Executive Summary
Wisconsin Institute for Healthcare Systems Engineering Roundtable
August 29, 2016

A College of Engineering-sponsored Roundtable held August 29, 2016 convened COE faculty and research staff, representatives from the schools of health sciences and key individuals from elsewhere on the UW campus to engage the participants and help define WIHSE's research agenda. Sixty-three individuals participated in the event, including 11 graduate and undergraduate students who assisted in various capacities. (See Appendices A & B for the agenda and list of participants.)

Dean Ian Robertson welcomed attendees and expressed support of healthcare systems engineering research that WIHSE intends to promote and facilitate. Professor Pascale Carayon offered an overview on WIHSE, including its vision "to be the premier research institute that transforms health care through engineering" and the nature of WIHSE research that focuses on 1) the patient journey, 2) systems and processes, 3) the local context, 4) human-centered design and 5) the quadruple aim. (See Appendix C for the slides and information presented during the introduction.)

Five "theme tables" convened, each addressing different healthcare systems engineering research opportunities, and were primarily comprised of COE engineering faculty and research staff. A member of the WIHSE Working Group (also a COE faculty member) facilitated each theme table and was partnered with existing health sciences faculty. The five themes and the theme co-leaders were:

Theme	COE facilitator	Health sciences partner	Participants^
Monitoring and anticipating safe care transitions	Nicole Werner*	Manish Shah (SMPH)	6 COE 2 Health Sci
Smart automation of imaging process/workflow	Doug Wiegmann*	Maureen Smith* (SMPH)	8 COE 1 Health Sci 2 Other
Smart and connected patient-centered care	Jingshan Li*	Shannon Dean (UW Health) & Michelle Chui* (School of Pharmacy)	11 COE 3 Health Sci 1 Other
Modeling, forecasting and responding to healthcare-associated infections	Oguzhan Alagoz*	Nasia Safdar (SMPH, VA)	4 COE 1 Health Sci 1 Other
Technologies for integrated diagnosis and treatment	Beth Meyerand*	Elizabeth Burnside (SMPH)	7 COE 1 Health Sci

* Also members of WIHSE Working Group
^ "Other" includes representatives from: UW-Madison Chancellor's Office, UW-Madison Office of Quality, Industry partner, Great Lakes Bioenergy Research Center

Although each of the themes provided specific context for research opportunities, the overarching and consistent concept identified by the five groups related to *engineering novel healthcare systems to optimize workflow and management of information*. This reflects the "data rich information poor" focus of proposed WIHSE research and cuts across the quadruple aim as WIHSE research aims to revolutionize the patient experience, improve

population health, control healthcare costs and enhance clinician satisfaction. In summary this research will develop new engineering methods, models and algorithms that address:

- *Designing systems that facilitate and promote data use*
- *Sharing meaningful information* across providers, between clinicians and to the patient and caregivers to facilitate care delivery
- *Providing timely, relevant information and feedback* at the clinician, patient and population levels as a means of
  - facilitating informed decision making while decreasing uncertainty
  - monitoring health and performance
  - adapting interventions to achieve goals
  - ensuring sustainability of change or appropriate interventions within an organization and sharing results of interventions with others
- *Proactively ensuring the design of information technologies* fits the needs and expectations of the user and is well integrated in the workflow and work environment
- *Providing access* to high value technology or its output
- *Designing sensors* or other technologies to more efficiently capture and manage physiologic and clinical data
- *Modeling and predicting* changes in clinical/physiologic states, needs and plans to avoid disease or provide appropriate high quality care if disease occurs
- *Ensuring a positive impact of worker* health, performance and satisfaction.

Groups were also asked to identify possible next steps. Suggestions include:

- Engage healthcare delivery organizations and healthcare technology companies in the design of information management "systems" (e.g., healthcare delivery organizations, medical device/equipment and health IT companies, payors)
- Continue similar discussions
- Establish a pilot funding program
- Consider multi-university collaborations
- Include patient/caregiver representation (e.g., on WIHSE Advisory Board)
- Promote education in information science and management.

