Keith Feldman

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RESEARCH INTERESTS

Neonatal Research:
Analysis of complex, heterogeneous clinical and operational data recorded for infants in the neonatal intensive care unit (NICU). In particular, studies designed to gain insights into the practices surrounding patient conditions and outcomes, aimed to ultimately better inform the quality and effectiveness of care.

Augmentation not Automation:
Development of informatics-driven methods to aid practitioners in understanding the abundance of health and wellness data available today. Specifically exploring ways to augment their existing skillsets, rather than automate their roles, and advance knowledge around the practice and administration of healthcare

Population Health:
Exploration of population-level data drawn from a wide array of indirect sources with personalized clinical factors to improve knowledge of health and healthcare outcomes.

EDUCATION

PhD in Computer Science and Engineering 2013–2018
University of Notre Dame
Advisor: Prof. Nitesh V. Chawla
Dissertation: *Beyond Modeling: The Emergent Role of Informatics in Advancing Healthcare Knowledge*

M.S. in Computer Science and Engineering 2013–2017
University of Notre Dame
Advisor: Prof. Nitesh V. Chawla

B.S. in Computer Science 2008–2012
University of Notre Dame

RESEARCH EXPERIENCE

Dept. of Computer Science and Engineering | University of Notre Dame **Notre Dame, IN**
Postdoctoral Research Associate - Professor Nitesh V. Chawla 2018–Present

- Managing and executing several analytical research projects in a long-term research collaboration with the Centre for Recovery and Nutritional Education (CREN) in São Paulo, Brazil. I am actively engaged in the study of informatics' ability to derive insights from data collected as part of clinical, nutritional, and psychological health services offered by the professionals at CREN.
- Developing and teaching a course on healthcare analytics. In addition to lectures grounding the concepts and theories associated with analysis of health data, the course has been designed give students hands on experience surrounding the preparation, modeling, and interpretation of a large real-world electronic health record data using python.

Dept. of Computer Science and Engineering | University of Notre Dame **Notre Dame, IN**
Research Assistant - Professor Nitesh V. Chawla 2013–2018

- Developed a research portfolio focused on the application of statistical, data mining and machine learning methodologies to problems across the healthcare domain.
- Processed and analyzed data from a wide array of clinical, administrative, and population health sources
- Collaborated extensively with clinicians and practitioners to develop research questions, perform analyses, interpret results, and present findings in a clinically interpretable manner.
- Built and launched two pilot studies designed to investigate technology's role in addressing community-based health and wellness problems.

IBM Research **Dublin, Ireland**
Data Science Intern Summer 2016

- Analyzed a large community-health survey dataset to identify a personalized subset of questions, which, based on an individual's survey history, would be most relevant in the determination of their need for a specific health and wellness intervention.
- Developed a novel framework that combined multiple machine learning techniques including collaborative filtering, rule-based learners, and predictive modeling to capture latent relations between survey questions and ultimately improve estimations of intervention need.

ZirMed **Chicago, IL**
Data Science Intern Summer 2015

- Researched a potential quantitative metric to determine the appropriate frequency for rebuilding predictive models deployed in production. Accounting for the evolving nature of coding practices in healthcare claims by identifying shifts in the underlying data.
- Investigated approaches for utilizing claims data to estimate an individual's likelihood of hospital readmission after discharge for specific conditions.

Stony Brook University **Stony Brook, NY**
Researcher Summer 2010

- Member of a team exploring the efficacy of active learning techniques on classification tasks.
- Designed an interactive active-learning application for the visualization and labeling of uncertain data instances of an image classification problem.
- Learned and applied various machine learning algorithms including Gaussian mixture model and support vector machines.

PROFESSIONAL EXPERIENCE

Computing Research Association – Education Committee (CRA-E) **Washington, DC**
Graduate Student Fellow June 2016 – June 2018

- Selected as one of two students nationally to serve as the inaugural graduate student fellows.
- In collaboration with other fellows, designed and implemented "Undergraduate Research Highlights" series. Collecting interviews and writing the initial 12 articles to showcase outstanding research done by undergraduate students at universities and colleges across North America.
- Redesigned the CRA-E Conquer website. Providing information for undergraduate students interested in research and graduate school, as well as faculty who are interested in mentoring undergraduate research and helping their students apply to graduate school.

