BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: **Kukhareva, Polina V.**

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

POSITION TITLE: Research Assistant Professor, Department of Biomedical Informatics, University of Utah

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

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Saint Petersburg State University, Saint Petersburg	BS	06/2007	Biology
Saint Petersburg State University, Saint Petersburg	MS	11/2009	Immunology
University of North Carolina, Chapel Hill, NC	MPH	05/2012	Biostatistics
University of Utah, Salt Lake City, UT	PhD	12/2017	Biomedical Informatics

A. Personal Statement

I am a Research Assistant Professor (primary faculty) in the Department of Biomedical Informatics at the University of Utah. As an investigator uniquely positioned at the intersection of classical biostatistics and clinical informatics, I am qualified to conduct the research proposed in this grant. My academic journey, which includes a Master of Public Health in biostatistics (2012) and a PhD in clinical informatics (2017), reflects my commitment to improvement of healthcare quality and equity through interdisciplinary, methodological research. This dedication has resulted in over 35 peer-reviewed manuscripts, including 10 as the first author, and contributions to over 30 healthcare quality improvement projects, including projects funded by the Agency for Healthcare Research and Quality (AHRQ) and the National Institutes of Health (NIH). My work has provided a unique environment to gain experience in the quantitative evaluation of electronic health record (EHR)-driven innovations and to establish a strong working relationship with Dr. Ken Kawamoto.

My research in clinical informatics has focused on strengthening recognition of the need for **[1]**, and the theoretical foundation of **[2]**, the evaluation of EHR-integrated information techonology (IT) innovations, integrating clinical decision support (CDS) and electronic clinical quality measurement, and promoting equity focus in evaluation. During my postdoctoral research, I built upon my interest in health IT evaluation, successfully leading the evaluation of over 20 healthcare quality improvement projects addressing diverse healthcare topics such as neonatal bilirubin management, sepsis, diabetic ketoacidosis, and opioid overuse.

In my faculty role, my research has focused on developing methods to assess the effectiveness, implementation, and financial value of CDS interventions. With over a decade of experience at the intersection of healthcare, IT, and evaluation, I lead the design and implementation of CDS evaluation studies within the ReImagine EHR initiative led by Dr. Kawamoto. My role as Director of Evaluation for the ReImagine EHR initiative involves leading evaluation efforts, leveraging my expertise in statistical methods, data extraction, and study design to improve patient care through evidence-based health IT innovations. Successful examples of such IT innovations include CDS tools for weight maintenance **[3]** and lung cancer screening **[4]**. In this project, I will serve as evaluation lead, ensuring rigorous quantitative and qualitative studies, timely project deliverables, and contributing to study design, data extraction, analysis, and dissemination of findings through manuscripts and presentations. As an expert in CDS evaluation, I bring the necessary expertise, training, and motivation to contribute significantly to the proposed research.

The following are ongoing and recently completed projects I would like to highlight:
NIH/NIDDK: R18DK123372 Conroy/Kawamoto (MPI)
Promoting Real World Implementation of an Evidence-Based Weight Management Intervention in Primary Care
Role: Co-Investigator
07/01/20 – 06/30/25

AHRQ: R18HS028791 Kawamoto (PI)
Engaging Patients to Enable Interoperable Lung Cancer Decision Support at Scale
Role: Co-Investigator
08/01/22 – 07/31/25

AHRQ: R18HS026198 Kawamoto (PI)
Scalable Decision Support and Shared Decision Making for Lung Cancer Screening
Role: Co-Investigator
07/01/19 – 07/31/22

The following are publications that highlight my experience and qualifications for this proposal:

1. **Kukhareva PV**, Caverly TJ, Li H, Katki HA, Cheung LC, Reese TJ, Del Fiol G, Hess R, Wetter DW, Zhang Y, Taft TY, Flynn MC, Kawamoto K. Inaccuracies in electronic health records smoking data and a potential approach to address resulting underestimation in determining lung cancer screening eligibility. *J Am Med Inform Assoc*. 2022 Apr 13;29(5):779-788. PMCID: PMC9006678
2. **Kukhareva PV**, Weir C, Del Fiol G, Aarons GA, Taft TY, Schlechter CR, Reese TJ, Curran RL, Nanjo C, Borbolla D, Staes CJ, Morgan KL, Kramer HS, Stipelman CH, Shakib JH, Flynn MC, Kawamoto K. Evaluation in Life Cycle of Information Technology (ELICIT) framework: Supporting the innovation life cycle from business case assessment to summative evaluation. *J Biomed Inform*. 2022 Mar;127:104014. PMCID: PMC8959015
3. **Kukhareva PV**, Weir CR, Cedillo M, Taft T, Butler JM, Rudd EA, Zepeda J, Zheutlin E, Kiraly B, Flynn M, Conroy MB, Kawamoto K. Design and implementation of electronic health record-based tools to support a weight management program in primary care. *JAMIA Open*. 2024 May 13;7(2):ooae038. doi: 10.1093/jamiaopen/ooae038. PMCID: PMC11091423.
4. **Kukhareva PV**, Li H, Caverly TJ, Del Fiol G, Fagerlin A, Butler JM, Hess R, Zhang Y, Taft T, Flynn MC, Reddy C, Martin DK, Rodriguez-Loya S, Warner PB, Kawamoto K. Implementation of Lung Cancer Screening in Primary Care and Pulmonary Clinics: Pragmatic Clinical Trial of Electronic Health Record-Integrated Everyday Shared Decision Making Tool and Clinician-Facing Prompts. *Chest*. 2023 May 2; PMCID: PMC10792294

B. Positions, Scientific Appointments, and Honors

Positions and Scientific Appointments

2023-2024	Workgroup Lead, Clinical Decision Support Innovation Collaborative (CDSiC) Measurement and Outcomes Workgroup, Rockville, MD
2023	Member, Lung Cancer Screening Technical Expert Panel, National Committee for Quality Assurance (NCQA), Washington, DC
2022-present	**Research Assistant Professor**, Department of Biomedical Informatics, University of Utah, Salt Lake City, UT
2022-2023	Member, CDSiC Scaling, Measurement, and Dissemination of CDS Workgroup, Rockville, MD
2022-2023	Co-Chair, Equity, Diversity, and Inclusion (EDI) Committee, Department of Biomedical Informatics, University of Utah, Salt Lake City, UT
2022-present	Event Organizer, Women Career Development, American Medical Informatics Association (AMIA) Annual Symposium
2021-present	Member, Technology Assessment & Quality Development in Health Informatics Working Group, International Medical Informatics Association (IMIA)
2020-present	Member, People and Organizational Issues and Evaluation Working Group, AMIA
2020-present	Member, Women in AMIA, Networking/Mentoring, and Lifecycle Committee, AMIA
2020-2022	Member, Editorial Board, *Journal of the American Medical Informatics Association (JAMIA)*
2020-2022	Reviewer, Health Level Seven (HL7), Fast Healthcare Interoperability Resources (FHIR) Applications Competition, AMIA

2020-2021	Member, Gender and Racial Equity Dashboard Initiative, University of Utah Health, Salt Lake City, UT
2020	Session Chair, AMIA Virtual Annual Symposium, AMIA
2019-present	Evaluation Director, ReImagine EHR Initiative, University of Utah Health, Salt Lake City, UT
2019-present	*Ad hoc* Reviewer, *JAMIA*
2019	Mentor, Women in AMIA First Look Program
2018-2022	Research Associate, Department of Biomedical Informatics, University of Utah, Salt Lake City, UT
2017-2019	Mentor, High School Scholar Conference Program, AMIA
2015-present	Member, Clinical Decision Support Working Group, AMIA
2014-present	Member, Healthcare Information and Management Systems Society (HIMSS)
2013-present	Member, American Medical Informatics Association (AMIA)
2013-2017	Graduate Research Assistant, Department of Biomedical Informatics, University of Utah, Salt Lake City, UT

Honors

2023-2024	Scholar, Vice President's Clinical & Translational (VPCAT) Research Scholars Program, Senior Vice President for Health Sciences Education Unit, University of Utah
2023	Fellow, American Medical Informatics Association (FAMIA), AMIA
2019	Recipient, AMIA FHIR® App Showcase Competition First Prize Winner, AMIA
2019	Scholar, Women in AMIA Leadership, AMIA
2017	Recipient, *Helmuth F. Orthner* Travel Assistance Award, University of Utah
2015	Recipient, Distinguished Poster Award, AMIA
2015	Fellow, *Richard A. Fay and Carol M. Fay* Endowed Graduate Fellowship, University of Utah
2014	Scholar, Western Users of SAS Software Student Scholar, Western Users of SAS Software
2014	Scholar, Utah HIMSS Graduate Scholarship, Utah HIMSS
2013	Recipient, SAS Global Forum Junior Professional Award, SAS
2010-2012	Scholar, **Fulbright Scholarship**, US Department of State's Bureau of Educational and Cultural Affairs
2008	Fellow, Training and Research in HIV Prevention in Russia, Fogarty International Center
2004-2007	Scholar, V. Potanin Russian Federal Grant Fund Scholarship, V. Potanin Foundation