The evaluation of the Roundtable provided positive feedback concerning participants'

- understanding of healthcare systems engineering research opportunities in the COE (score of 4.5 on 1-5 scale; 1=strongly disagree, 5=strongly agree)
- awareness of others within the COE with whom they might collaborate in the area of healthcare systems engineering (score of 3.9 on 1-5 scale; 1=strongly disagree, 5=strongly agree)
- belief that the COE can develop impactful healthcare systems engineering technologies and address major quality, efficiency and safety issues facing health care (score of 4.7 on 1-5 scale; 1=strongly disagree, 5=strongly agree).

The RIC-sponsored workshop scheduled for March 15-17, 2017 will build on the results of this Roundtable. Nationally recognized researchers and leaders David Bates (Director, Health Policy and Management, Harvard School of Public Health and Chief, Internal Medicine & Primary Care, Brigham & Women's Hospital) and Patricia Brennan (Director, National Library of Medicine) have already committed to participate and give keynote talks. The WIHSE Working Group will develop a clear focus and agenda for the event during Fall 2016. The timeline of other future WIHSE activities is provided in Appendix C.

WIHSE Roundtable

Executive Summary
Appendices

Appendix A – WIHSE Roundtable Agenda

WIHSE Roundtable Agenda
3:45–6:30, August 29, 2016
Open Court – East, WID

Objective: Engage College of Engineering faculty and research staff to define WIHSE's research agenda.

3:45 – 4:00 PM: Registration
- Activity: Building WIHSE Campus Collaboration Map
- Appetizers and Beverages served

4:00 – 4:20 PM: Welcome and Introduction to WIHSE
- Ian Robertson, Dean of the College of Engineering
- Pascale Carayon, Procter & Gamble Bascom Professor in Total Quality, Department of Industrial and Systems Engineering

4:20 – 5:30 PM: Break into Small Groups - Theme Table Discussions
- Monitoring and anticipating for safe care transitions
- Smart automation of imaging process/workflow
- Smart and connected patient-centered care
- Modeling, forecasting and responding to healthcare-associated infections
- Technologies for integrated diagnosis and treatment (e.g., cancer, chronic conditions)

5:30 – 5:55 PM: Wrap Up, Poster Presentations

5:55 – 6:00 PM: Next Steps and Thank You
- Pascale Carayon, Procter & Gamble Bascom Professor in Total Quality, Department of Industrial and Systems Engineering

6:00 – 6:30 PM: Post Event Conversations
- Bar will stop serving at 6:20

Appendix B – WIHSE Roundtable Attendees

Name	Title	Affiliation	
		Department	**School / College**
Peter Adamczyk	Assistant Professor	ME	Engineering
Oguzhan Alagoz	Associate Professor	ISyE	Engineering
David Beebe	Professor	BME	Engineering
Walter "Wally" Block	Professor	BME	Engineering
John Booske	Professor & Department Chair	ECE	Engineering
Chris Brace	Associate Professor	BME	Engineering
Elizabeth Burnside	Professor	Radiology	SMPH
Pascale Carayon	Professor & Director CQPI	ISyE	Engineering
Michelle Chui	Associate Professor	Pharmacy	Pharmacy
John Corbin	Adjunct Professor	CEE	Engineering
Shannon Dean	UW Health Chief Medical Information Officer (CMIO) & Associate Professor Pediatrics	UW Health	
Jay Ford	Associate Scientist	CHSRA	Engineering
Jeffrey Grossman	Former CEO UW Health, Consultant	UW Health	
David Gustafson	Professor	ISyE	Engineering
Darin Harris	Administrative Program Specialist	OQI – UW-Madison	
Susan Hagness	Professor & Associate Dean for Research and Graduate Affairs	ECE	Engineering
Justin Hines	Corporate Relations Manager	Engineering	
Peter Hoonakker	Research Scientist, Associate Director of Research	CQPI	Engineering
Ann Hundt	Research Scientist, Associate Director of Education	CQPI	Engineering
Leon Janssen	Retired Executive	GE Healthcare	
Michelle Kelly	Assistant Professor	Pediatrics	SMPH
Hanns Kuttner	Associate to the Chancellor	UW-Madison	
Jingshan Li	Professor	ISyE	Engineering
Jeffrey Linderoth	Professor, Department Chair	ISyE	Engineering
Jinn-ing Liou	Senior Programmer Analyst	Medicine	SMPH
James Luedtke	Associate Professor	ISyE	Engineering
Zhenqiang (Jack) Ma	Professor	ECE	Engineering
Elizabeth Meyerand	Professor	BME	Engineering
Todd Molfenter	Assistant Scientist, CHESS	ISyE	Engineering
Amit Nimunkar	Faculty Associate	BME	Engineering
Susan Nordman Oliveria	Researcher	CHSRA	Engineering
Phil O'Leary	Professor, Department Chair	EPD	Engineering
Heidi-Lynn Ploeg	Associate Professor	ME	Engineering
Andrew Quanbeck	Associate Scientist, CHESS	ISyE	Engineering
Robert Radwin	Professor	ISyE	Engineering

