJ Innovations, 7(2).

Blake, J.,** , Fiske, S.**, Giuliano, K. (2022). IV Smart Pump Usability: A Qualitative Descriptive Analysis. Nursing Open.

Carleton, A. G., Sup, F. C., & Modarres-Sadeghi, Y. (2022). Passive double pendulum in the wake of a cylinder forced to rotate emulates a cyclic human walking gait. Bioinspiration & Biomimetics, 17(4), 045006.

Fiske, S., Alalawi, R., Cody, J,Choi, WJ., Chung, J., & Choi, J. Cognitive Behavioral Therapy in Nursing Science and Practice for Fatigue Related to Chronic Diseases: A Systematic Review. Journal of American Psychiatric Nurses Association. Submitted on October 2022.

Fitzgerald, L. F., Bartlett, M. F., Nagarajan, R., Francisco, E. J., Sup IV, F. C., & Kent, J. A. (2021). Effects of old age and contraction mode on knee extensor muscle ATP ux and metabolic economy in vivo. The Journal of Physiology, 599(12), 3063-3080.

Giuliano, K. K., Penoyer, D., Middleton, A., & Baker, D. (2021). Oral care as prevention for nonventilator hospital-acquired pneumonia: A four-unit cluster randomized study. AJN The American Journal of Nursing, 121(6), 24-33.

Giuliano, K. K., Penoyer, D., Mahuren, R. S., & Bennett, M. (2021). Intravenous smart pumps during actual clinical use: a descriptive comparison of primary and secondary infusion practices. Journal of Infusion Nursing, 44(3), 128.

Giuliano, K. K., Blake, J. W., & Butterfield, R. (2021). Secondary medication administration and IV smart pump setup. AJN The American Journal of Nursing, 121(8), 46-50.

Giuliano, K., & Pozzar, R. (2022). Achieving Noise Reduction With a Novel Lower Limb External Mechanical Compression System. Ergonomics in Design, 30(1), 26-32.

Giuliano, K. K., & Baker, D. (2022). Best practices for cardiac monitoring during neonatal resuscitation. Journal of Neonatal Nursing.

Giuliano, K. K., Blake, J. W., Bittner, N. P., Gamez, V., & Butterfield, R. (2022). Intravenous Smart Pumps at the Point of Care: A Descriptive, Observational Study. Journal of Patient Safety, 18(6), 553-558.

Giuliano, K. K., & Landsman, K. (2022). Collaborative Nurse–Engineer Product Innovation. AJN The American Journal of Nursing, 122(7), 59-61.

Giuliano, K. K., Sup, F. C., Benjamin, E., & Krishnamurty, S. (2022). INNOVATE: Preparing Nurses to Be Healthcare Innovation Leaders. Nursing administration quarterly, 46(3), 255-265.

*with undergraduate **with graduate

Center Publications, Presentations, and Research

Giuliano, K. K., Baker, D., Thakkar-Samtani, M., Glick, M., Restrepo, M. I., Scannapieco, F. A., ... & Frantsve-Hawley, J. (2022). Incidence, mortality, and cost trends in nonventilator hospital-acquired pneumonia in medicaid beneficiaries, 2015-2019. American Journal of Infection Control.

Gregory, D. L., Sup IV, F. C., & Choi, J. T. (2021). Contributions of spatial and temporal control of step length symmetry in the transfer of locomotor adaptation from a motorized to a non-motorized split-belt treadmill. Royal Society open science, 8(2), 202084.

Jung, K. J., Jaber, Y., & Sup IV, F. C. A Validation of MR Flow Velocity Mapping with Automated Phase Offset Correction Using a Gel Flow Phantom Controlled by a Motorized Piston in MR Phase Contrast Cine Flow Measurement.

Labropoulos, N., Giuliano, K. K., Tafur, A. J., & Caprini, J. A. (2021). Comparison of a nonpneumatic device to four currently available intermittent pneumatic compression devices on common femoral blood flow dynamics. Journal of Vascular Surgery: Venous and Lymphatic Disorders, 9(5), 1241-1247.

Munro, S. C., Baker, D., Giuliano, K. K., Sullivan, S. C., Haber, J., Jones, B. E., ... & Klompas, M. (2021). Nonventilator hospital-acquired pneumonia: a call to action: recommendations from the National Organization to Prevent Hospital-Acquired Pneumonia (NOHAP) among nonventilated patients. Infection Control & Hospital Epidemiology, 42(8), 991-996.

