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Program Committee Report December 2018

Regenstrief Center for Healthcare Engineering

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Regenstrief Center
for Healthcare Engineering

Program Committee Report

December 2018

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Contents

Summary Report

The Regenstrief Center for Healthcare Engineering (RCHE) strives to conduct nationally recognized research that ultimately leads to improved quality, accessibility, equity and affordability of healthcare delivery. Our research focuses on the generation, diffusion and adoption of evidence to better inform healthcare policy and practice. In this Program Committee summary report, we describe the activates that RCHE has accomplished in research, outreach and education since the summary report provided to the Board in June 2018. Additional details may be found in the December 2018 Program Committee Supplement Report.

RCHE Core Faculty Update

One of the ways that Purdue has supported RCHE is through the commitment of faculty hiring through the College of Engineering.

2018/2019 Faculty Search - In August, Dean Mung Chiang approved the search for RCHE core faculty in the College of Engineering. A search committee of four engineering faculty was formed and the faculty position ad (Appendix A) was written and posted that same month. The target area is data science in healthcare delivery. In addition to the ad, the search committee and other faculty actively recruited for the position, with an emphasis on encouraging women and underrepresented minorities to apply. By November 1, we received over X applications. From these candidates, the committee identified 5 applicants for phone interviews, which were completed in November. Based on the phone interviews, Z were identified to bring to campus for onsite interviews. We anticipate that all interviews will be completed by the end of January at which time we will recommend offers to be made to the best candidates.

2018 Core Faculty Hire – Zach Hass, assistant professor in the Schools of Industrial Engineering and Nursing, joined Purdue in August 2018. He holds a PhD in statistics and his research focuses on the application statistical methods to answering questions in health services research. He is currently working on problems related to health outcomes and program evaluation for long term care support and services. We have already actively involved him in our research, and he is an investigator on a $4M CMS grant on long term care described later in this document. We are also supporting his efforts by providing him and his students space in Mann Hall in Discovery Park (the location of RCHE's main offices) and giving him access to our IT staff, computing resources, and research scientists, all of which are being used for the CMS research. His CV is provided in Appendix B.
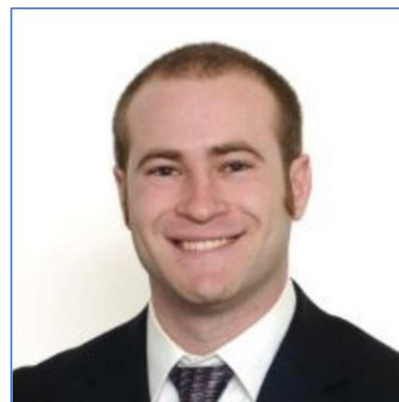
RCHE Research Efforts

In an effort to pursue our mission of a proactive, patient-centered, and wellness-focused healthcare delivery system, we conduct research in three strategic areas: i) prediction and evidence generation through data science methods, ii) efficient capacity management through systems modeling, and iii) improved access for vulnerable populations. Our approach this past year has been to identify significant opportunities that involve a diverse set of faulty expertise, to recruit the appropriate team, and to solicit funding from a variety of sources to support the effort. As mentioned in the June

In this section, we discuss an ongoing research example in each area followed by a brief description of other active projects.

A Data Science Approach to Evidence Generation

The foundation of evidence in healthcare is the randomized controlled trial (RCT) which randomly assigns individuals to either a treatment (receives intervention) or a control (receives placebo) group. In a well-designed RCT, the potential sources of confounding bias are controlled for, and the causal effect of the intervention of interest can be estimated. Unfortunately, RCTs have many well-known limitations, not the least of which is that the findings often cannot be generalized beyond the study group.

For much, and perhaps most, of modern medical practice, RCT-based data are lacking and no RCT is being planned or is likely to be completed to provide evidence for action. This "dark matter" of clinical medicine leaves practitioners with large information gaps for most conditions and increases reliance on past practices and clinical lore. (Frieden, 2017)

An even more serious limitation, as the callout box to the right emphasizes, is that the difficulty of conducting RCTs (both time and money) means that there are significant information gaps for most conditions.

In an effort to address these large information gaps, RCHE affiliated faculty Pavlos Vlachos (Mechanical Engineering), Elias Barienboim (Computer Science), and Marvi Bikak (IU School of Medicine) with RCHE Research Scientist Mohammad Adibuzzaman are developing and applying new data science approaches in causal modeling. The researchers are using retrospective (observational) data from electronic health records (EHR) together with clinical knowledge to develop structural causal graphs (Barienboim and Pearl, 2013) to which inference methods can be applied. To demonstrate the approach, they regenerated results from landmark trials in acute respiratory distress syndrome[1] (ARDS) trials (Bikak et al, 2018). These trials considered three ARDS treatment types: tidal volume level in ventilator support (ARMA) (ARDS Network, 2000), level of positive end-expiratory pressure (PEEP) in ventilatory support (ALVEOLI) (BIACT Network, 2004), and the use of neuromuscular blocking agents (ACURASYS) (Papazian et al, 2010). They examined the medical records of patients who had ARDS onset within 48 hours of admission using the same inclusion criteria as the selected trials. They found survival rates for the observational study were very similar to the trials. Further, although the PEEP trial found an effect but that it wasn't significant, it had relatively few patients in the trial (n=300). The much larger number of patients in the researcher's observational study (n=14,110) found the same effect, but that it was indeed significant. This demonstrates that data science methods can be used to either supplement RCTs or to estimate causal effects of interventions without even having to conduct an RCT.

The researchers are also estimating what is known as the "efficacy-effectiveness gap" in RCTs (Nordon et al., 2016), which is the difference between the magnitude of an intervention effect that an RCT estimates and what the actual magnitude is in practice (which tends to be lower). This is extremely important because it informs clinicians of what the impact of an evidence-based intervention would be in their specific setting. Further, it helps to personalize treatment for specific groups.

A Community Driven Approach to Address Opioid Use Disorder

Indiana's drug overdose deaths rose from 1,571 in 2017 to 1,808 in 2018, a greater than 15% increase (CDC, 2018a). Further, Indiana's emergency department (ED) visits due to opioid overdose increased by 40% from July 2016 to September 2017 (CDC, 2018b). The problem is particularly challenging due to limited access to for individuals with opioid use disorder (OUD) to treatment. The Surgeon General stated in his report Facing Addiction in America (HHS, 2018) "because substance misuse has traditionally been seen as a social or criminal problem, prevention services were not typically considered the responsibility of health care systems; and people needing care for substance use disorders have had access to only a limited range of treatment options that were generally not covered by insurance". This is particularly important

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[1]ARDS occurs when fluid builds up in the alveoli (air sacs) in your lungs. This prevents the lungs from filling with enough air, which in turn deprives the organs on needed oxygen. Sepsis is the primary cause of ARDS, and the risk of death is significant.

in rural counties where opioid poisonings have increased at a rate greater than their urban counterparts and less treatment access is available individuals living in these counties.

In October, we were awarded a $12M grant from the Centers for Medicare & Medicaid Services (CMS) through the Indiana Family Social Services Administration (FSSA), $4M of which is being applied to "An HIT-Enabled Community-Wide Approach to Opioid Treatment". In addition, we received a $1.1M grant from Health and Human Services (HHS) entitled "Empowering a Rural

> It takes a typical opioid addicted user 8 years – and 4 or 5 treatment attempts – to achieve remission for a single year. (Kelly, 2018) Yet...only 10% of individuals of the addicted population have access. (Jack et al, 2017)

Community to Respond to Prescription Opioid Abuse". A team of RCHE-affiliated faculty from nursing (Nicole Adams and Tera Hornbeck), pharmacy (Dan Degnan), biomedical engineering (Nan Kong), industrial engineering (Paul Griffin), and Health and Human Sciences (Laura Schwab Reese) together with staff from Purdue Healthcare Advisors (PHA) (Andrew Cabamalan, Mark Claire, Randy Hountz, and Tatlin Resetich) and a group of graduate students are leading these efforts.

The goal of the work for FSSA is to improve patient care regarding opioid addiction treatment and referral coordination in Indiana. We will make improvements through advanced Meaningful Use and referral management, system analysis design, and community involvement, for regional mental health and addiction, primary care, hospital, and specialty care providers. Efforts are intended to reduce opioid prescribing and increase referrals and treatment to addiction services. Implementing these interventions can be facilitated by making more clinical and social information available at the point of decision-making. This means improving EHR interoperability and the use of other information technology systems such as INSPECT, Indiana's prescription monitoring program, are at the heart of addressing the opioid crisis. In addition, advanced analytics are being developed to identify Medicaid patients with a high risk of opioid-related overdose, non-compliance, relapse or new addiction, and to identify patients that have a high likelihood of responding to non-opioid/medication pain treatments. Further, we are working to develop methods that identify, prototype, and when relevant implement, telehealth, mobile unit, home-based and other technologically-enabled means of multiplying capacity and improving access to health services needed to avoid and manage opioid related problems. The activities will be piloted in two Indiana counties, including Tippecanoe.