Name	Title	Affiliation	
		Department	School / College
Edmond Ramly	Postdoctoral Research Associate	CHSRA	Engineering
James Robinson	Director	CHSRA	Engineering
Nasia Safdar	Associate Professor	Medicine	SMPH
Mary Sesto	Associate Professor	Medicine	SMPH
Manish Shah	Associate Professor	Emergency Medicine	SMPH
Nihar Sheth	Director, Informatics and IT, Great Lakes Bioenergy Research Center		Engineering
Maureen Smith	Professor	Pop Health Sciences	SMPH
Michael J. Smith	Professor Emeritus	ISyE	Engineering
Ray Vanderby	Professor	BME	Engineering
Raj Veeramani	Professor	ISyE	Engineering
Xudong Wang	Associate Professor	MS&E	Engineering
John Webster	Professor Emeritus	BME	Engineering
Nicole Werner	Assistant Professor	ISyE	Engineering
Douglas Wiegmann	Associate Professor	ISyE	Engineering
Emily Wirkus	Operations Manager	CQPI	Engineering
Yushi Yang	Post-Doctoral Research Associate	CQPI	Engineering
Thomas Yen	Instrument Innovator	BME	Engineering

Student Assistants

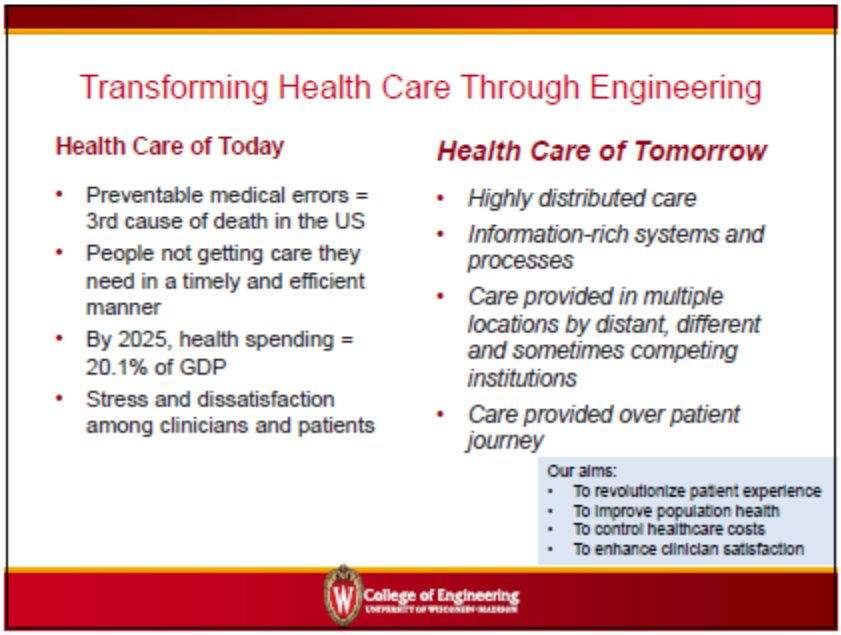
Name	Student Status	Affiliation	
		Department / Program	School / College
Amy Borkenhagen	Graduate Student	ISyE	Engineering
Karly Christensen	Graduate Student	Pop Health Sciences	SMPH
Jack Heide	Undergraduate Student	ISyE	Engineering
Ali Hassan Hjaar	Graduate Student	ISyE	Engineering
Amanda Kane	Undergraduate Student	Health Innovation Program	SMPH
Hyo Kyung Lee	Graduate Student	ISyE	Engineering
Corey Lester	Graduate Student	Pharmacy	Pharmacy
Suganya Sathiamoorthi	Undergraduate Student	Health Innovation Program	SMPH
Michelle Tong	Undergraduate Student	BME	Engineering
Yudi Yang	Graduate Student	ISyE	Engineering
Abigail Wooldridge	Graduate Student	ISyE	Engineering