Penoyer, D., Giuliano, K., & Middleton, A. (2022). Comparison of safety and usability between peristaltic and pneumatic large volume intravenous smart pumps during actual clinical use. BMJ Innovations, 8(2). 23(5), 2347-2357.

Pryor, L., Giuliano, K. K., & Gallagher, S. (2021). Creating a culture of worker safety: Evidence-based safe mobility in the ICU. Association of Occupations Health Professionals in Healthcare (AOHP) Journal.

Wedge, R. D., Sup IV, F. C., & Umberger, B. R. (2022). Metabolic cost of transport and stance time asymmetry in individuals with unilateral transtibial amputation using a passive prostheses while walking. Clinical Biomechanics, 94, 105632.

Wedge, R. D., LaPre, A. K., Sup, F., & Umberger, B. R. Effects Of Walking Speed On The Stump-Socket Interface In Transtibial Amputees

Presentations (Invited)

Baker, D., Giuliano, K. Sepsis in the context of non-ventilator hospital-acquired pneumonia. National Sepsis Alliance Healthcare acquired Infection Summit, December 10, 2020 (Virtual).

Baker, D., Giuliano, K. (2021). Sepsis in the context of non-ventilator hospital-acquired pneumonia. National Sepsis Alliance Healthcare-acquired Infection Summit, December 16, 2021.

Baker, D., Giuliano, K., Worzala, C., Cloke, A., Zawistowich, Lu. (2022) Hospital-Acquired Pneumonia Threatens Patient Safety—Policy Makers Must Act to Confront It. Health Affairs Forefront. https://www.healthaffairs.org/do/10.1377/forefront.20220418.65994

Baker, D., Giuliano, K., Scannapieco, F. (2022). The Connection Between a Healthy Mouth and Prevention of Hospital-Acquired Pneumonia. National Sepsis Alliance Webinar, June 22.

Baker, D., Giuliano, K., Scannapieco, F. (2022). The Connection Between a Healthy Mouth and Prevention of Hospital-Acquired Pneumonia. CareQuest Webinar, September 29.

Baker, D., Giuliano, K., Scannapieco, F. Oral Hygiene as Prevention: Discovering the Links Between Oral Health, Respiratory Infection, and Sepsis. Sepsis Alliance National Webinar, June 22, 2022.

*with undergraduate student **with graduate student

Blake, J.,** Butterfield, R., Giuliano, K. (2021). Clinical Implications of IV Extension Tubing with Titratable Medications. AACN Adv Crit Care (2021) 32(2): 153–155.

Blake, J., Giuliano, K. (2022). Safety, Usability and Flow Rate Accuracy of IV Smart Pumps. Institute for Safe Medication Practices Medication Safety Webinar, August 29.

Francisco, E. J. , K.A., Boyer, and F.C. Sup IV (2021) Clutch-based quasi-passive knee brace to reduce tibio-femoral contact forces. American Society of Biomechanics Annual Conference.

Giuliano, KK., Blake, J.,** (2021). Medication Safety at the Frontlines: Nurse and Pharmacist Knowledge of Secondary Medication Administration. Biomedical Instrumentation & Technology. Biomed Instrum Technol. 55 (1): 51–58.
*winner of BI&T 2021 research paper publication award

Giuliano, K. (2021). The Role of the Nurse in Medical Product Innovation. New York University Webinar, March 9.

Giuliano, K., Littman, R. (2021). How Visibility on Infusion Pump Data Can Promote Better Use of Clinical Decision Support in the Perioperative Setting, National Webinar, April 12.

Giuliano, K. (2021). Accelerating Healthcare Innovation: Nursing Perspectives and Medical Product Development. Adelphi University Webinar, April 27.

Giuliano, K. Challenging precedent: Critical care nursing and medical product innovation. American Association of Critical Care Nurses National Teaching Institute. May, 2021.

Giuliano, K. Landsman, K, Andersen, Erik (2021). UPenn Nursing Innovation Colloquium: The Need for Nurse-Engineers. November 10, 2021.

Giuliano, K. The Unconventional Journey of a Nurse Innovator. AACN Houston Chapter, December 9, 2021.