Fayette County is being used as the pilot site for the HHS work and involves several community partners including Fayette County Health Department, Fayette Regional Health System, behavioral health providers Centerstone and Meridian Health, and a community advisory board that includes law enforcement, local government, schools, and pharmacies. The goal of the HHS work is to reduce prescription opioid abuse as well as increase patient access to addiction treatment and recovery services in a rural area with the five objectives shown in the figure to the right.

Building Capacity for Vulnerable Populations in Global Health

Several of our faculty affiliates and research scientists are conducting research to improve access to healthcare in resource-constrained countries including Bangladesh, Kenya, and Uganda. This work is funded by several sources including the Gates Foundation, USAID, and the National Institutes for Health (NIH).

For the Gates Grand Challenge Grant research, industrial engineering faculty Yuehwern Yih and Seokcheon Lee and RCHE research scientist Md. Munirul-Haque are improving the maternal health supply chain in Uganda to save lives at child birth. The researchers are collaborating with ResillientAfrica Network, Management Science for Health, and health providers in the Mukono district of Uganda. The goal is to

Achieving health equity in our lifetime, it's not just a possibility but an imperative, because everyone deserves a chance to live a healthy and productive life. (Gates, 2018)

reduce the mortality rate by preventing stock outs of essential medicines required at child birth. An integrated solution that triangulates patient data, laboratory data, and stock data accurately predicts demand for essential supplies. This integrated solution, named E+TRA Health, enables health workers to enter data and retrieve information on handheld devices. While the embedded analytics tool is learning from the incoming data in real time, E+TRA Health is designed to work in environments with limited internet connectivity. Currently this system has been deployed in two health centers, Kojja Health Center IV and Mukono Health Center IV and the research team is actively monitoring the data usage activities daily and supporting the health providers. In addition, the system is designed based on DHIS II forms, which are in use in Uganda and many African countries. Hence, E+TRA Health is positioned for diffusion into other regions. The impressive results led to Yih et al. to be invited to submit for Phase II funding, which is currently under review. Note that only 5% of Phase I projects were invited.

In the area of global health, RCHE Associate Director Yuehwern Yih was co-principal investigator on a $70M effort that was awarded to Purdue by USAID. The purpose is to "leverage the intellectual prowess, knowledge, and in-country experience of our university partners to co-create research solutions to pressing development challenges". Purdue will serve

as the lead of this network and Yih will serve as co-academic lead of the initiative, which is called LASER PULSE. This will bring several new opportunities in global health for RCHE-affiliated faulty.

Summary of RCHE-Supported Research Efforts

In order to pursue a proactive, patient-centered, and wellness-focused healthcare delivery system, we have supported research efforts in our three strategic areas: i) health analytics, ii) capacity management, and iii) rural and global health. In addition, we work to continually develop strategic partnerships. Current supported efforts underway at RCHE are provided in the following table. Note that support can come in the form of student support, data/IT support, involvement of RCHE research scientists or other staff. In most cases, this support was leveraged into a corresponding research proposal or externally sponsored project.

Topic	RCHE Researchers	Clinical Partner Researchers
AREA 1: HEALTH ANALYTICS		
Explanatory artificial intelligence: structural causal models for acute respiratory distress syndrome	E. Bareinboim (Computer Science), P. Vlachos (Mechanical Engineering), and M. Adibuzzaman (RCHE)	M. Bikak, MD (IU School of Medicine; Pulmonary Medicine)
Outcomes from the use of antipsychotics in patients with delirium in the ICU: a big data approach	M. Adibuzziman (RCHE) and P. Griffin (RCHE)	W. Ingram, PhD (Johns Hopkins and Geisinger; Department of Psychiatry) and R. Adib (Marquette University)
Framework software for integrated data-driven reproducible research to support healthcare delivery	A. Grama, J. Blocki, and A. Kate (Computer Science), M. Adibuzzaman (RCHE)	B. Karunakaran, MS MBA (Geisinger; Vice President of Enterprise Data Management)
Prediction of intravenous medication use error after concentration change	R. Reklaitis (Chemical Engineering) and P. Delaurentis (RCHE)	B. Benneyworth, MD (Riley Hospital; Critical Care Medicine)
Risk Stratification for Atrial Fibrillation for Intensive Care Unit Patients with Transient Ischemic Attack or Stroke	X. Wang (Statistics) and M. Adibuzziman (RCHE)	R. Zand, MD (Geisinger; Director of Clinical Stroke Operations) and V. Abedi, PhD (Geisinger; Critical Care)
A machine learning approach to estimate the impact of a cardiovascular intervention on population health	P. Griffin (RCHE) and R. Hountz (PHA)	A. Kho, MD (Feinberg School of Medicine) and Theresa Walunas, PhD (Feinberg School of Medicine)
AREA 2: CAPACITY MANAGEMENT		
Cost effective quality care for Indiana's long-term care Medicaid patients	D. Degnan (RCHE). R. Hountz (PHA), M. Clare (PHA), G. Arling (Nursing),	Centers for Medicare & Medicaid Services; Indiana Family and Social

	K. Abrahamson (Nursing), Z. Hass (Industrial Engineering), P. DeLaurentis (RCHE)	Services Administration; various community partners
An HIT-enabled community-wide approach to opioid treatment	N. Adams (Nursing), T. Hornbeck (Nursing), D. Degnan (RCHE), N. Kong (Biomedical Engineering), R. Hountz (PHA), M. Clare (PHA), M. Cabamalan (PHA), P. Griffin (RCHE), P. Huang (RCHE)	Centers for Medicare & Medicaid Services; Indiana Family and Social Services Administration; various community partners
Improving health outcomes and efficiency in chronic obstructive pulmonary disease	J. Thomas (Pharmacy) and Y. Yih (Industrial Engineering)	IU Health Goshen Hospital
Optimizing trauma care network design	N. Kong (Biomedical Engineering)	P. Parik, PhD (Boonshoft School of Medicine; Surgery)
The impact of infusion practices on nursing outcomes	B. Dunford (Krannert)	Four nursing associations in the US and Canada
Empowering a rural community to respond to prescription opioid abuse	R. Hountz (PHA), P. Griffin (RCHE), T. Resetich (PHA), E. Morrison (Discovery Park), W. Burgess (Purdue Evaluation Center), M. Clare (PHA)	Health and Human Services; various community partners in Fayette County
AREA 3: RURAL AND GLOBAL HEALTH		
mHematology for care and management of sickle cell patients in sub-Saharan Africa	Y. Kim (Biomedical Engineering) and M. Munril-Haque (RCHE)	M. Were, MD (Vanderbilt School of Medicine; Department of Biomedical Informatics)
Mobile-based care for children with autism spectrum disorder using remote experience sampling method (mCARE)	A. Schwichtenberg (Human Development and Family Services) and M. Munril-Haque (RCHE)	University of Toronto and BSMMU, NIMH in Bangladesh
Demand sensing to support maternal and newborn health	Y. Yih (Industrial Engineering) and S. Lee (Industrial Engineering)	ResilientAfrica Network, Manangement Science for Health Uganda, various health providers in Mukono
Non-invasive anemia detection	Y. Kim (Biomedical Engineering) and M. Munril-Haque (RCHE)	A. Suvannasankha, MD (IU School of Medicine)
Understanding nursing intuition in home care settings	D. Yu (Industrial Engineering), Brad Duerstock (Industrial Engineering), T. Hornbeck (Nursing), P. Karagory (Nursing)	Hill Rom
BoilerWoRx – smart mobile health initiative	C. Ott (Pharmacy), C. Scott (Pharmacy)	Various community partners

Brief summaries of the research projects are provided in the 2018 June Board Supplement Document.

