BIOGRAPHICAL SKETCH

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NAME: SWARD, KATHERINE

eRA COMMONS USER NAME (credential, e.g., agency login): KATHYSWARD

POSITION TITLE: Associate Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Lutheran Hospital School for Nurses, Moline, IL	RN	1981	Nursing
Westminster College, Salt Lake City, UT	BS	1990	Nursing
University of Utah, Salt Lake City, UT	MS	1998	Nursing informatics
University of Utah, Salt Lake City, UT	PHD	2007	Nursing, Informatics

A. Personal Statement

I am an Associate Professor with tenure in the College of Nursing, and Adjunct Associate Professor in the Department of Biomedical Informatics. I am a senior nursing and biomedical informatics scientist with extensive research experience. I served as Principal or Co-Investigator on multiple NIH extramural awards and am deeply familiar with informatics methods, processes, tools, workflows, and artifacts to support complex multi-center trials, reflected in part by my role as Co-Investigator for the Utah Trial Innovation Center [TIC] (U24TR001597; PI Dean) and as co-investigator for the Utah Data Coordinating Center (DCC) for the Collaborative Pediatric Critical Care Research Network [CPCCRN], (U01HD049934; PI Dean). In those roles, I lead informatics efforts including data harmonization and information exchange; including NIH-wide data harmonization for the NIH HEAL (Helping End Addiction Long-term) opioid trials.

I have been part of long-standing collaborations across campus. I lead, with Dr. Facelli, the NIH/NIBIB funded *PRISMS Informatics Platform – Federated Integration Architecture* center (U54EB021973), part of a national initiative to examine the effects of the environment on health by integrating sensor data and mobile apps into research. Dr. Facelli and I also co-direct the *Center of Excellence for Exposure Health Informatics* at the University of Utah.

a. Moore, J., Goffin, P., Meyer, M., Lundrigan, P., Patwari, N., **Sward**, K., Weise, J. (2018). Managing in-home environments through sensing, annotating, and visualizing air quality data. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* (IMWUT)(Ubicomp '18). Available at http://vdl.sci.utah.edu/publications/2018_imwut_maav/
b. Lundrigan, P., Min, K., Patwari, N., Kasera, S.K., Kelly, K., Moore, J., Meyer, M., Collingwood, S.C., Nkoy, F., Stone, B., **Sward**, K. (2018). EpiFi: An in-home IoT architecture for epidemiological deployments. Thirteenth *IEEE Workshop on Practical Issues in Building Sensor Network Applications (SenseApp), 619-626.* Oct 1-4 2018. https://span.ece.utah.edu/pub/EpiFi.pdf
c. Gouripeddi R, Tran L, Madsen R, Gangadhar T, Mo P, Warner P, Burnett N, R Butcher, **Sward** K, Facelli J. (2019). An Architecture for Metadata-driven Integration of Heterogeneous Sensor and Health Data for Translational Exposomic Research. 2019 IEEE International Conference on Biomedical and Health Informatics, Chicago, IL, USA (3/19/2019): IEEE.
d. Tiase VL, **Sward** KA, Cummins MR. (2019). Navigating the Search for Patient Generated Health Data. Stud Health Technol Inform. 2019 Aug 21;264:1992. doi: 10.3233/SHTI190750.

B. Positions and Honors

Positions and Employment

(Past ~20 years)

1998 - 2001 Computer Professional, University of Utah, College of Nursing, Salt Lake City, UT

1999 - 2007	Clinical Instructor, University of Utah, College of Nursing, Salt Lake City, UT
2007 - 2014	Assistant Professor, University of Utah, College of Nursing; Department of Biomedical Informatics (adjunct), Salt Lake City, UT
2014 - present	Associate Professor, University of Utah, College of Nursing; Department of Biomedical Informatics (adjunct), Salt Lake City, UT