Giuliano, K. The Unconventional Journey of a Nurse Innovator. AACN Dallas Chapter, January 4, 2022

Giuliano, K., Blake, J.** (2022). How Smart are IV Smart Pumps. UMass Center for Clinical and Translational Science (UMCCTS) Research Webinar. April 22.

Giuliano, K., Blake, J. (2022). Safety, Usability and Flow Rate Accuracy of IV Smart Pumps. Institute for Safe Medication Practices and ECRI, July 14, Plymouth Meeting PA.

Giuliano, K (2022). IV Smart Pumps: Evidence to Guide Practice and Patient Safety. University of Michigan Center for Healthcare Engineering and Patient Safety (CHEPS), Seminar Series, November 7.

Scannapieco, F., Giuliano, KK., Baker, D. (2022). The role of oral health in the prevention of non-ventilator hospital-acquired pneumonia. Invited contributor for special issue of Dental Clinics of North America.

Wedge, R. D., F.C. Sup IV, and B.R. Umberger. (2020). Speed Effects of Knee Joint Loading in People with Unilateral Transtibial Amputation, American Society of Biomechanics Annual Conference: Online.

Center Publications, Presentations, and Research

Poster Presentations

Blake, J.,** Giuliano, K. Flow Rate Accuracy of Secondary Medication: A Laboratory Study Comparing Four IV Smart Pump Models. Council for the Advancement of Nursing Science Advanced Methods National Conference. October 6, 2021.

Blake, J.,** Giuliano, K. Innovations in Emergency Care: Nursing Perspectives on Code Cart Operation. Arizona Nurses Association Regional Conference. October 2, 2021.

Blake, J.,** Fiske, S.,** Giuliano, K. IV Smart Pump Usability: A Qualitative Analysis. American Association of Critical Care Nurses National Teaching Institute. May 24-27, 2021.

Giuliano, K. Innovations to Protect Healthcare Workers: Using Safe Patient Handling and Mobility for Decision-Making. Association of Safe Patient Handling Professionals National Conference. March 5, 2021.

Giuliano, K., Penoyer, D., Middleton, A., Baker, D. IV Smart Pumps Non-ventilator hospital-acquired pneumonia prevention: A four unit cluster randomized study. American Association of Critical Care Nurses National Teaching Institute. May 24-27, 2021.

Giuliano, K., Penoyer, D. IV Smart Pumps: A Descriptive Comparison of Primary and Secondary Infusion Practices. American Association of Critical Care Nurses National Teaching Institute. May 24-27, 2021.

Giuliano, K., Baker, D. (2022). Patient Safety and Quality Care: Time to Focus on Non-ventilator Hospital-Acquired Pneumonia. SHEA National Conference, April 12-14, Colorado Springs. *selected to be highlighted during poster rounds

Gabele, D., Giuliano, KK. (2022). Early and Progressive Mobility: Improving Quality While Reducing Cost. American Organization of Nurse Leaders (AONL), June 7.

Mahuren, R., Giuliano, K. (2022). Data-based Program Management of System-Wide IV Smart Pump Integration. American Society of Healthcare Pharmacists (ASHP) Summer Meeting, June 12.

Penoyer, D., Giuliano, K., Middleton, A., Blake, J.** Performance and Usability Evaluation of Three IV Medication Reconstitution Devices. ASHP National Midyear Clinical Conference. December 5-9, 2021.

Walker, R., Briere, C., Giuliano, K., Iradukunda, F., Mwalingo, T.** (2022). Redefining Objectives for a Transformative Nursing PhD Curriculum Using an Equity-Centered Community Design Process. Sigma Theta Tau 33rd International, Edinberg Scotland, July 22.

*with undergraduate student **with graduate student

Conference Presentations

Baker, D., Giuliano, K. A cluster randomized trial of NVHAP prevention. Association for Professionals in Infection Control (APIC). June, 2021

Blake, J.,** Giuliano, K. Flow Rate Accuracy of Secondary Medication: A Laboratory Study Comparing Four IV Smart Pump Models. Sigma Theta Tau Region 15 Conference. October 1, 2021 (virtual).