RCHE Educational Efforts

RCHE impacts of the educational experience of Purdue students by providing meaning research experiences and in supporting educational programs. The main efforts are:
- Support of undergraduate research – we supported numerous undergraduate students through the Discovery Park Undergraduate Research Initiative (DURI) and the Summer Undergraduate Research Fellowship (SURF). In each case, Purdue provides the majority of the funding and RCHE provides match. Students worked with RCHE affiliated faculty and RCHE research scientists.
- Summer actuarial science program – each summer, we provide a research experience for a group of actuarial science students. This summer seven students were given access to Purdue claims data in order to build a program to help individuals choose the best insurance plan based on their distinct characteristics.
- Data Mine – RCHE developed a new program this year to support between 25-50 undergraduate students interested in data science in healthcare. The program includes a research experience and a 1-credit hour course on an introduction to health analytics.
- Master of Science in Health Systems Engineering – A new MS program, developed by RCHE Associate Director Yih, will be offered starting the Spring 2019. It will be run through the Industrial Engineering program, but open to all qualified majors. It will include an internship experience with Purdue Healthcare Advisors.

RCHE Events

In order to increase Purdue faculty and student engagement with RCHE, we held several events in 2018 such as seminars and a conference.

Events and Activities
- We held several seminars in 2018, including: i) Pinar Keskinocak, George Chair of Industrial Engineering at Georgia Tech, ii) Wendy Ingram, Johns Hopkins Bloomberg School of Public Health, iii) Colin Walsh, Biomedical Informatics at Vanderbilt University Medical Center, iv) Martin Were, Vanderbilt Institute for Global Health at Vanderbilt University Medical Center, and v) Martine Bellanger, French School of Public Health, University Sorbonne Paris Cite.
- Faculty Networking Events – Three networking events were held, which started with a set of faculty discussing a healthcare topic (e.g., Data Science in Healthcare), followed by a social time to network. We use this as a way to introduce and engage faculty with RCHE.

- REMEDI Pump Collaborative Conference – Held in the Big 10 Conference Center in Chicago on April 18 - 20, 2018. The goal is to bring together the collaborative community of pharmacists, nurses, researchers, and vendors. It was the largest attended conference with over 80 participants and 20 speakers. Participating providers included University of Michigan Health, Ochsner Health, Aurora Health, Medical College of Wisconsin, University of Iowa Hospitals, and Eskenazi Health. Vendors included Baxter, B. Braun, and BD. The heads of the American Society of Health-System Pharmacists, Institute for Safe Medication Practices, ECRI Institute, and Joint Commission also presented.
- Visit to Promote a Community Response to Opioids – Arranged by government relations firm Lewis Burke, RCHE affiliates traveled to Washington DC to visit the Indiana delegation, the Surgeon General (Jerome Adams), the head of NIH Healing Communities (Jack Stein), and USDA Assistant to the Secretary (Anne Hazlett).
- Webpage Redesign - We implemented a new webpage in order to provide a better online description of what RCHE does.
- Operations Manager – We hired Maralee Hayworth as a new Operations Manager for RCHE. Her efforts have helped us to realign our budget and implement several important changes for the Center to improve our partner engagements.

Purdue 150th Ideas Festival

- This year is Purdue's 150th anniversary. In response, Purdue is hosting a 150th Ideas Festival to promote for areas. Health and longevity is one of the four theme areas, and RCHE is involved in the planning of the events. To date, there have been multiple events including i) a visit and talk from Centers for Medicare and Medicaid Administrator Seema Verma, ii) a talk from Harvard psychology professor and author Steven Pinker, and iii) an international breast cancer prevention symposium.

Purdue Healthcare Advisors Update

Purdue Healthcare Advisors (PHA) is Regenstrief Center's not-for-profit outreach initiative for the healthcare industry. A staff of over 30 specialists consult, coach, and train healthcare professionals in various capacities in both hospitals/health systems and physician practices. PHA's three service lines are: 1) health information technology security, 2) process improvement, and 3) quality services, including Medicare payment reform.

PHA has participated in multiple large initiatives in 2018. Examples include:
- *Great Lakes Practice Transformation Network* (GLPTN) – this $46M grant is part of a national effort to work alongside healthcare professionals to improve the quality and reliability of care. Led by the IU School of Medicine (Malaz Boustani, MD) and including Northwestern University, Altarum Institute, and Kentucky Regional Extension Center, PHA is partnering with over 5,000 providers to transform their practice in preparation for upcoming health care mandates and share their learnings.

- *Healthy Hearts in the Heartland* (H3) – this is a $15M federally funded research program working with small practice clinics in the Midwest to implement and evaluate quality improvement strategies for cardiovascular care. H3 is led by Northwestern University (Abel Kho, MD) and is part of the Agency for Healthcare Research and Quality's EvidenceNOW grant initiative. PHA is helping roughly 300 participating providers to build reporting infrastructure, prepare for value-based reimbursement, and strengthen prevention for heart disease.
- *CMS MACRA Support for Small Practices (QPP)* – this is a 1.4M federally funded grant through Altarum Institute. The MACRA-Provider Resource Network (M-PRN) provide clinicians in the Midwest customized direct technical assistance to deliver care efficiently and with a patient-centric approach. Working to enroll eligible providers in rural and underserved areas to leverage relationships. Operate a helpdesk to answer questions and give virtual coaching on MACRA, MIPS, and APMs.

PHA has also initiated several new initiatives in 2018. Examples include:
- *Smoking Cessation Program* – Funded by the Indiana Family Social Services Administration, PHA is helping to improve access to tobacco cessation products and counseling services for Indiana Medicaid (HIP) enrollees. Note that HIP members have 12 months to stop using tobacco or else their POWER Account Contribution increases by 50%.
- *PHA Direct* – As mentioned in the 2018 June Board Summary Report, PHA launched a new online platform for instruction, coaching and community building. The platform is called PHA Direct. Their initial offerings have focused on lean training (lean immersion and lean daily improvement). One of the organizations that PHA is providing the service for is the Alliance for Academic Internal Medicine. We anticipate that additional offerings will be rolled out next year that focus on soft-skills development for physicians such as resilience and motivational interviewing. Note that PHA Direct will also be an important component for training in the HHS funded grant "Empowering a Rural Community to Respond to Prescription Opioid Abuse".

- *St. Vincent Care Coordination Command Center (C4)* – PHA helped St. Vincent in the design of a C4 to centralize scheduling, determine the right number of call representatives (staff to demand) in place based on call volumes, and provide call center representative onboarding and training to support the addition of 49 clinics.

Blended Proposals – As mentioned in the June 2018 report to the Board, it is a goal of RCHE to focus on implementation science in healthcare delivery by having RCHE-affiliated faculty and PHA staff work together on proposals when appropriate. We have written three proposals together that were funded in 2018:
- *An HIT-Enabled Community-Wide Approach to Opioid Treatment* ($4M over 2 years)
- *Cost Effective Quality Care for Indiana's Long-Term Care Medicaid Patients* ($4M over 2 years)

- Empowering a Rural Community to Respond to Prescription Opioid Abuse ($1.1M over 3 years)

Each of these funded grants include a team from PHA staff, Purdue faculty (biomedical engineering, health and human sciences, industrial engineering, management, nursing, and pharmacy). We believe that we are uniquely positioned to do this kind of research and that the synergistic combination of capabilities ensures that the result will be impactful in the implemented sites and across the academic community.

REMEDI Update

The Regenstrief National Center for Medical Device Informatics (REMEDI) is an evidence-based community of practice that uses a collaborative HUB to collect data that has been captured and stored on medical devices such as smart infusion pumps. REMEDI enables vendor-neutral analytics and reporting to improve patient safety. From January 2018, the number of participants has grown from 292 hospitals in 23 states to 437 hospitals in 32 states.

In the past, there was no cost for membership to REMEDI. Starting in December, an annual subscription-based model was initiated that will charge for membership for both hospitals and vendors. There is a tiered subscription fee depending on size. The annual membership fees range from $1,200 to $12,000 for hospitals and from $15,000 to $50,000 for vendors.

In September, REMEDI was awarded the Lucian Leape Institute Medtronic Safety Culture & Technology Innovator award. REMEDI was recognized for its work in advancing patient safety.

Endowment Update

As part of the 2019-2024 Grant Agreement with the Regenstrief Foundation, we are raising funds to match with the grant to support faculty and students through endowed positions. As of November 2018, we have raised $1.15M that we have matched for a total of $2.3M. Our goal is to raise $7M by 2024 for a total of $14M. The following endowments have been raised to this point:

- John W. Anderson Graduate Scholarship Endowment - $150,000, which was matched for a total of $300,000. This will be used to support graduate students on RCHE research projects.
- John Christian & Paul Ziemer Assistant/Associate Professorship for the School of Health Sciences - $500,000 from donor, which was matched for a total of $1,000,000. This will be used to support a faculty member in Health Sciences that will work with RCHE.
- Barner-Gross Rising Star Professorships for the School of Biomedical Engineering - $500,000 from the donor, which was matched for a total of $1,000,000. This will be used to support two assistant/associate professors in Biomedical Engineering that will work with RCHE.

