



*Patents to Patients*®



**Office of University Relations**

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## **Annual First Look Forum 2023**

Hosted jointly by the UWM Research Foundation,  
The Medical College of Wisconsin Office of Technology Development, and  
the Office of University Relations at Marquette University

### **Agenda**

1. 3:30-4:00 pm – **Arrival and Registration Check-in**
2. 4:00-4:20 pm - **Welcome; Opening remarks**

#### **Welcome:**

Jessica Silvaggi, Interim President, UWMRF

Landon Olp, Licensing Manager Office of Technology Development, MCW

Kalpa Vithalani, Executive Director of Technology Transfer, Marquette University

**Opening Remarks:** Tessa Myers, Senior Vice President, Intelligent Devices, Rockwell Automation, UWMRF Board Member

3. 4:20-5:45 pm - **Presentations and Panel Discussion**
4. 5:45 pm-7:00 pm - **Networking and Tours\***

\*Clock Tower Tours: Starting at 6:00pm, new group every 5 minutes, last tour at 6:25

Limit of 10 people per group

## Presentations

### ***Fullyet: A wearable ultrasound device for improving delivery of radiation therapy***

Radiation therapy is a very common cancer treatment used in half of all cancer patients. When patients undergo daily radiation treatment, they need to fill their bladder to a precise size to minimize its exposure to radiation. Such a task is often difficult for patients to accomplish. We have designed a patent pending, wearable, ultrasound-based device to monitor a patient's anatomy internally. Monitoring takes place via an entirely external belt, without the need for healthcare provider setup or intervention. The objective of this device is to provide patients with feedback via a smart phone application as to when their internal anatomy will be ready for radiation therapy treatment delivery. The device will improve clinical throughput, patient quality of life, and reduce patients' unnecessary exposure to radiation. Our device will address a major unmet clinical need for tens of thousands of cancer patients treated with radiation therapy annually.



William Hall, MD Associate Professor of Radiation Oncology and Surgery, School of Graduate Studies, Medical College of Wisconsin



Eric Paulson, PhD Associate Professor, Radiation Oncology, Radiology and Biophysics, Medical College of Wisconsin



Nathan Spaeth, Technical Director, Rehabilitation Research Design & Disability Center (R2D2), UWM

### ***myAccessibleHome and AccessibleHomePRO: Making a home fit for you***

People with disabilities (PwD), care partners, and aging adults increasingly desire to live independently and age in place. The convergence of emerging technologies, such as smart homes and devices and aging-in-place technologies, has generated substantial opportunities to optimize independence in the home. However, finding, providing, and designing efficient home safety assessments can be daunting. Successful home safety assessments and interventions require a complex integration of assistive technology while accounting for the person, the daily tasks they complete, and their home environment. HESTIA NextGen is an in-depth multi-faceted home assessment designed for consumers, novices, PwD, expert rehabilitation service providers, or home evaluation experts to perform comprehensive home evaluations.

### ***Building Façade Inspection Using Drones and AI***

Façade inspection is required for thousands of high-rise buildings in the United States and around the world to maintain their integrity. Currently, high-rise building inspections are performed manually, which has safety concerns. If work needs to be done in terms of maintenance, renovation, and repair, building owners must provide as-is drawings to design firms and contractors. Some existing buildings have as-is drawings in the paper format, which is difficult to share among parties involved in the maintenance, renovation, and repair operations. (continued)



(Speaker) Sahara Adhikari, Graduate Student, Civil, Construction & Env Engr, Marquette University



Yong Bai, Ph.D., P.E., F.ASCE McShane Chair & Professor – Construction Engineering & Management, Dept of Civil, Construction & Env Engr, Marquette University

Converting existing paper format drawings to digital format drawings, such as a BIM model, is time-consuming and costly. Some buildings constructed in the past do not have as-is drawings. Reproducing as-is drawings for existing buildings is significantly expensive and takes months because this currently is performed manually. We have developed an automated as-is high-rise building façade modeling technology using drone and artificial intelligence (AI). Our revolutionary technology transforms the way a high-rise building façade will be inspected, and how missing façade drawings will be reproduced for maintenance, renovation, and repair operations. Utilizing this technology will not only improve communication among building owners, design firms, contractors, material suppliers, and financial institutions but also speed up the inspection, design, approval, and finance processes, and overall construction operations. We are shaping our business model through participation in the regional and national I-Corps program.