Other Experience and Professional Memberships

1981 -	Sigma Theta Tau International Honor Society for Nursing (Sigma). Member; vice president Gamma Rho chapter 2008-2009
1981 -	American Nurses Association. Member
1997 -	American Medical Informatics Association (AMIA). Member
1998 -	Utah Nursing Informatics Network (UNIN). Current role: president-elect
2000 -	Health Information Management Systems Society (HIMSS). Member
2000 - 2019	American Thoracic Society (ATS). Member
2017 -	International Society for Exposure Science. member
2018	Western Institute of Nursing, member
2019	Council for the Advancement of Nursing Science, member, meeting chair
2018 -	Huntsman Cancer Institute Cancer Control & Population Sciences (CCPS) Program, member
2011 - 2014	Ad hoc reviewer, Agency for Healthcare Research and Quality (AHRQ) Healthcare Information Technology Research (HITR) Study Section
2014 - present	Grant Application Reviewer, Patient-centered outcomes research institute (PCORI)
2015 – present	Grant Application Reviewer, National Institutes of Health (NIH)
2016 - present	Grant Application Reviewer, National Science Foundation

Honors

2006	Excellence in Teaching Award, University of Utah College of Nursing
2007	Outstanding Doctoral Student, University of Utah College of Nursing
2008	Award for Excellence in Teaching, Sigma Theta Tau International, Gamma Rho Chapter
2013	Award for Excellence in Mentoring, Sigma Theta Tau International, Gamma Rho Chapter
2014	Excellence in Scholarship and Research, University of Utah College of Nursing
2017	Inducted as Fellow in the American Academy of Nursing
2019	University of Utah Presidential Scholar, 2019-2022

C. Contribution to Science

1. **Clinical Research Informatics (CRI) and Decision Support**
   Clinical research is a complex, resource intensive endeavor comprised of a multitude of actors, workflows, processes, and information resources. Clinical research informatics (CRI), one of my primary research focus areas, is a subdomain of biomedical informatics focused on tools and methods that support and enable clinical and translational research. I contributed to and led the development and evaluation of clinical decision support (CDS) tools, computer protocols, and other evidence based tools within clinical care and research studies, and serve as the clinical informatics expert and/or scientific lead for multi-center network research teams. Our contributions raised awareness about unnecessary variability in clinical research and potential benefits of using informatics tools and methods to standardize and support clinical and translational research in children and adults.

   a. Sward KA, Newth CL. Computerized decision support systems for mechanical ventilation in children. Journal of Pediatric Intensive Care. 2015 October 26; 0:1-6.
   b. Carcillo JA, Sward K, Halstead ES, et al: Systemic Inflammation Mortality Risk Assessment Contingency Table for Severe Sepsis. Pediatr Crit Care Med. 2017 Feb;18(2):143-150. PubMed PMID: 27941423; PubMed Central PMCID: PMC5291785.

c. Newth CJL, Sward KA, Khemani RG, Page K, et al. Variability in usual care mechanical ventilation for pediatric Acute Respiratory Distress Syndrome: Time for a decision support protocol? Ped critical care med. 2017 Sep 19. doi: 10.1097/PCC.0000000000001319. PMID:28930815

d. Furlong-Dillard, J.M., Miller, B., Sward, K et al. (2019) The Association between Compliance and Weight Gain When Using a Feeding Protocol in Single Ventricle Patients; a Single Center Experience. Cardiol Young. 2019 May 28:1-8. doi: 10.1017/S1047951119000222. [Epub ahead of print]. PMID: 31133078

2. **Data Science/Data Management**

Data are a crucial element in clinical research, used for evaluating the study aims, and for internal decision making and study monitoring. Healthcare data vary widely between organizations, and may be stored in different formats and information models. Data standardization & harmonization bring heterogeneous data into a common format, allowing for collaborative research and large-scale analytics. Research data need to be described systematically in unambiguous language to be shareable and comparable. I have participated in national terminology harmonization efforts such as CDASH, CTCAE harmonization (NCI), Health eDecisions, and the NICHD pediatric terminology initiative. Our research has improved the use of consistent data artifacts and harmonization with national data and messaging standards in multi-center research networks

a. Frey LJ, **Sward** KA, Newth CJ, et al: Virtualization of open-source secure web services to support data exchange in a pediatric critical care research network. *J Am Med Inform Assoc*. 2015 Nov;22(6):1271-6. PubMed PMID: 25796596; PubMed Central PMCID: PMC4639713.