Note that there have been discussions with several other alumni that are interested in potentially providing gifts. We are optimistic that we will be able to meet our fundraising goal.

RCHE Financials

Revenue
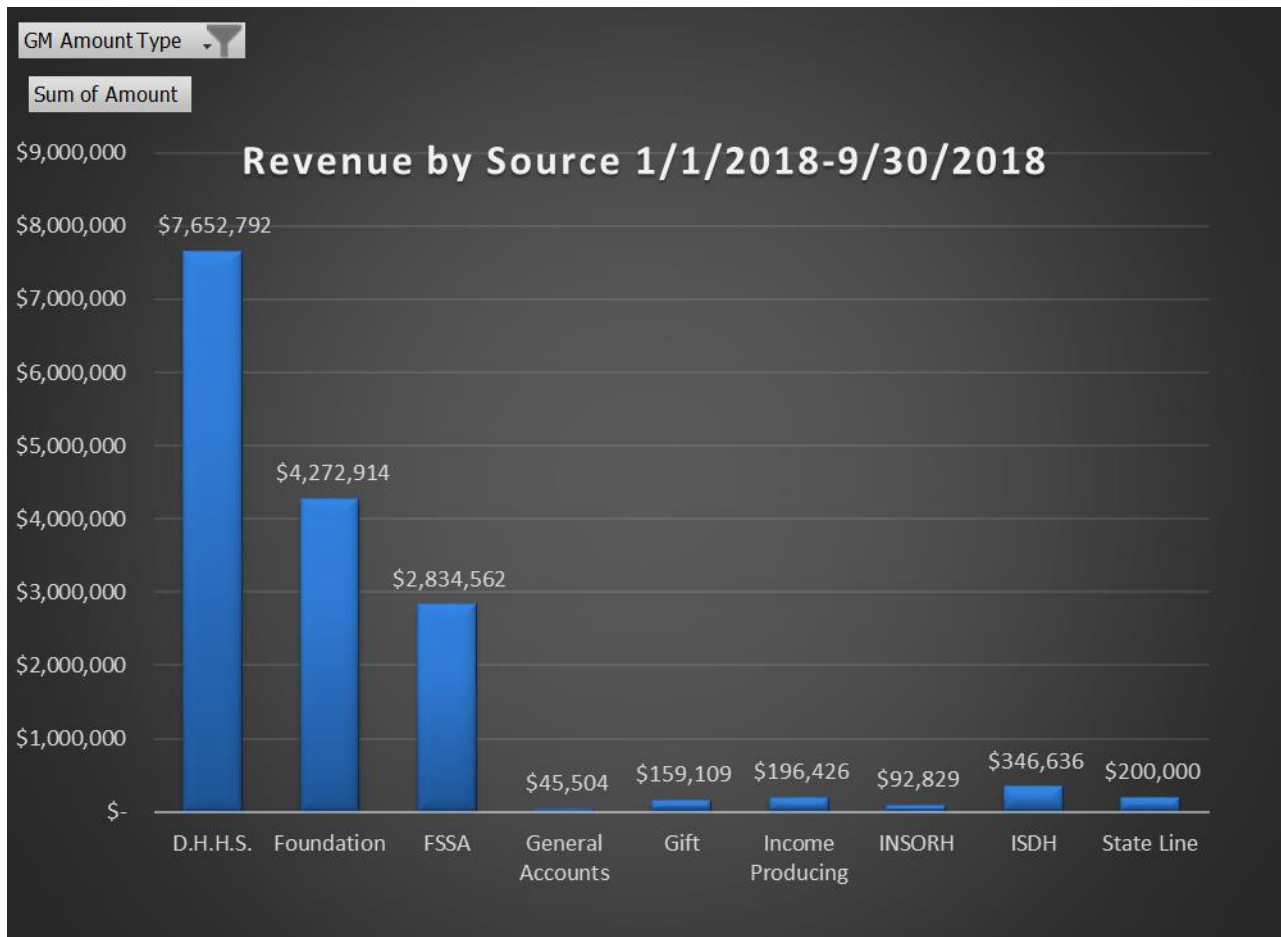
Note – the foundation accounted for are based on the carryforward allotment of the grant and not when revenue is recognized. We will account for this annually as $2M starting July 1, 2019. $2M of the $4,272,914 starting balance at July 1, 2018 have been dedicated for the Regenstrief Endowment Match.

Purdue Cost Share
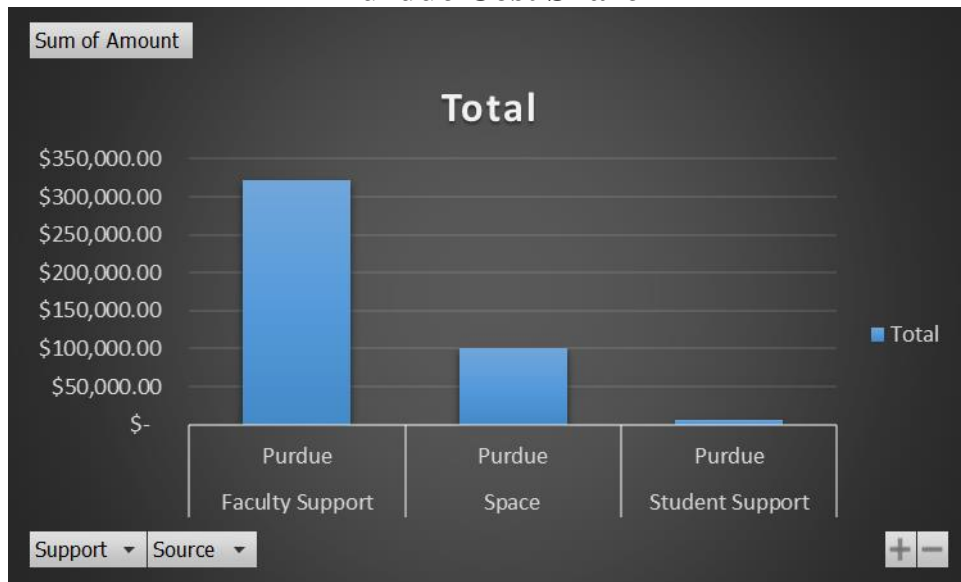
Expenses Based on Funding Source
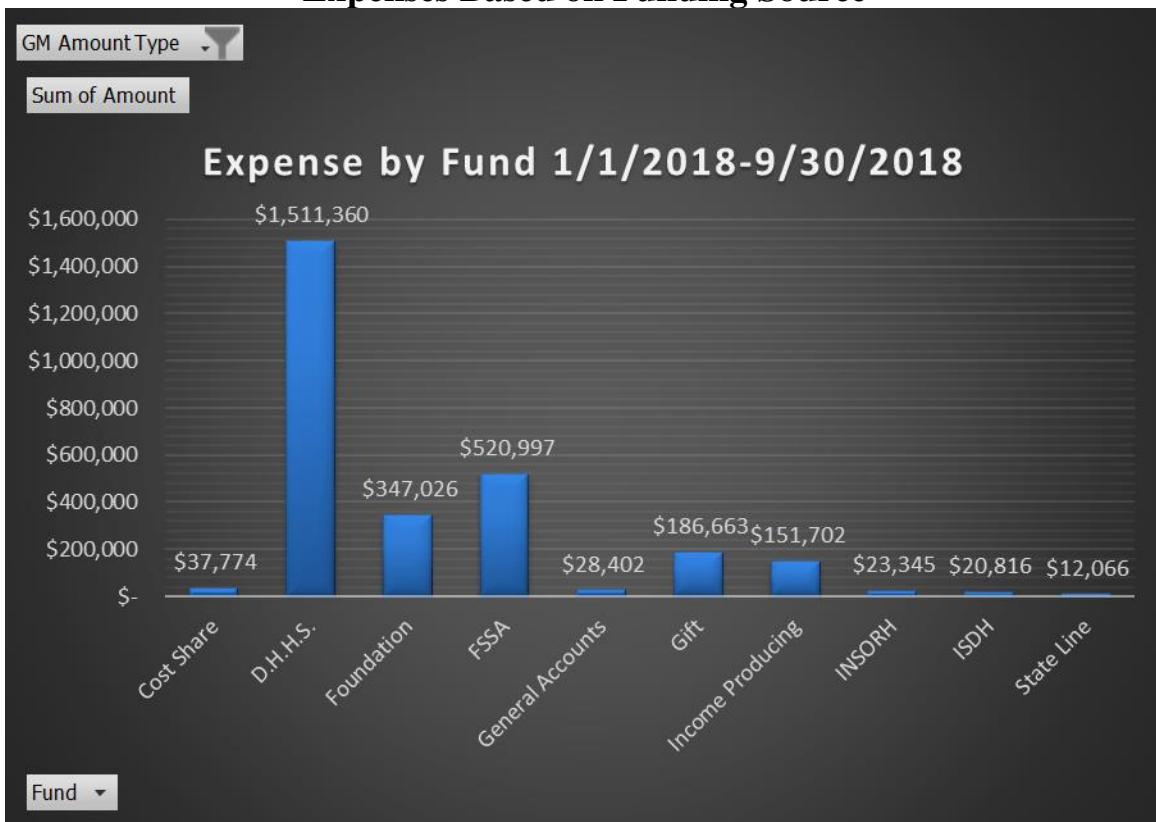
Note – Our income producing accounts are based on a break-even rate and are not intended to carry a balance from year to year.