Office of Research Compliance **Notre Dame, IN**
Student Employee Spring 2017

- Managed outreach and performed the migration of Institutional Review Board (IRB) research protocols during university wide transition to a new eProtocol system.
- Learned and applied the Common Rule to advise students, faculty, and staff of possible revisions to existing protocols and aided in the design of future protocols.
- Utilizing experience gained during protocol transitions, helped to design improved forms to be implemented in the new eProtocol system.

Credit Suisse **Manhattan NY**
Technical Analyst Summer 2012—Summer 2013

- Developed and maintained code within a large test-driven application serving traders in their daily operations within the bank.
- Utilized data structure theory to create optimized method functionality.
- In addition to programming duties, worked to migrate or eliminate antiquated components of the project within the production environment.

Credit Suisse **Manhattan NY**
Technical Analyst Intern Summer 2011

- Developed web-based dashboard providing all levels of the bank access to comprehensive analytics of the usage of a database
- Produced extensive documentation through all stages of the project life-cycle.
- Worked as a member of a team to meet multiple project goals and deliver a formal presentation to project sponsors

TEACHING EXPERIENCE

University of Notre Dame **Notre Dame, IN**
Course Instructor – Healthcare Analytics Fall 2018

- Designed a healthcare analytics course to incorporate the use of python and an increased focus on modern statistical and machine learning techniques specifically geared towards answering a wide range of health-centric research questions.
- Prepared and delivered lectures based on the concepts, techniques, and theories associated with the complex nature of health data.
- Created interactive labs allowing hands on experience using techniques surrounding the preparation, modeling, and interpretation of a large real-world electronic health record data.

University of Notre Dame **Notre Dame, IN**
Interim Instructor – Data Science Fall 2017

- Selected by the department chair to act as an interim instructor while the current instructor was unavailable to teach.
- Created and delivered course material covering data exploration, preprocessing, cleaning, and introducing rule-learners over the first six sessions of the semester.

The Stanley Clark School **South Bend, IN**
Volunteer Teacher Summer 2014

- Created and instructed a weeklong course introducing students to basic programming concepts.
- Worked 1-1 and in groups with students ranging from 6th to 8th grade.

University of Notre Dame **Notre Dame, IN**
Teaching Assistant – Healthcare Analytics Fall 2013

- Responsible for grading and providing feedback on quizzes, assignments and project milestones.
- Devised assignments, and managed class materials.
- Provided lectures in professors absence.

AWARDS AND HONORS

- Winning Team (Tied 1st) BHI Data Challenge – Best Novel Insights 2018
- Recipient of IEEE BHI/NSF Student Travel Award 2018
- Ethical Leader in STEM Fellow (NSF Funded graduate leadership program) 2015-2016
- NSF Graduate Research Fellowships (GRFP) – Honorable Mention 2015
- Article, *Does Medical School Training Relate to Practice? Evidence from Big Data,* featured of cover page of Big Data Journal 2015
- Kaneb Center for Teaching & Learning Certificates
  - Striving for Excellence in Teaching (2015)
  - Teaching Well Using Technology (2015)
  - Advanced Teaching Scholar (2016)
- Recipient of IEEE BIBM Student Travel Award 2014
- Best Paper Nominee – Scaling Personalized Healthcare with Big Data 2014
- Recipient of Outstanding TA Award 2013
- Upsilon Pi Epsilon Inductee- Computer Science Honor Society 2013-present
- First place mobile app development class for work on NICU analytics 2012
  - Presented project to Notre Dame University Council for Academic Technologies
- Second place in Four Horsemen Society (Entrepreneurship and Innovation Society) new idea PITCH Competition 2012

REFEREED PUBLICATIONS

In Conference Proceedings:

- **Feldman, Keith**, Mayra Duarte, Waldo Mikels-Carrasco, and Nitesh V. Chawla, “Leveraging Health and Wellness Platforms to Understand Childhood Obesity: A Usability Pilot of FitSpace,” IEEE International Conference on Biomedical and Health Informatics, 2018.
- Nagrecha, Saurabh, Pamela Bilo Thomas, **Keith Feldman**, and Nitesh V. Chawla. "Predicting chronic heart failure using diagnoses graphs." International Cross-Domain Conference for Machine Learning and Knowledge Extraction. Springer, Cham, 2017.
- **Feldman, Keith**, Nicholas Hazekamp, and Nitesh V. Chawla. "Mining the Clinical Narrative: All Text Are Not Equal." IEEE International Conference on Healthcare Informatics, 2016.
- **Feldman, Keith**, and Nitesh V. Chawla. “Admission Duration Model for Infant Treatment (ADMIT),” IEEE International Conference on Bioinformatics and Biomedicine, 2014
- **Feldman, Keith**, and Nitesh V. Chawla. “Scaling Personalized Healthcare with Big Data,” 2nd International Conference on Big Data Analytics and Healthcare, 2014. Best paper nominee.
- Dasgupta, Dipanwita, **Keith Feldman**, Disha Waghray, Waldo. Mikels-Carrasco, Patty Willaert, Debra A. Raybold, and Nitesh V. Chawla. “Integrated Digital Care Framework for Successful Aging,” IEEE International Conference on Biomedical and Health Informatics, 2014.

Journal Articles:

- Gonya, Jenn*, **Keith Feldman***, Kristen Brown, Melanie Stein, Sarah Keim, Kelly Boone, Robert Rumpf, William Ray, Nitesh V. Chawla, Eric Butter. "Human interaction in the NICU and its association with outcomes on the Brief Infant-Toddler Social and Emotional Assessment (BITSEA) " Early Human Development, 2018
- Gonya, Jenn, Tondi Harrison, **Keith Feldman**, Melanie Stein, Nitesh Chawla. "Nursing networks in the NICU and their association with maternal stress: A pilot study." Journal of Nursing Management, 2018
- **Feldman, Keith**, Reid A. Johnson, and Nitesh V. Chawla. “The State of Data In Healthcare: Path towards standardization.” Journal of Healthcare Informatics Research, 2018
- **Feldman, Keith**, Spyros Kotoulas, and Nitesh V. Chawla. “TIQS: Targeted Iterative Question Selection for Health Interventions.” Journal of Healthcare Informatics Research, 2018
- **Feldman, Keith**, Louis Faust, Xian Wu, Chao Huang, and Nitesh V. Chawla. “Beyond Volume: The Impact of Complex Healthcare Data on the Machine Learning Pipeline”. Towards Integrative Machine Learning and Knowledge Extraction. Lecture Notes in Computer Science, vol 10344. Springer, 2017
- **Feldman, Keith**, Gregor Stiglic, Dipanwita Dasgupta, Mark Kricheff, Zoran Obradovic, and Nitesh V. Chawla. "Insights into Population Health Management Through Disease Diagnoses Networks." Scientific Reports 6 (2016).
- **Feldman, Keith**, and Nitesh V. Chawla. "Does Medical School Training Relate to Practice? Evidence from Big Data." Big data 3.2 (2015): 103-113. **Featured on Cover Page**
- **Feldman, Keith**, Darcy Davis, and Nitesh V. Chawla. "Scaling and contextualizing personalized healthcare: A case study of disease prediction algorithm integration." Journal of biomedical informatics 57 (2015): 377-385.