b. Sward KA, Rubin S, Jenkins TL, Newth CJ, Dean JM. Case Study: Semantic Annotation of a Pediatric Critical Care Research Study. *Comput Inform Nurs*. 2016 Mar;34(3):101-4. PubMed PMID: 26958992; PubMed Central PMCID: PMC4788017.

c. Luo G, Sward K. A roadmap for optimizing asthma care management via computational approaches. *JMIR Medical Informatics*. 2017; 5(3):e32. PMID:28951380.

d. Luo, G., Stone, B.L., Koebnick, C et al.Using Temporal Features to Provide Data-Driven Clinical Early Warnings: Rationale and Methods. *JMIR Research Protocols*. 2019. 8(6), e13783. DOI: 10.2196/13783; PMID: 31199308; PMCID: 6592592

3. **Translational Science and Health Outcomes**

I have participated in research teams for more than 10 years, predominantly in multi-center studies and research networks. Our findings promote informatics methods that support research rigor and reproducibility, translation of research findings to clinical practice, and improving health outcomes. Content domains included critical care, chronic illness, pain management, and oncology. System and population level domains include exposure / environmental science.

a. Lyons AM, Sward KA, Deshmukh VG, et al: Impact of computerized provider order entry (CPOE) on length of stay and mortality. J Am Med Inform Assoc. 2016 Jul 8;PubMed PMID: 27402139.

b. Hirshberg EL, Lanspa MJ, Wilson EL, Sward KA, Jephson A, Larsen GY, Morris AH. A Pediatric Intensive Care Unit Bedside Computer Clinical Decision Support Protocol for Hyperglycemia Is Feasible, Safe and Offers Advantages. Diabetes Technol Ther. 2017 Mar 1;PubMed PMID: 28248127

c. Min KT, Lundrigan P, Sward K, Collingwood SC, Patwari N, Smart home air filtering system: A randomized controlled trial for performance evaluation, Smart Health (Elsevier), 9 July 2018, ISSN 2352-6483. http://www.sciencedirect.com/science/article/pii/S2352648318300448

d. Kalsy, M., Lin, J., Bray, B. & Sward, K. (2018). Role of Nursing Informatics in the Automation of Pneumonia Quality Measure Data Elements. Comput Inform Nurs. 2018 Oct;36(10):475-483. doi: 10.1097/CIN.0000000000000451. PMID: 29927766

4. **Human-Systems Interaction and Consumer Health Informatics**

Given that my training and experience spans clinical care, research, informatics, and software development, it is not surprising that I have explored human-systems interactions and related workflows. Previous employment included developing decision-support software in the context of consumer health informatics (patient and family interactions), while subsequent research focused on the clinician's

interaction with health IT and the *clinician-patient interaction*. Recent work includes the use of *patient-generated health data* and *mobile apps* in clinical care and research. Our findings emphasized the importance of understanding contextual factors and the need to tailor designs and workflows so that they are appropriate for and meet the needs of those who will actually be using the systems.

a. Demiris, G., Iribarren, S.J., Sward, K., Yang, R., May, S. (2019). Patient Generated Health Data Use in Clinical Practice: A Review. Nursing Outlook. 67(4), 311-330
b. Sward K, Newth CJL, Khemani RG, et al. Potential Acceptability of a Pediatric Ventilator Management Computer Protocol. Pediatr Crit Care Med. 2017 Sep 16. doi: 10.1097/PCC.0000000000001331. PMID: 28926488
c. Iribarren SJ, Sward KA, Beck SL, Pearce PF, Thurston D, Chirico C. Qualitative evaluation of a text messaging intervention to support patients with active tuberculosis: implementation considerations. JMIR Mhealth Uhealth. 2015 Feb 27;3(1):e21. PubMed PMID: 25802968; PubMed Central PMCID: PMC4376194.
d. Sward K, Orme J Jr, Sorenson D, Baumann L, Morris AH. Reasons for declining computerized insulin protocol recommendations: application of a framework. J Biomed Inform. 2008 Jun;41(3):488-97. PubMed PMID: 18499528; PubMed Central PMCID: PMC2490709.