Appendix C – WIHSE Roundtable Slide Presentation

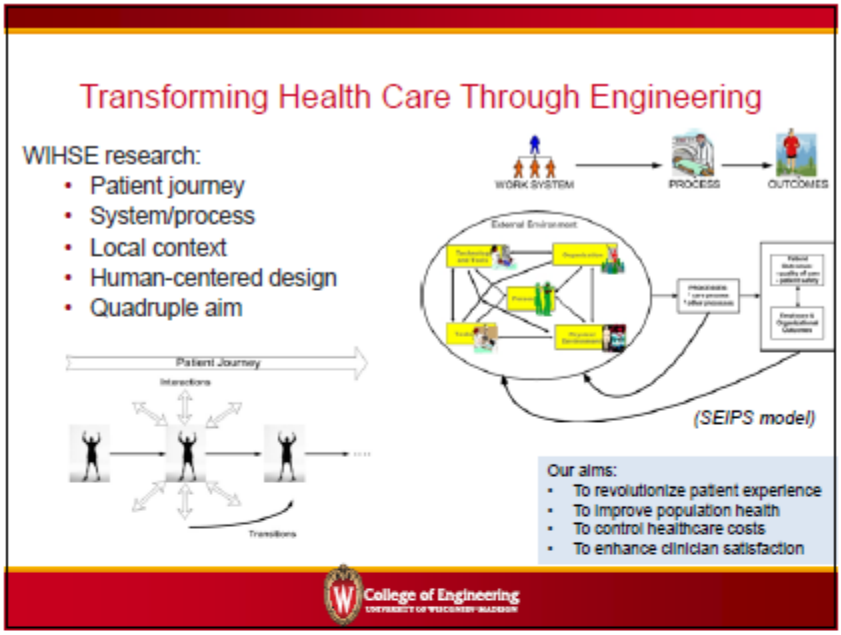

Welcome from Dean Robertson
UW-Madison strategic plan
COE strategic plan
COE RIC
Strengths of COE in health/healthcare research
WISCONSIN
Engage our interdisciplinary strength to generate creative solutions
College of Engineering
Lead the nation in transformative engineering research targeted at solving the technological challenges facing the nation and society
College of Engineering


Wisconsin Institute for Healthcare Systems Engineering (WIHSE)
Goal:
To develop healthcare systems engineering (HSE) research of the future
To address major quality, efficiency and safety issues facing health care through research
To create HSE technologies to foster information-rich systems and processes for integrated care
College of Engineering


Vision of WIHSE
Our vision is to be the premier research institute that transforms health care through engineering.
Our aims:
• To revolutionize patient experience
• To improve population health
• To control healthcare costs
• To enhance clinician satisfaction
The Quadruple Aim: care, health, cost and meaning in work
College of Engineering


Transforming Health Care Through Engineering
Health Care of Today
• Preventable medical errors = 3rd cause of death in the US
• People not getting care they need in a timely and efficient manner
• By 2025, health spending = 20.1% of GDP
• Stress and dissatisfaction among clinicians and patients
Health Care of Tomorrow
• Highly distributed care
• Information-rich systems and processes
• Care provided in multiple locations by distant, different and sometimes competing institutions
• Care provided over patient journey
Our aims:
• To revolutionize patient experience
• To improve population health
• To control healthcare costs
• To enhance clinician satisfaction
College of Engineering

Appendix C – WIHSE Roundtable Slide Presentation




What is next for WIHSE?
Submission of proposal to establish WIHSE as UW-Madison center/institute
Workshop for HSE research
Submission of UW2020 proposal
August 2016
Fall 2016
December 5, 2016
March 15-17, 2017
Submitting research proposals and exploring funding options
Engaging with healthcare organizations and healthcare technology companies
College of Engineering


Transforming Health Care Through Engineering
Themes for roundtable discussion:
1. Monitoring and anticipating for safe care transitions
2. Smart automation of imaging process/workflow
3. Smart and connected patient-centered care
4. Modeling, forecasting and responding to healthcare-associated infections
5. Technologies for integrated diagnosis and treatment
College of Engineering

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