### ***Economically feasible Li-ion battery recycling***

Recycling spent lithium iron phosphate (LFP) cathodes in an economically sustainable way remains a great challenge due to its low-value elemental composition. Thus, low-cost technology together with a high-value product are critical for the recovery of the LFP materials. The feasibility of the mature and low-cost IX method to recycle LFP cathode was explored for the first time. This simple and economical technology provides a practical recycling strategy for the spent LFP batteries. The verification of this method opens a new promising recycling direction that could transform spent LFP cathodes to high-value single or multi-elemental fertilizer. Inventors at University of Wisconsin, Milwaukee (UWM) have investigated the feasibility of Li-H and Li-K IX reactions using strong and weak acid cation exchange resins. More than 90% of lithium can be recovered with strong acid cation resins as well as K-form resins. The kinetics of IX and regeneration reaction were fast, and the equilibrium can be reached in as short as 20 min. Along with the phosphorus remaining in the leaching solution, the reaction delivered a potential product of multi-elemental fertilizer.



Deyang Qu, PhD,  
Distinguished Professor,  
Johnson Control Endowed  
Professor, UWM



Xiaoxiao Zhang, PhD,  
Research Associate,  
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Qizhen Shi, MD, PhD,  
Senior Investigator, Versiti  
Blood Research Institute;  
Secondary Faculty in Cell  
Biology, Neurobiology,  
and Anatomy, Medical  
College of Wisconsin

### ***Platelet-targeted gene therapy for multiple sclerosis***

Multiple sclerosis (MS) is a chronic inflammatory autoimmune disease of the central nervous system with no cure yet. Here, we genetically engineered hematopoietic stem cells to express myelin oligodendrocyte glycoprotein (MOG), a primary autoantigen in MS, as a means of intervention to induce immune tolerance in a mouse model of MS. We found that targeting MOG expression specifically to platelets could prevent disease development and attenuate disease severity, including the loss of bladder control in transduced recipients. Optimization of MOG significantly enhanced the clinical efficacy in preventing the onset and development of disease and induced regulatory T cells in the mouse model. Together, our data demonstrated that targeting MOG expression to platelets is an effective strategy to induce immune tolerance in an MS mouse model, which could be a promising approach for the treatment of patients with MS autoimmune disease.

## ***A Novel Anaerobic Biotechnology for Energy Conservation in Municipal Wastewater Treatment***

ThaneSource Water was born with the desire to improve energy recovery in municipal wastewater treatment. Water and Resource Recovery Facilities (WRRF) treating the wastewater of more than 75% of the U.S. population are the largest municipal energy users in many cities. Most of these facilities use high-energy, conventional aerobic biotreatment systems accounting for 30 TWh of annual electricity use and \$2 billion in costs for municipalities. To change this, our research team at Marquette University has developed an anaerobic membrane bioreactor (AnMBR) composed of a novel configuration to conserve energy and provide high efficiency in municipal wastewater treatment. The combination of membranes and anaerobic microbes does not use aeration and can generate energy through the conversion of organic matter into methane-rich biogas. Our results using a bench-scale system have shown high organic pollution removal rates (> 95%) at low temperature (10 °C), representing up to 60% energy savings compared to traditional aerobic systems. If energy production from biogas is considered, then our AnMBR is estimated to use 70-100% less energy than aerobic systems. We are now working to enhance system efficiency and planning pilot-scale testing and development work. We are developing our business model through extensive customer discovery through our regional and national NSF I-Corps programs.



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of Civil, Construction and  
Environmental  
Engineering, Marquette  
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Daniel Zitomer, Ph.D., P.E.,  
BCEE, Fellow Water  
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Professor & Chair – Dept of  
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Eng, Marquette University



AkkeNeel Talsma, PhD,  
RN, FAAN, Founder  
MaternityMetrix, Associate  
Professor and Kellner  
Entrepreneurship Fellow,  
UWM College of Nursing

## ***MaternityMetrix: Prenatal webapp to support a healthy pregnancy***

MaternityMetrix is a clinically vetted webapp content for navigating pregnancy and childbirth for use by community programs and Leaders in the Prenatal Industry. Annually, about 3.7M babies are born in the USA. Maternal and infant outcomes vary across populations, with well-known adverse mother/infant outcomes, especially for African American, Native American, Hispanic women, and in rural areas. Pregnant people need, aside from medical/nursing care delivered in medical offices or clinics, a trusted, informed, community network and support system that helps them navigate and manage their health throughout pregnancy and prepare for childbirth and family life. The MaternityMetrix webapp informs and guides unlicensed community workers and social network members with regional based reporting, and relevant topics that are linked with clinically vetted and curated content from official, professional sites supporting a healthy pregnancy outcome.



## **Responder Panel**



### **MODERATOR: Chuck Swoboda** **Innovator-in-Residence | Marquette University**

Chuck Swoboda is an author, speaker, Innovator-in-Residence at Marquette University, and executive chairman of Vast Therapeutics.