Giuliano, KK., Blake, J.** Penoyer, D. The state of the science of IV medication administration safety using IV smart pumps. Eastern Nurses Research Society Symposium, March 2021 (COVID-19 virtual)

Giuliano, K., Blake, J.** How smart are IV smart pumps? American Association of Critical Care Nurses National Teaching Institute, May 2021)

Giuliano, K., Radersdorf, T., Ackerman, M. Leading Healthcare Innovation: Opportunities for Critical Care Nurses. National Teaching Institute Mastery session, May 2021.

Giuliano, KK., Blake, J.** How smart are IV smart pumps. American Medical-Surgical Nurses National Conference, October 2, 2021

Giuliano, K., Blake, J.** IV Smart" Pumps: Evidence to Guide Practice and Patient Safety. AACN Horizons Conference. Portland ME. April 17, 2022.

Penoyer, D., Giuliano, K, Middleton, A (2022). Comparison of two IV Smart Pumps for safety and usability during actual clinical use-Society of Critical Care Medicine International Conference, San Juan, Puerto Rico, February 6-9.

Active Research/Grants

Blake, J., Vital, C., Giuliano, K., Penoyer, D., PhD, RN (Orlando Health). IV Smart Pumps During Actual Clinical Use: A Descriptive Study of multiple channel IV smart pumps during actual clinical use. ICU Medical.

Eckert, S. Pharm D (University of North Carolina), Giuliano, D., PharmD (Purdue University). Reducing Preventable Medication Errors through Minimizing Work Distractions: Evaluating Smart Pump Data Usage in Health-Systems across the Midwest. FDA BAA number: 21-00123.

Giuliano, K. and Baker, D., PhD, RN (California State University). The Role of Enhanced Oral Care in Non-Ventilator Hospital-Acquired Pneumonia Prevention. Delta Dental Foundation of Illinois.

Giuliano (Consultant). The NEVER Trial (Nursing Excellence to Avoid Pneumonia Randomized Trial). CDC Epicenter V: Harvard Pilgrim Healthcare Institute Center for Excellence in Hospital-acquired Infection Surveillance and Prevention.

Jiménez, Juan (UMass College of Engineering), Blake, J. (UMass College of Engineering), Giuliano, K., (Elaine Marieb College of Nursing) Development and Design of a Novel IV Infusion Device. UMass IALS-Manning Grant.

Principal Investigator (subaward). Guiliano, K., Mobile technology to reduce risk of DVT patient compliance. NIH SBIR Phase 2. National Heart, Lung and Blood Institute of the National Institutes of Health under Award Number

Roberts, S., (UMass College of Engineering), Giuliano, K., The Use of Eye-tracking Technology to Measure Cognitive-Behavioral Processes During IV Medication Administration using IV Smart Pumps. Beta Zeta Chapter Sigma Theta Tau Graduate Mentoring Grant.

Sup IV, Frank and Yahya Modarres-Sadeghi (College of Engineering), NRI: FND: Natural Power Transmission through Unconstrained Fluids for Robotic Manipulation. National Science Foundation (CMMI)-National Robotics Initiative.

Vital, C. PhD, RN (Baystate Health), Giuliano, K., IV Smart Pump Flow Rate Accuracy in the Real World. Baystate Health Learning Health System. (LHS) Award.


KN95

> “Learning the specifics of using robotic technology with experienced engineers is a rewarding aspect of my role, and the integration of robotics in nursing is instrumental to the development of the profession. It’s an honor to be a part of this collaboration.”
>
> Tracey Cobb RN
> *Clinical Professor, Elaine Marieb College of Nursing*

Tracey Cobb, RN; Kathryn Pacheco ’22; and Frank Sup, PhD, discussing potential applications for the Elaine Marieb Center research robot, Stretch.

Photo by: Jon Crispin

Postdoctoral fellow Jeannine Blake, PhD RN and Professor Juan Jiménez, PHD collaborate on the IV Smart Pump initiative that addresses issues in flow rate accuracy and usability.

Photo by: Jon Crispin

> “Nurses are serial problem solvers. They Macgyver things, but the engineers have the luxury of looking at the system level. I think the two work together very well. The nurse is always the patient advocate, so having a nurse on your design team throughout the process is very important.”
>
> Neal Wiggerman, PhD
> *Baxter International, Research Scientist, Human Factors and Ergonomics, Annual Symposium Panelist*

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