C. Contributions to Science

1. **Implementation of IT Tools that Improve Chronic Disease Management.** Many IT tools for the management of chronic diseases have been developed, but evaluation of such applications remains suboptimal. I led the design and implementation of an evaluation strategy for EHR-based weight coaching **[a]**, AI models for diabetes pharmacotherapy **[b],** standardized care pathway for diabetes ketoacidosis **[c]**, and chronic disease manager applications **[d].**

   a. **Kukhareva PV**, Weir CR, Cedillo M, Taft T, Butler JM, Rudd EA, Zepeda J, Zheutlin E, Kiraly B, Flynn M, Conroy MB, Kawamoto K. Design and implementation of electronic health record-based tools to support a weight management program in primary care. *JAMIA Open*. 2024 May 13;7(2):ooae038. doi: 10.1093/jamiaopen/ooae038. PMCID: PMC11091423.
   b. Tarumi S, Takeuchi W, Chalkidis G, Rodriguez-Loya S, Kuwata J, Flynn M, Turner KM, Sakaguchi FH, Weir C, Kramer H, Shields DE, Warner PB, **Kukhareva P**, Ban H, Kawamoto K. Leveraging Artificial Intelligence to Improve Chronic Disease Care: Methods and Application to Pharmacotherapy Decision Support for Type-2 Diabetes Mellitus. *Methods Inf Med*. 2021 Jun;60(S 01):e32-e43. PMCID: PMC8294941.
   c. Edholm K, Lappé K, **Kukhareva P**, Hopkins C, Hatton ND, Gebhart B, Nyman H, Signor E, Davis M, Kawamoto K, Johnson SA. Reducing Diabetic Ketoacidosis Intensive Care Unit Admissions Through an Electronic Health Record-Driven, Standardized Care Pathway. *J Healthc Qual*. 2020 Sep/Oct;42(5):e66-e74. PubMed ID: 31923009.
   d. Curran RL, **Kukhareva PV**, Taft T, Weir CR, Reese TJ, Nanjo C, Rodriguez-Loya S, Martin DK, Warner PB, Shields DE, Flynn MC, Boltax JP, Kawamoto K. Integrated displays to improve chronic disease management

in ambulatory care: A SMART on FHIR application informed by mixed-methods user testing. *J Am Med Inform Assoc*. 2020 Aug 1;27(8):1225-1234. PMCID: PMC7481023.

2. **Promoting Equity Focus in Biomedical Informatics.** I co-authored 4 papers related to different aspects of healthcare equity, health disparities, and gender equity in the biomedical informatics profession. This includes 2 publications in the *IMIA Yearbook of Medical Informatics* 2022 issue *"Inclusive Digital Health: Addressing Equity, Literacy, and Bias for Resilient Health Systems"*. In collaboration with Dr. Stevens, we described how implementers could decide whether to use race as an input variable for AI models **[a]**. In collaboration with Dr. Cresswell, we proposed strategies to reduce bias in the design and implementation of patient portals **[b]**. In collaboration with Dr. Stipelman, we demonstrated how poorly EHR-enabled CDS innovations are evaluated in healthcare organizations serving populations facing healthcare disparities **[c].** Further, I am a co-first-author of a paper describing the needs of women in biomedical informatics that showed that 74% of women report gender bias as a career obstacle **[d]**.