He served as Chairman and CEO of Cree for 16 years where his team successfully led the LED lighting revolution not just by creating new products, but by focusing on solving old problems in completely new ways. He has seen what it takes to make the impossible, possible. Under his leadership, the company grew from just over \$6 million in annual revenue in 1993 to over \$1.6 billion as they transformed Cree from a start-up into a global market leader with 6,500 employees worldwide. Cree was recognized as MIT Technology Review's 50 Smartest Companies for 2014 and as one of Fast Companies World's 50 Most Innovative Companies in 2015.

Chuck is the author of *The Innovator's Spirit*, and has been a speaker on leading innovation for both corporate clients as well as a number of universities including Harvard Business School, Marquette University, University of Pennsylvania, Duke University, University of North Carolina, and North Carolina State University.

He founded his consulting company, Cape Point Advisors in 2017 focusing on innovation and technology disruption. Chuck serves on the board of Ryder Systems, Vast Therapeutics, KnowBio LLC, and Lonerider Brewing Company.

Chuck holds an engineering degree from Marquette University (1989), where he served on the Board of Trustees for 12 years, including two as chairman. He currently splits his time between Raleigh, North Carolina and Milwaukee, Wisconsin.



### **PANELIST: Dana A. Guthrie** **Managing Partner | Gateway Capital**

Dana A. Guthrie is Managing Partner at Gateway Capital, a venture capital firm focused on Wisconsin-based, early-stage startups. Prior to her current role, Guthrie founded and managed Alchemy Angel Investors, an angel investment network. She founded Alchemy while being employed full-time at a Fortune 500 company and managing a multi-million dollar, global product offering.

Guthrie is a two-time patent recipient, holds a B.S. in Computer Engineering from Milwaukee School of Engineering, and a M.S. in Energy Engineering from University of Illinois at Chicago. She is a member of Blacks in Tech and serves on the board of the Milwaukee Metropolitan Association of Commerce (MMAC) and Teens Grow Greens.



**PANELIST: Jennifer Abele**  
**Venture Capitalist | Angel Investor | Public Sector Leader | Strategic Advisor**

Jennifer Abele has over 20 years of leadership experience in public finance, negotiation, executive leadership, and strategic partnerships in local/state/federal government and higher education. After earning her master's degree in Public Affairs from the LaFollette School of Public Affairs at the University of Wisconsin - Madison in 2001, she served as a lead financial analyst and planner for the City of Milwaukee. In 2012, she was the youngest person to ever be appointed to the Mayoral cabinet when she was selected to lead the City's governmental relations team. She stayed in city leadership for 17 years, culminating in a second cabinet role leading the Milwaukee Water Works, which is a regional water utility serving 1 million customers with \$100m annual P/L and 350 employees.

In 2018, she left city hall to join the cabinet of another important Milwaukee institution, the University of Wisconsin - Milwaukee. As Chief Partnership Officer, she built a new team focused on major campus partnerships, corporate engagement, government, and external relations. Outside of work, she has served on various community boards and is often consulted for strategic advice. Her commitment to making an imprint on Milwaukee is evident in having worked for 4 Mayors and being involved in a variety of highly visible projects that have shaped the future of the city. This includes the construction of the Fiserv Forum, the Milwaukee Streetcar, the new Lakefront Interchange, securing the 2024 RNC Convention, the Northwestern Mutual Data Science Institute, and the Connected Systems Institute, amongst others.

At the end of 2022, she left the university to found an emerging venture capital firm, VC 414, with her business partner, Raquel Filmanowicz. She now serves as Managing Partner of the firm, which invests in startups founded by women and other undercapitalized founders. Privately, she has invested in rental real estate, was the treasurer of a successful stock investment club, and has been avidly investing in venture capital funds, syndications, and making angel investments since 2019. She resides in Milwaukee where she is happily married with a son and three bonus daughters.



**PANELIST: Mike Maschek**  
**Director | Inception Health**

Mike is a Director at Inception Health. In his role he provides leadership for the Inception Health Investment Fund. As the venture capital arm of the F&MCW health network, the Inception Health Investment Fund makes strategic investments in early-stage digital health companies that help solve real problems facing the F&MCW health network by finding innovative solutions for our staff, clinicians, and patients.

Mike has extensive experience working in finance and strategy roles within health systems at both Rush University Medical Center in Chicago and Froedtert & the Medical College of Wisconsin here in Milwaukee. He has a passion for entrepreneurship that was instilled in him at an early age by his parents who managed a café in Memphis, TN and a sporting goods store in Mt Pleasant, SC. He has invested personally in a sizeable portfolio of local businesses in the city of Milwaukee including Sherman Phoenix, the Tandem Restaurant, Fyxation Bikes, the Daily Bird Coffee Shop, Rooted MKE Children's Bookstore and the Riverwest Co-op.