Complete List of Published Work in My Bibliography: http://bit.ly/1LSyb0U

ORCID https://orcid.org/0000-0002-6568-4031

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

2R01ES017431, National Institute of Environmental Health Sciences (NIEHS)
REILLY, CHRISTOPHER
6/30/2019 – 7/1/2024
TRP Channels and Air Pollution
Human-generated and natural-source particulate air pollutants (i.e., PM2.5-10) in the air we breathe are a health risk. This research is focused on discovering how different forms of environmental PM adversely affect the lungs and human health.
Role: Co-Investigator

U54 EB021973-01
SWARD, KATHERINE A (PI) and FACELLI, JULIO C (PI)
09/30/15-05/31/20
PRISMS Informatics Platform - Federated Integration Architecture
This multi-disciplinary, collaborative center develops an informatics platform for the NIH Pediatric Research Using Integrated Sensor Monitoring Systems (PRISMS) program. This infrastructure (research ecosystem) developed in this project supports research about the effects of the environment on health
Role: PI (MPI – contact PI)

2U01HD049934-11, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD)
DEAN, J MICHAEL (PI)
12/01/14-11/30/19
Data Coordinating Center of Collaborative Pediatric Critical Care Research Network
This center provides central data management and statistical resources for the Collaborative Pediatric Critical Care Research Network (CPCCRN); including network data collection, data management, data analysis guidelines and assistance with study publication.

Role: Co-Investigator [Also co-I in previous funded cycle 12/01/09-11/30/14; 5U01HD049934-06]

U24TR001597, National Center for Advancing Translational Sciences (NCATS)
DEAN, J MICHAEL (PI)
07/01/16-06/30/23
Utah Trial Innovation Center
This center is part of the Trial Innovation Network within the Clinical and Translational Science Award (CTSA) Program. The center will support single IRB and streamlined contracting, development and implementation of study protocols, and support the conduct of selected clinical trials. In 2019, the Trial Innovation Network received a supplement for the coordination and management of trials conducted within the HEAL Evidence-based Research Network (HEAL ERN) as well as multi-center studies in each of the Maternal-Fetal Medicine network (MFMU) and the National Cancer Institute NCORP network.
Role: Co-Investigator

U01TR002538, National Center for Advancing Translational Sciences (NCATS)
DERE, WILLARD (PI)
05/01/18-04/30/23
University of Utah Center for Clinical and Translational Science
This center provides support for all aspects of clinical and translational research, from basic science investigation to studies on implementing research findings in clinical practice.
Role: Key Personnel (biomedical informatics support core)
Note – also contributed as part of the BMI core in the previous CCTS award (UL1TR001067, 5/2012 – 2018).

Completed Research Support

NA Primary Children's Hospital Foundation
6/2016-6/2019
GUO, JIA-WEN (PI)
Automatic Self-Monitoring for Adolescent Depression
This study examines the linguistics used by adolescents in social media and conversations, to describe depression symptoms.
Role: Co-Investigator

NA McGillis Foundation
6/2015 to 6/2017
Sward, Katherine Ann (PI) and Roberts, Leissa (PI)
Coping with Labor: An algorithm for assessing labor pain
This study uses Delphi survey techniques to validate concepts and patient questionnaire for the Coping with Labor algorithm
Role: Multiple PI

N/A, University of Utah Center for Clinical and Translational Science
Gawron, Lori (PI)
07/30/15-06/30/16
Contraceptive use in women with chronic diseases: prioritizing personalized reproductive planning in the "silos" of subspecialty care
This project provides pilot data regarding chronic illness in women of reproductive age, patterns of contraceptive use, and pregnancy outcomes.
Role: Co-Investigator