   a. Stevens ER, Caverly T, Butler JM, **Kukhareva P**, Richardson S, Mann DM, Kawamoto K. Considerations for using predictive models that include race as an input variable: The case study of lung cancer screening. J Biomed Inform. 2023 Nov;147:104525. PubMed PMID: 37844677.
   b. Cresswell K, Rigby M, Georgiou A, Wong ZS, **Kukhareva PV**, Medlock S, De Keizer NF, Magrabi F, Scott P, Ammenswerth E. The Role of Formative Evaluation in Promoting Digitally-based Health Equity and Reducing Bias for Resilient Health Systems: the Case of Patient Portals. *Yearb Med Inform*. 2022 Aug;31(1):33-39. PMCID: PMC9719768
   c. Stipelman CH, **Kukhareva PV**, Trepman E, Nguyen Q, Valdez L, Kenost C, Hightower M, Kawamoto K. Electronic Health Record Clinical Decision Support for Populations Facing Health Care Disparities: Literature Review. *Yearb Med Inform*. 2022 Aug;31(1):184-198. PMCID: PMC9719761
   d. Wei DH*, **Kukhareva PV***, Tao D, Sordo M, Pandita D, Dua P, Banerjee I, Abraham J. Assessing Perceived Effectiveness of Career Development Efforts Led by the Women in American Medical Informatics Association Initiative. *J Am Med Inform Assoc*. 2022 Aug 16;29(9):1593-1606. PMCID: PMC9382400 (available on 2023-06-30)

3. **Using EHR Data to Evaluate EHR-enabled Health IT Tools in Pragmatic Clinical Trials.** The quality of healthcare in the United States continues to be compromised by unnecessary variations in the implementation of clinical practice guidelines. The University of Utah Department of Internal Medicine implemented several novel interventions involving the use of health information technology and CDS tools. I successfully led the EHR data extraction and the statistical analyses of several of these projects and published high-quality peer-reviewed publications in collaboration with internal medicine physicians. These projects focused on several interventions: reducing the length of antibiotics therapy using an EHR pathway for lung cancer screening **[a]**; medical calculators **[b]**; early identification of sepsis **[c]**; and neonatal bilirubin management **[d]**.

   a. **Kukhareva PV**, Li H, Caverly TJ, Del Fiol G, Fagerlin A, Butler JM, Hess R, Zhang Y, Taft T, Flynn MC, Reddy C, Martin DK, Rodriguez-Loya S, Warner PB, Kawamoto K. Implementation of Lung Cancer Screening in Primary Care and Pulmonary Clinics: Pragmatic Clinical Trial of Electronic Health Record-Integrated Everyday Shared Decision Making Tool and Clinician-Facing Prompts. *Chest*. 2023 May 2; PMCID: PMC10792294
   b. Morgan KL, **Kukhareva PV**, Warner PB, Wilkof J, Snyder M, Horton D, Madsen T, Habboushe J, Kawamoto K. Using CDS Hooks to increase SMART on FHIR app utilization: a cluster-randomized trial. J Am Med Inform Assoc. 2022 Aug 16;29(9):1461-1470. PMCID: PMC9382378.
   c. Horton DJ, Graves KK, **Kukhareva PV**, Johnson SA, Cedillo M, Sanford M, Dunson WA Jr, White M, Roach D, Arego JJ, Kawamoto K. Modified early warning score-based clinical decision support: cost impact and clinical outcomes in sepsis. JAMIA Open. 2020 Jul;3(2):261-268. PMCID: PMC7382614.
   d. Kawamoto K, **Kukhareva PV**, Shakib JH, Kramer H, Rodriguez S, Warner PB, Shields D, Weir C, Del Fiol G, Taft T, Stipelman CH. Association of an Electronic Health Record Add-on App for Neonatal Bilirubin Management With Physician Efficiency and Care Quality. *JAMA Netw Open*. 2019 Nov 1;2(11):e1915343. PubMed Central PMCID: PMC6902796.

4. **Strengthening Recognition of Need for and the Theoretical Foundation of the Evaluation of EHR-integrated IT Tools.** Although EHR-enabled innovations have great potential for improving both health and

care, such innovations do not always reach their full potential and might have unintended consequences. Some of these shortfalls are due to technology design, and some are due to implementation. To avoid these previously documented shortfalls, to promote learning, and to guide future implementations, systematic evaluations are required. Such evaluations must be supported by socio-technical frameworks describing interactions between society's complex infrastructures, human behavior, and technology. With international collaborators, we highlighted the need for strengthening IT evaluation **[a].** In 2022, I showed how using last observation EHR smoking data instead of the longitudinal data could result in the underestimation of eligibility for lung cancer screening further highlighting the need for stronger evaluation of EHR-based interventions **[b].** Building on earlier frameworks and providing a bird's-eye view of dimensions surrounding health IT, the Evaluation in Life Cycle of Information Technology (ELICIT) framework **[c]** was developed to facilitate evaluation throughout health IT life cycle phases. This work was conducted as part of the University of Utah ReImagine EHR initiative **[d]**.