Expense Based on Aggregate Type
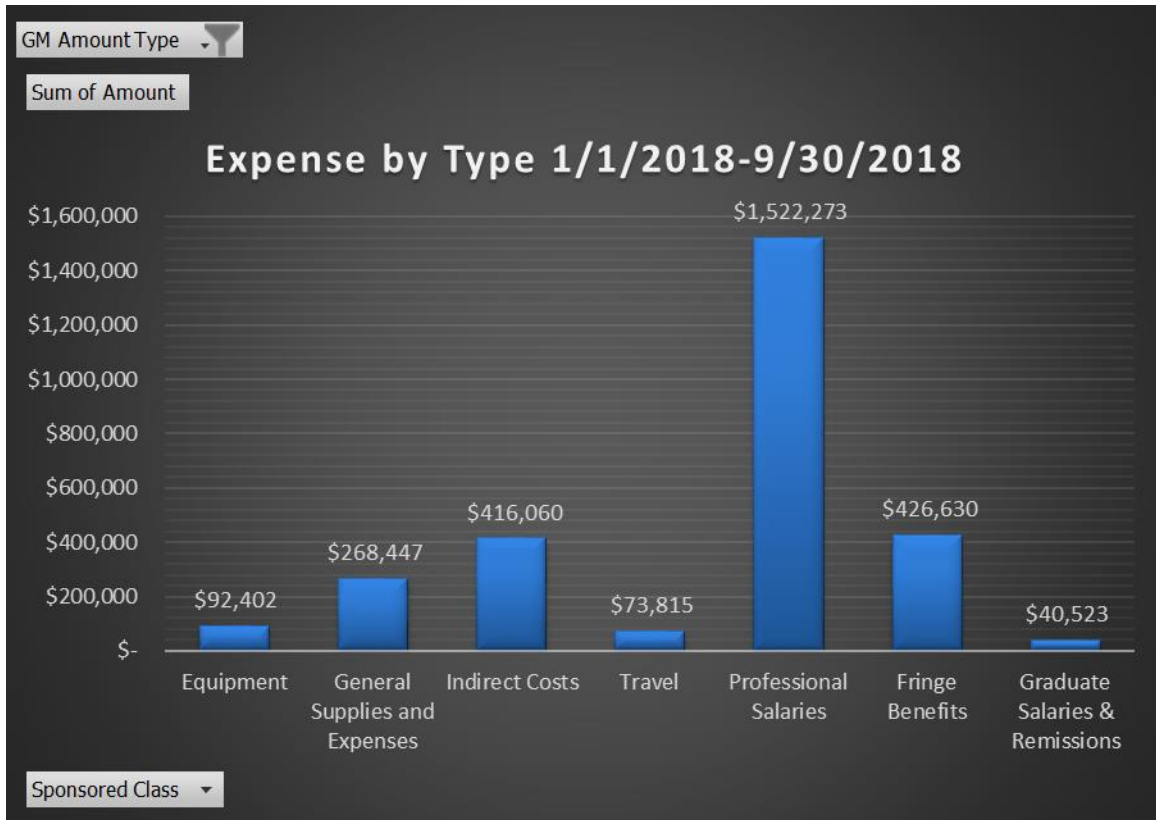
Note – Indirect Costs are associated with our sponsored programs and calculated at various rates. Our Professional salaries accounts for all staff outside of students. We currently have 50 full-time staff supporting all projects and initiatives under Regenstrief Center for Healthcare Engineering.

Going Forward

This has been a year of transition for the Regenstrief Center for Healthcare Engineering. With the renewal in place for 2019-2024 based on the generous $10M gift from the Regenstrief Foundation and an infrastructure put in place based on our strategic plan developed in 2017, we are able to start to achieve our mission of pursuing a proactive, patient-centered, and wellness-focused healthcare delivery system by conducting impactful research that leverages collaborative partnerships.

The infrastructure that has been developed includes:
- A high-performance computing platform implemented this year that supports an open-source "sand box" environment for researchers using clinical data.
- An alignment of our staff and other resources around our three strategic areas of health analytics, capacity management, and rural/global health.
- A set of clinical partners with whom we are regularly conducting research.
- An engaged set of faculty affiliates combined with core faculty positions provided by the College of Engineering that we are starting to fill.
- A unique set of expertise and applied capabilities provided by PHA staff together with a large network of provider collaborators and an online learning platform.

As a result, we have started to show success in obtaining external funding to support our efforts by leveraging this infrastructure. This includes a total of $9.1M in funded proposals that were joint between PHA and RCHE-affiliated faculty. We also secured multiple National Science Foundation and National Institutes of Health (NIH) grants. This was the first year, in fact, that RCHE staff successfully secured funding from the NIH.

As defined in our one-year action plan, in 2019 we will focus on recruiting and hiring outstanding core faculty to RCHE, thoughtfully expand our faculty and clinical affiliates, and successfully conduct research, implementation, and dissemination of our funded projects. We will also continue to develop our blended approach to research with PHA and RCHE-affiliated faculty and students. In addition, we will continue to grow our clinical partnerships and identify opportunities to partner with faculty in the Regenstrief Institute. Finally, we will work to increase our national recognition through press releases, marketing efforts, and dissemination of our research findings.

Overall, we believe that our efforts this year are helping us to achieve our vision of being a leading research institution that generates evidence for the effectiveness and successful adaptation of interventions and policies to improve the quality, accessibility, equity, and affordability of healthcare delivery. The generous investments that the Regenstrief Foundation and Purdue have made in us have been key to putting us in this position.

APPENDICES

APPENDIX A: RCHE Faculty Position Ad

PURDUE
UNIVERSITY
COLLEGE OF ENGINEERING
FACULTY POSITION IN DATA SCIENCE FOR HEALTHCARE-RELATED DEVICES AND MONITORING

Healthcare-related devices and IoT sensors are changing the way we support population health and wellness by providing remote and real-time information that can be analyzed and acted upon. This information can help to improve access, empower individuals in their decisions and self-management, provide notifications to providers, predict health events, and improve diagnostic accuracy. Key challenges include security and compliance, integration and interoperability, fusion of heterogeneous data, and development of appropriate data science methodologies that support evidence-based care.

We are seeking a highly qualified individual with expertise in data science applied to healthcare, and in particular, to healthcare-related devices and monitoring. Areas of emphasis include deep learning, explainable artificial intelligence, causal inference, predictive analytics, transportability of causal and statistical relationships, connected care, IoT analytics, and remote monitoring/point of care analytics. New faculty are sought to build strong research programs working in collaboration with Purdue's Regenstrief Center for Healthcare Engineering. The goal is preeminence in healthcare engineering research combined with extraordinary impact on healthcare delivery and community engagement for improving outcomes that are proactive, patient-centered, and wellness-focused.

Candidates must hold a Ph.D. in biomedical engineering, computer engineering, computer science, electrical engineering, industrial engineering, mechanical engineering, statistics, or a related field. The focus is on the assistant professor level, but outstanding individuals at all levels of experience will be considered. The successful candidate will conduct original research, advise graduate students, teach undergraduate and graduate level courses, and perform service both at the School and University levels. Candidates with experience working with diverse groups of students, faculty, and staff and the ability to contribute to an inclusive climate are particularly encouraged to apply.

Purdue University's College of Engineering is committed to advancing diversity in all areas of faculty effort, including scholarship, instruction, and engagement. Candidates should address at least one of these areas in their cover letter, indicating their past experiences, current interests or activities, and/or future goals to promote a climate that values diversity and inclusion.