Posters and Presentations:

- **Feldman, Keith**, Annie Rohan, and Nitesh V. Chawla. "Manual, automated, or derived measures: The value of variability in the meaningful use of vital sign data." AMIA iHealth Clinical Informatics Conference, 2017. (Presentation)
- Brown, Kaitlyn, **Keith Feldman**, Nitesh Chawla, Wolfgang Rumpf, Will Ray, Kelly M. Boone, Sarah Keim, Leif Nelin, Eric Butter, and Jenn Gonya. “Effect of Mesosystemic Variability in the NICU on Early Autism Behaviors in Extremely Preterm Infants” Nationwide Children’s Hospital Neonatal-Perinatal Conference, 2017. (Poster)
- **Feldman, Keith**, Annie Rohan, and Nitesh V. Chawla. "Manual, automated, or derived measures: The value of variability in the meaningful use of vital sign data." Stony Brook University's School of Nursing Distinguished Alumni Award Symposium, 2017. (Poster)
- **Feldman, Keith** and Nitesh V. Chawla. "From Data to Insights." INFORMS Healthcare, 2015. (Presentation)
- **Feldman, Keith**, et al. "Leveraging Technology to Assist in Management of Diabetic Conditions." AMIA Joint Summits on Translational Science, 2015. (Poster)

Completed Manuscripts to be submitted:

- **Feldman, Keith**, Annie Rohan, and Nitesh V. Chawla “Manual, automated, or derived measures: The value of variability in the meaningful use of vital sign data.”
- **Feldman, Keith**, Gisela Solymos, Maria Paula Albuquerque, and Nitesh V. Chawla. “Uncovering Complex Interactions: Associations of psychological factors to nutritional intervention outcome”

INVITED TALKS

The Role of Informatics in Nursing — Saint Mary's College, IN
Graduate Program in Nursing — April 2016

PROFESSIONAL SERVICE

Departmental Service

Graduate Mentor — August 2017 – Present

- Mentor for two first-year graduate students in the computer science and engineering department. Acting as a resource to help students navigate their initial years of graduate school.

Computer Science Graduate Student Board Member — August 2017 – August 2018

- Designed and implemented a mentor program for incoming graduate students. Matching incoming students to a senior student outside of their lab, and working with the department to secure funding for the program.
- Responsible for the facilitation of effective communication between the department and graduate students. The board also organizes professional and social events during the academic year.

Computer Science Dept. Representative to the Graduate Student Union — December 2015 – August 2018

- Liaison between the department and university graduate student union. Tasked with voicing student concerns to the union, and communicating policy and programming back to the department.
- Member of academic affairs sub-committee. Working to promote student workshops, and selecting graduate student teaching awardee.

Volunteer Judge, Northern Indiana Regional Science & Engineering Fair — February 2016

- Worked as part of a team to evaluate and award student science fair projects.

Mentoring

Christopher Giuffrida – Computer Science Undergraduate — Fall 2018 – present
Mariana Suarez - Science-Computing Undergraduate — Fall 2018 – present
Karthik Pansetty – Visiting Summer Researcher (IIT Gandhinagar) — Summer 2018 – present
Catherine Markley – Computer Science Undergraduate — Fall 2017 – present
Shuyang Li – Computer Science Undergraduate — Fall 2014 – Spring 2015
Mayank Shekhar – Visiting Summer Researcher (IIT Gandhinagar) — Summer 2014
Jacob Rebec – High School Student Researcher — Spring 2014

External Service

TPC:

- BIGDATA4HEALTH (2017)

Reviewer:

- Journal of Biomedical Informatics (2015,2018)
- IEEE Access (2017)
- Scientific Reports (2016)
- Journal of Biomedical and Health Informatics (2016)

- Big Data (2015)
- Transactions on Knowledge and Data Engineering (2015)
- AMIA Joint Summits on Translational Science (2015,2016,2017,2018,2019)
- Transactions on Knowledge Discovery from Data (2014)
- Statistical Analysis and Data Mining (2014)

TECHNICAL QUALIFICATIONS

Programming Language Proficiency: Python, C, C++, C#
Data analysis and visualization tools: Matlab, R, Python (Pandas, Scikit-Learn)
Database and Web Experience: MySQL, PHP, JavaScript, JQuery

REFERENCES

Available Upon Request

Last Updated October 2nd, 2018