a. Cresswell K, Rigby M, Magrabi F, Scott P, Brender J, Craven CK, Wong ZS, **Kukhareva P**, Ammenwerth E, Georgiou A, Medlock S, De Keizer NF, Nykänen P, Prgomet M, Williams R. The need to strengthen the evaluation of the impact of Artificial Intelligence-based decision support systems on healthcare provision. Health Policy. 2023 Oct;136:104889. PubMed PMID: 37579545.
b. **Kukhareva PV**, Caverly TJ, Li H, Katki HA, Cheung LC, Reese TJ, Del Fiol G, Hess R, Wetter DW, Zhang Y, Taft TY, Flynn MC, Kawamoto K. Inaccuracies in electronic health records smoking data and a potential approach to address resulting underestimation in determining lung cancer screening eligibility. *J Am Med Inform Assoc*. 2022 Apr 13;29(5):779-788. PMCID: PMC9006678
c. **Kukhareva PV**, Weir C, Del Fiol G, Aarons GA, Taft TY, Schlechter CR, Reese TJ, Curran RL, Nanjo C, Borbolla D, Staes CJ, Morgan KL, Kramer HS, Stipelman CH, Shakib JH, Flynn MC, Kawamoto K. Evaluation in Life Cycle of Information Technology (ELICIT) framework: Supporting the innovation life cycle from business case assessment to summative evaluation. J Biomed Inform. 2022 Mar;127:104014. PMCID: PMC8959015
d. Kawamoto K, **Kukhareva PV**, Weir C, Flynn MC, Nanjo CJ, Martin DK, et al., Wetter DW, Lam C, Caverly TJ, Fagerlin A, Norlin C, Malone DC, Kaphingst KA, Kohlmann WK, Brooke BS, Del Fiol G. Establishing a multidisciplinary initiative for interoperable electronic health record innovations at an academic medical center. *JAMIA Open*. 2021 Jul 31;4(3):ooab041. PMCID: PMC8325485

5. **Exploration of Perspectives on Clinical Decision Support (CDS), Quality Measurement, and Quality of EHR Data.** Healthcare information technology groups are siloed, and electronic phenotypes are often recreated. For example, two separate teams could be developing similar electronic phenotypes for CDS and electronic clinical quality measurement (**eCQM**). My PhD research focused on exploring potential synergies between CDS and eCQM **[a]** and proposing frameworks for their integration **[d]** and governance **[b]**. I continued my work on the quality of EHR data with the development of novel approaches to validating electronic phenotypes for eCQM defined using EHR data **[c]**.

a. **Kukhareva PV**, Weir CR, Staes C, Borbolla D, Slager S, Kawamoto K. Integration of Clinical Decision Support and Electronic Clinical Quality Measurement: Domain Expert Insights and Implications for Future Direction. *AMIA Annu Symp Proc*. 2018 Dec 5;2018:700-709. PMCID: PMC6371250
b. Kawamanto K, Flynn MC, **Kukhareva P**, ElHalta D, Hess R, Gregory T, Walls C, Wigren AM, Borbolla D, Bray BE, Parsons MH, Clayson BL, Briley MS, Stipelman CH, Taylor D, King CS, Del Fiol G, Reese TJ, Weir CR, Taft T, Strong MB. A Pragmatic Guide to Establishing Clinical Decision Support Governance and Addressing Decision Support Fatigue: a Case Study. AMIA Annu Symp Proc. 2018;2018:624-633. PMCID: PMC6371304.
c. **Kukhareva PV**, Staes C, Noonan KW, Mueller HL, Warner P, Shields DE, Weeks H, Kawamoto K. Single-reviewer electronic phenotyping validation in operational settings: Comparison of strategies and recommendations. *J Biomed Inform*. 2017 Feb;66:1-10.
d. **Kukhareva PV**, Kawamoto K, Shields DE, Barfuss DT, Halley AM, Tippetts TJ, Warner PB, Bray BE, Staes CJ. Clinical Decision Support-based Quality Measurement (CDS-QM) Framework: Prototype Implementation, Evaluation, and Future Directions. *AMIA Annu Symp Proc*. 2014;2014:825-34. PMCID: PMC4419969 [Nominated for the best paper award]

Complete List of Published Work in MyBibliography

https://www.ncbi.nlm.nih.gov/myncbi/polina.kukhareva.2/bibliography/45483636/public/