Submit applications online at https://engineering.purdue.edu/Engr/AboutUS/Employment/Applications, including a letter of interest, curriculum vitae, academic transcripts, statements of approach, teaching and research plans, and names of five references. For information/questions regarding applications, contact the Office of Academic Affairs, College of Engineering, at coeacademicaffairs@purdue.edu. Questions regarding the position may be addressed to the chair of the search committee, Professor Paul Griffin

paulgriffin@purdue.edu. Review of applications will begin on September 1, 2018 and will continue until the position is filled. A background check will be required for employment in this position.

Purdue's main campus is located in West Lafayette Indiana, a welcoming and diverse community with a wide variety of cultural activities, events, and industries. Purdue and the College of Engineering have a Concierge Program to assist new faculty and facilitate their relocation.

Purdue University is an EOE/AA employer. All individuals, including minorities, women, individuals with disabilities, and veterans are encouraged to apply.

APPENDIX B: Two-Page CV for Zachary Hass

Zachary J Hass
Office: Johnson 247B
502 N University St, West Lafayette, IN 47907
Email: zhass@Purdue.edu
Office: 765-494-4020
EDUCATION
Purdue University, West Lafayette, Indiana
Ph.D. Statistics (August 2017)
M.S. Applied Statistics (May 2013)
Case Western Reserve University, Cleveland, Ohio
B.A. Statistics and Economics (May 2011)
Minor Banking and Finance
EMPLOYMENT HISTORY

Assistant Professor Fall 2018 – Present
Purdue University, Schools of Nursing and Industrial Engineering, West Lafayette, IN
· Regenstrief Center for Healthcare Engineering Core Faculty
· Health services research with a focus on program evaluation and health outcomes for older adults
· Teach graduate and undergraduate statistical courses with applications in health care and engineering
· Service to the University, mentoring students, and engagement with the community

Post-Doctoral Research Associate Fall 2017 – Fall 2018
Purdue University, School of Nursing, West Lafayette, IN
· Data management and statistical modeling for gerontology and health care research group (SAS, R, MPlus)
· Author and assist in preparation of manuscripts, give research presentations (both local and national)
· Consult/collaborate with nursing faculty on research projects, statistical modeling and interpretation
· Assist in design/implementation of new Applied Statistics in Healthcare course for new PhD program

Research Assistant Fall 2013 – Fall 2017
Purdue University, School of Nursing, West Lafayette, IN
· Data management and statistical modeling for gerontology and health care research group (SAS, R, SPSS)
· Produce papers and give presentations

Stat Crew Keyer Fall 2013 – Present
Purdue University, Athletic Communications Department, West Lafayette, IN
· Transcribe statistician's game call live for official record for media and NCAA (FB, VB, MBB, WBB)

Graduate Student Mentor – HHMI REU Summers 2014, 15
Purdue University, Biology Department, West Lafayette, IN
· Statistical consultant on life science undergraduate summer research projects
· Serve as mentor, social organizer, and lead quantitative training sessions for non-statistical audience (SPSS)

Measurement Science Intern Summer 2013
The Neilsen Company, Measurement Science Division, Schaumburg, IL
· Develop and implement Data Fusion sample maintenance program for new big data product (SAS/UNIX)

Teacher's Assistant and Student Statistical Consultant Fall 2011 – Spring 2013
Purdue University, Statistics Department, West Lafayette, IN
· Provide statistical advice to graduate students and professors for their research projects (2 semester)
· Grade, give review lectures, write quizzes, assist new TAs, run computer lab (SPSS, R, SAS, TA Award)

Actuarial Intern Summers 2011, 12
The Erie Insurance Group, Actuarial Division, Modeling Team, Erie, PA

· Test and create documentation for TreeNet software, build life insurance propensity model (TreeNet, SAS)
· Investigate stability and pricing impact of new rating variables over time (SAS)

Teacher's Assistant August 2010-May 2011
Case Western Reserve University (Economics Dept.), Cleveland, Ohio
· Econometrics, hold review sessions, grade assignments, serve as point of contact (STATA)

Business Process Analyst Intern Summer 2010
Goodyear Tire & Rubber Company, Corporate IT, Akron, Ohio
· IT project management process improvement, research and implement best practices

Football Office Assistant Fall 2007-May 2011
Case Western Reserve University, Cleveland, Ohio
· Assist in new player recruitment and game film management

CURRENT RESEARCH PROJECTS
Cost-Effective Quality Care for Indiana's Long-Term Care (PI: Randall Hountz) Fall 2018 – Present
· Indiana Family and Social Services Administration

Adult Protective Services (PI: Marion Liu) Fall 2018 – Present
· Evaluation of impact of ISO matrix intervention on reducing elder abuse

Transitions in Care for Older Nursing Home Residents with Dementia (PI: Dongjuan Xu) Spring 2018 – Present
· Trajectory analysis of dementia cohort

Impact of Life Events on Physical Activity (PI: Libby Richards) Fall 2017 – Present
· Secondary data analysis using American Changing Lives survey, latent class trajectory analysis

Clinton County Health Assessments (PI: Vicki Simpson) Fall 2017 – Present
· Latent class trajectory analysis for community intervention impact on blood pressure management

Study of a State-Level Model for Transitioning Nursing Home Residents to the Community (PI: Greg Arling), Health Services Research Demonstration and Dissemination Grants (R-18), Agency for Healthcare Research and Quality Spring 2015 – Present
· Evaluation of program impact

Evaluation of Department of Human Services Continuing Care Policy Initiatives (PI: Greg Arling), Minnesota Department of Human Services Spring 2015 – Present
· Development and quarterly updating of nursing home QI for community discharge and hospitalization
· Assessing the impact of the Level of Care legislation in Minnesota
· Program evaluation of Value Based Reimbursement program

RESEARCH PROPOSALS
Impact of Medical Errors on Advanced Nurse Practioners
· Assisting in preparation of grant

Community Clinics Health Assessment
· Assisting in preparation of grant

Bethany Christian Services
· Program Evaluation

Evaluation of Integrated Education program on Nurse Confidence in Clinical Decision Making
· Assisting in preparation of grant

MANUSCRIPTS IN THE DEVELOPMENT STAGE
· Do RTCI discharged residents experience similar outcomes to their peers? Primary Author.
· Medicaid Cost Savings of RTCI Community Discharges. Primary Author
· Clinton County Community Health Assessments Impact on Blood Pressure Trajectories. Secondary Author.
· Division of Credit Modeling for NCAA Volleyball, a proof of concept. Primary Author.

PUBLICATIONS UNDER REVIEW
· Impact of RTCI on Community Discharge Rates using Regression Discontinuity. Submitted March, 2018. Primary Author.

· A Longitudinal Examination of the Impact of Major Life Events on Physical Activity. Submitted February, 2018. Secondary Author.

· Health Promotion Behaviors of Air National Guard Reservists: A Descriptive Correlational Study. Submitted September 2018. Secondary Author.

PUBLICATIONS
Peer Reviewed
· Abrahamson, K., Hass, Z., & Arling, G. (2018). Shall I stay or shall I go? The choice to remain in the nursing home among residents with high potential for discharge. Journal of Applied Gerontology. (in press)

· Hass, Z. and Craig, B.A. Exploring the Potential of the Plus/Minus in NCAA Women's Volleyball via the Recovery of Court Presence Information (2018). Journal of Sports Analytics. (in press)

· Unroe, K., Hickman, S.E., Carnahan, J.L., Hass, Z., Sachs, G.A., Arling, G. (2018). Investigating the Avoidability of Hospitalizations of Long Stay Nursing Home Residents – Opportunities for Improvement. Innovation in Aging, 2(2).

· Unroe, K., Carnahan, J.L., Hickman, S., Sachs, G., Hass, Z., Arling, G. (2018). The Complexity of Determining Whether a Nursing Home Transfer is Avoidable at Time of Transfer. Journal of American Geriatrics Society, 66, 895-901.

· Hass, Z., Woodhouse, M., Kane, R., & Arling, G. (2018). Modeling Community Discharge of Medicaid Nursing Home Residents: Implications for Money Follows the Person. Health services research, 53(4).

· Abrahamson, K., Hass, Z., & Sands, L. (2017). Likelihood that expectations of informal care will be met at onset of caregiving need: a retrospective study of older adults in the USA. British Medical Journal Open. (Epub ahead of print)

· Noureldin, M., Hass, Z., Abrahamson, K., & Arling, G. (2017). Fall risk, supports and services, and falls following a nursing home discharge. The Gerontologist.

· Hass, Z., Craig, B. A., & Schinckel, A. (2017). Proceedings from Conference on Applied Statistics in Agriculture 2016: Developing Prediction Equations for Fat Free Lean in the Presence of an Unknown Amount of Proportional Measurement Error. Manhattan, Kansas.

· Abrahamson, K., Hass, Z., Morgan, K., Fulton, B., & Ramanujam, R. (2016). The Relationship Between Nurse-Reported Safety Culture and the Patient Experience. Journal of Nursing Administration, 46(12), 662-668.

· Noureldin, M., K. Abrahamson, Z. Hass, Y. Cai, P. Sudyanti, and G. Arling (2016). Living Arrangement and Outcomes at 30 Days after Nursing Home Discharge in Minnesota's RTCI Program. The Gerontologist, 56, 616-616.

· Hass, Z., Levine, M., Sands, L. P., Ting, J., & Xu, H. (2016). The modeling of medical expenditure data from a longitudinal survey using the generalized method of moments (GMM) approach. Statistics in medicine, 35(15), 2652-64.

· Hass, Z., DePalma, G., Craig, B. A., Xu, H., & Sands, L. P. (2015). Unmet Need for Help with Activities of Daily Living Disabilities and Emergency Department Admissions among Older Medicare Recipients. The Gerontologist, 57(2), 206-210.

· Abrahamson, K., Z. Hass, and L. P. Sands (2015). Factors that Influence the Likelihood of Met Versus Unmet Expectations for Informal Care. The Gerontologist, 55, 755-755.

· He, S., Craig, B. A., Xu, H., Covinsky, K. E., Stallard, E., Thomas, J., ... & Sands, L. P. (2015). Unmet need for ADL assistance is associated with mortality among older adults with mild disability. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 70(9), 1128-32.

· Hass, Z. J., Zhou, Z., & Craig, B. A. (2015). Proceedings from Conference on Applied Statistics in Agriculture 2014: Developing Prediction Equations for Carcass Lean Mass in the Presence of Proportional Measurement Error. Manhattan, Kansas.

· Hass, Z., Woyczyński, W. A., Yanosko, C., & Becker, E. (2012). A Lost Opportunity: Recovering the End of Major League Baseball's 1994 Strike Shortened Season. Mathematica Applicanda, 40.

Other
· Arling, G., Hass, Z., and Woodhouse, M. (2018). Evaluation of Changes in Minnesota's Change in Nursing Facility Level of Care (NF-LOC) Criteria for Nursing Facility Residents. Report submitted to the Minnesota Department of Human Services.

· Arling, Greg et al. (2017). Return to Community Initiative (RTCI) Evaluation Final Report: Quantitative Findings. (AHRQ Project Report).

· Hass, Z. J. (2017). Division of Credit Modeling for Team Sports with an Emphasis on NCAA Volleyball (Doctoral dissertation, Purdue University).

· Craig, B. A., Hass, Z., & McCabe, S. (2015). A Statistician Reads the Sports Pages: Easy to Criticize, Harder to Verify: Fourth and Goal in Post-2011 NFL Overtime. CHANCE, 28(2), 54-57.

CONFERENCE PRESENTATIONS
· Hass, Zachary, Mark Woodhouse, David Grabowski, and Greg Arling (2018). "Using Regression Discontinuity to Evaluate the Minnesota Return to Community Initiative's Impact on Community Discharge." Paper presented at the Academy Health Annual Research Meeting, Seattle, WA.

· Hass, Zachary, Mark Woodhouse, and Greg Arling (2018). "Using a Semi-Markov Model and Simulation to Estimate the Medicaid Cost Savings Attributable to Minnesota's Return to Community Initiative." Poster presented at the Academy Health Annual Research Meeting, Seattle, WA.

· Hass, Zachary and B.A. Craig (2017). "Division of Credit Modeling for Team Sports with an Emphasis on NCAA Volleyball." Paper presented at the Great Lakes Analytics in Sports Conference, Stevens Point, WI.

· Hass, Zachary, Mark Woodhouse, Robert Kane, and Greg Arling (2016). "Modeling Community Discharge of Medicaid Nursing Home Residents: Implications for Money Follows the Person." Paper presented at the Academy Health Long Term Services and Supports Interest Group Meeting, Boston.

· Hass, Zachary, Mark Woodhouse, Robert Kane, and Greg Arling (2016). "Modeling Community Discharge of Medicaid Nursing Home Residents: Implications for Money Follows the Person." Poster presented at the Academy Health Annual Meeting, Boston.

· Hass, Zachary, Mark Woodhouse, and Greg Arling (2016). "Building a Care Utilization Model for Minnesota's Return to Community Initiative." Poster presented at the Academy Health Annual Meeting, Boston.

· Hass, Zachary and Bruce Craig (2016). "Determining a +/- metric for NCAA Women's Volleyball using incomplete court presence information." Poster presented at the Joint Statistical Meeting, Chicago.

· Hass, Zachary, Bruce A Craig, Allan Schinckel (2016). Developing Prediction Equations for Fat Free Lean in the Presence of Proportional Measurement Error: Replacing Prior Knowledge with Technical Replicates. Poster presented at the Conference on Applied Statistics in Agriculture, Kansas State University.

· Hass, Zachary, Sean D McCabe, and Bruce A Craig (2014). "NFL Overtime Rule Change: Kick the field goal or go for it?" Poster presented at the Joint Statistical Meeting, Boston.

· Hass, Zachary and Bruce A Craig (2014). "Developing prediction equations for carcass lean mass in the presence of proportional measurement error." Paper presented at the Conference on Applied Statistics in Agriculture, Kansas State University.

· Xu, Jiayun, Zachary Hass, Kathleen Abrahamson, Donna Xu, and Greg Arling (2018). Caregiver Health Among Family Caregivers of Discharged Nursing Home Patients. Poster presented at Gerontological Society of America Annual Scientific Meeting, Boston, MA.

· Arling, Greg., Zachary Hass, Mark Woodhouse, and David Grabowski (2018). Minnesota's Return to Community Initiative is Effective in Reducing Nursing Home Use and Achieving Post-Discharge Outcomes. Paper presented at International Long-Term Care Policy Network 5th International Conference on Evidence-Based Policy in Long-Term Care, Vienna, Austria.

· Richards, Elizabeth, Patricia Thomas, Anna Forster, and Zachary Hass. (2018). A Longitudinal Examination of the Impact of Major Life Events on Physical Activity. The 16th International Conference on Social Stress Research. Athens, Greece.

· Potetz, Janelle, Becky Walters, and Zachary Hass (2018). "Clinical hours beyond the hospital: Incorporating 25% simulation into dedicated education unit clinical models." Poster presented at ATI Nursing Summit, Salt Lake City, UT.

· Hornsby, Claire, Azza Ahmed, Zachary Hass (2018). "Interactive web-based breastfeeding monitoring improves achieving intention to exclusively breastfeed at three months among mothers of full-term infants." Poster presented at Midwest Nursing Research Society Annual Research Conference, Cleveland, OH.

· Arling, Greg, Kathleen Abrahamson, Zachary Hass, Marwa Noureldin, Yun Cai, and Ayu Sudyanti (2016) "Return to Community Initiative Consumer Characteristics and Outcomes." Paper presented at the Gerontological Society of America Annual Research Meeting, New Orleans, LA.

· Noureldin, Marwa. Greg Arling, Kathleen Abrahamson, Zachary Hass, Yun Cai, and Ayu Sudyanti (2016). "Living Arrangements and Outcomes at 30 Days After Nursing Home Discharge among Minnesota Return to Community Initiative Residents." Paper presented at the Gerontological Society of America Annual Research Meeting, New Orleans, LA.

· Arling, Greg, Kathleen Abrahamson, Zachary Hass, Marwa Noureldin, Yun Cai, and Ayu Sudyanti (2016). "Shaill I Stay or Shall I Go? Factors Contributing to a Permanent Nursing Home Stay." Paper presented at the International Nursing Home Research Workgroup Meeting, Barcelona, Spain.

· Abrahamson, Kathleen, Zachary Hass, and Laura Sands (2015). "Factors that Influence the Likelihood of Met versus Unment Expectations of Informal Caregiving." Paper presented at the Gerontological Society of America Annual Research Meeting, Orlando, Fl.

· Abrahamson, Kathleen, Zachary Hass, Kris Morgan, and Brad Fulton (2015). "The Influence of Safety Culture on Hospital Patient Perception of Pain Management." Paper presented at Sigma Theta Tau International Nursing Research Congress, San Juan, PR.

· Abrahamson, Kathleen, Greg Arling, Zachary Hass, and Mark Woodhouse (2015). "Preliminary Outcome Assessment of Community Transitioned Nursing Home Residents." Poster presented at Academy Health Annual Research Meeting, Minneapolis, MN.

· Abrahamson, Kathleen, Zachary Hass, Kris Morgan, Brad Fulton, R. Ramanujam (2015). "Is Safe Care Satisfying?" Poster presented at Academy Health Annual Research Meeting, Minneapolis, MN.

OTHER ACTIVITIES
· National League for Nursing member (2018-Present)
· Academy Health member (2015-Present)
· American Statistical Association member (2013-Present)
· President of Purdue Graduate Statistics Organization (2015-16 academic year)
· Statistical consultant to Purdue Football recruiting (Fall 2015 – December 2016)
· Lafayette Transitional Housing volunteer (2015-Present)
· Co-usher coordinator (Faith West Church, West Lafayette 2013-Present)
· 4 Years Varsity Football (Case Western Reserve University 2007-2010)

APPENDIX C: One Year Action Plan

In this Appendix, we summarize our metrics to this point for the one-year action plan. They are defined in Table 1.

Table 1. Timing of Regenstrief Center action plan activities and goals. Green signifies that we have already achieve the goal, yellow signifies that we are on track to satisfy the goal by Q2, and red signifies that we are unlikely to achieve the metric by Q2 of 2018.

	2017		2018			
Faculty Recruitment	Q3	Q4	Q1	Q2	**Goal**	**Current Metric**
Fulfill Regenstrief Center Faculty position					Filling 2nd of 5 total positions	Currently conducting preliminary interviews with search committee
Identify 2 Rising Star Professors in Biomedical Engineering					Identify 2 candidates for the Gross-Barnes Endowment	Endowment has been established and matched.
Recruitment of faculty affiliates					12 faculty affiliates	Goal Met
Student Recruitment	Q3	Q4	Q1	Q2	**Goal**	**Current Metric**
Develop Regenstrief Center Scholars program					Identify 1 Regenstrief Center Scholar using endowment	Contribution has been secured. Will identify student in spring to support from the endowment starting Fall 2019
Engage undergraduate capstone design with Regenstrief Center efforts, including industrial and biomedical engineering					4 capstone projects	none to date

	Q3	Q4	Q1	Q2	Goal	Current Metric
Graduate Student Seminar Series					Monthly grauate student seminars	Currently planning and will host our first seminar February 2019
Particpate in DURI and SURF undergraduate research programs					Engage undergraduate students with the center throughout the academic year and summer.	Summer 18 - DURI - Matthew Cunningham SURF - Abishek Sharma Spring 2019 - Recruit undergrads for DURI program.
Development	**Q3**	**Q4**	**Q1**	**Q2**	**Goal**	**Current Metric**
Raise matching funds for endowments					2 Million	1.15M or 57%
PHA Engagement	**Q3**	**Q4**	**Q1**	**Q2**	**Goal**	**Current Metric**
Involvement of Regenstrief Center faculty in projects with PHA involvement					Bridge the gap between outreach arm and research faculty on campus.	Won CMS funded grant for 12M allowing collaboration from PHA, faculty and staff within IE, Nursing, and BME. The focus will be on opioid and long-term care.
Involvement of student interns from MS program with PHA					2 interns	
External Advisory Board	**Q3**	**Q4**	**Q1**	**Q2**	**Goal**	**Current Metric**
Hold external advisory board meetings and conference call					Meet twice per year in person.	November 14, 2018 is fall meeting

Communicating Regenstrief Center Success	Q3	Q4	Q1	Q2	Goal	Current Metric
Webpage overhaul					Align the website with current goals and initiatives	Completed fall 2018. We have also added a donations to advertise our match opportunity with Regenstrief Foundation
Invite speakers for distinguished seminar series					2 speakers	Set up private meeting for students with Administrator Verma. Will host Brian Kelley for an opioid workshop January 2019. Inviting ****Spring 2019
Plan for fall Regenstrief Center Forum and establish co-sponsor partnership					Co-sponsor	Co-sponsored forum (Women's Health)
Press releases of Regenstrief accomplishments					Announce accomplishments	These are maintained on our website and Twitter account.
Publish Regenstrief Center e-newsletter					Monthly	e-newsletter published monthly

Funding	Q3	Q4	Q1	Q2	Goal	Current Metric
Identify funding opportunities and submit proposals					8 proposals, $6M	USAID, NIH, FSSA, Fayette(look up), 4 won total financial award $
Support large grant initiative (> $5M)					1 proposal	Part of large grant initiative; working to take lead role
Engage IU School of Medicine	Q3	Q4	Q1	Q2	Goal	Current Metric
Recruit IUSM fellows as research partners					2 fellows	
Participate in joint proposals					At least 3 joint proposals	1 of 3 Dr. Cline
Strategic Planning	Q3	Q4	Q1	Q2	Goal	Current Metric
Regenstrief Center Faculty Leadership input for 2019-2020 action plan						Input received (December meeting)
Evaluate metrics and update Regenstrief Center strategic plan					Align goals and initiatives with the direction of the advisory board and center faculty leadership	Will create in spring 2019 for the June 2019 semi-annual report
Submit updated plan to Regenstrief Foundation for approval					June 2019	Will submit with semi-annual report June 2019

Abbreviation key:
MS – Professional master's degree in Healthcare Engineering
PHA – Purdue Healthcare Advisors (http://pha.purdue.edu)
PSO – Patients safety organization (https://pso.ahrq.gov)

Regenstrief Center – Regenstrief Center for Healthcare Engineering
(http://www.purdue.edu/discoverypark/rche/)
REMEDI – Regenstrief National Center for Medical Device Informatics
(https://catalyzecare.org/remedi)

APPENDIX D: New 2018 Regenstrief Center Faculty and Clinical Affiliates

Nicole Adams, PhD, MSN

Clinical Assistant Professor
School of Nursing
Purdue University

Milad Alucozai, MS, MPH

Partner at Good AI Capital
Visiting Scholar
Regenstrief Center for Healthcare
Engineering
Purdue University

Mireille "Mimi" Boutin, PhD

Associate Professor
Electrical and Computer Engineering
Purdue University

Mark Clare, MA, MS, LSC, LSSMBB

Principal Advisor, Strategic Initiatives
Purdue Healthcare Advisors
Purdue University

Karen Giuliano, PhD, RN, MBA, FAAN

Associate Professor
Bouve College of Health Sciences
Northeastern University

Michele Forman, PhD

Professor and Department Head
Department of Nutrition Science
Purdue University

Zach Hass, PhD

Assistant Professor
Schools of Nursing & Industrial Engineering
Purdue University

Tera Hornbeck DNP, RN, AGCNS-BC

Continuing Lecturer
School of Nursing
Purdue University

Jacqueline Linnes, PhD

Assistant Professor
Weldon School of Biomedical Engineering
Purdue University

Michael Levine, PhD

Associate Professor, Statistics
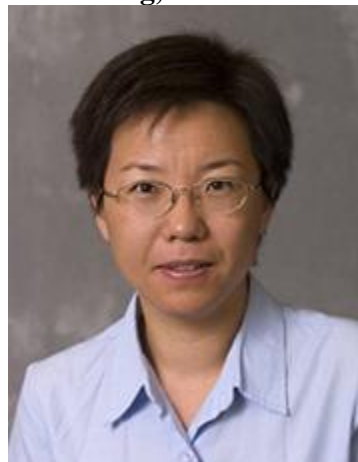College of Science
Purdue University

Zachary Pitluk, PhD

Vice President, Life Sciences and
Healthcare
Paradigm4

Mohammad Rahman, PhD

Associate Professor
Krannert School of Management
Purdue University

Min Zhang, PhD

Professor, Statistics
College of Science
Purdue University

Wenzhuo Wu, PhD

Assistant Professor
School of Industrial Engineering
Purdue University

An entire list of our faculty and affiliates along with links to their websites can be found at
https://www.purdue.edu/discoverypark/rche/people/faculty-clinical-affiliates.php

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Bareinboim E, Pearl J. A general algorithm for deciding transportability of experimental results. *Journal of Causal Inference*. 2013;1(1):107-34.

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Centers for Disease Control and Prevention (CDC). *Vital Signs – Opioid Overdoses Treated in Emergency Departments.* Atlanta, GA: CDC, March 2018. Available at: https://www.cdc.gov/vitalsigns/pdf/2018-03-vitalsigns.pdf

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Jack HE, Oller D, Kelly JF, Madgison JF, Wakeman SE. Addressing substance use disorder in primary care: The role, integration, and impact of recovery coaches. *Journal of General Internal Medicine*, 2017;9:1-8.

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US Department of Health and Human Services (HHS). *Facing Addiction in America: The Surgeon General's Spotlight on Opioids*. Washington, DC: HHS, September 2018. Available at: https://addiction.surgeongeneral.gov/sites/default/files/OC_SpotlightOnOpioids.pdf