Alicia L. Nobles, PhD

Research Interests

I am a data scientist, cross trained in information science, engineering, and public health, who leverages web and social media data to monitor, understand, and respond to public health issues. I use a broad range of data science methods, including text mining and machine learning, as well as qualitative methods to understand how we can better engage the public and rapidly respond to their needs.

My research has yielded actionable real-world results. For example, in response to identifying a discrepancy between reporting of celebrity suicide versus celebrity drug overdose, several editors at major news outlets have agreed to include SAMSHA's 1-800-662-HELP in their reporting of drug overdoses.

I believe our most pressing challenges will require multidisciplinary engagement and am excited to be one of the early leaders merging data science and public health.

Appointments (Research & Professional)

Assistant Professor   2020 - Current
Division of Infectious Diseases and Global Public Health, Department of Medicine
University of California San Diego

Co-Founder   2019 - Current
Center for Data-Driven Health, Qualcomm Institute
University of California San Diego

Postdoctoral Fellow   2018 - 2020
Division of Infectious Diseases and Global Public Health, Department of Medicine
University of Virginia

Graduate Fellow   2012 - 2018
Department of Systems & Information Engineering, Department of Civil Engineering
University of Virginia

Civil Engineer   2008 - 2012
Environmental Services
CH2M

Education

PhD, Systems & Information Engineering, Raven Society   2018
University of Virginia
Dissertation: Mining User-Generated Data to Examine Online Information Seeking for Reproductive and Sexual Health

MS, Civil Engineering   2014
University of Virginia

BS, Civil Engineering, Summa Cum Laude   2007
Georgia Tech

Grants and Fellowships

PI: "Quantifying Treatment Help-Seeking Among Self-Identified Opioid Users on Social Media" 2020 - 2025
NIH National Institute on Drug Abuse (NIDA)
Amount: $946,580

PI: "Rapid Examination of Collateral Threats to Population Behavioral Health during the COVID-19 Pandemic" 2020
University of California - Office of the President
Amount: $25,000

PI: "Quantifying and Contextualizing Personally Identifiable Information on Social Media" received but declined
Fordham University HIV and Drug Abuse Prevention Research Ethics Training Institute (RETI)
Amount: $20,000

Trainee: Substance Use, HIV, and Related Infections Training Grant (NIH T32) 2018 - 2020
Div of Infectious Diseases & Global Public Health, Dept of Medicine, UC San Diego

Fellow: StatLab Fellowship 2017 - 2018
Library Research Data Services & Sciences, University of Virginia
Amount: $6,400

Fellow: Teaching Fellowship 2017
School of Engineering and Applied Science, University of Virginia
Amount: $9,000

PI: "Health Insurance Literacy of College Students" 2017 - 2018
Double Hoo Grant, Center for Undergraduate Excellence, University of Virginia
Amount: $4,809

Trainee: Transdisciplinary Big Data Science Training Grant (NIH T32) 2016 - 2017
Dept of Biomedical Engineering, University of Virginia

PI: "Predicting Imminent Suicide Risk using Text Messages in Real-Time" 2015 - 2016
Presidential Fellowship in Data Science, Data Science Institute, University of Virginia
Amount: $25,000

Co-Author & Sole Supporting Grad Student: "Evaluating the Cost-Effectiveness of Water Quality 2014 - 2015
Trading for Stormwater Management"
Virginia Transportation Research Council Grant, Virginia Transportation Research Council
Amount: $102,901

Fellow: Olive B. and Franklin C. Mac Krell Jefferson Fellowship 2012 - 2017
Jefferson Scholars Foundation
Amount: $120,000

Fellow: Commonwealth Fellowship in Engineering 2012 - 2013
School of Engineering and Applied Science, University of Virginia
Amount: $32,500

Publications

* Conference proceedings are the primary peer-reviewed publication venue in computer science and similar in rigor to journals.

1. Glenn, **Nobles**, Barnes, Teachman. (forthcoming). Can Text Messages Identify Suicide Risk in Real Time? A Within-Subjects Pilot Examination of Temporally-Sensitive Markers of Suicide Risk. Clin Psychol Sci.

2. **Nobles**, Leas, Dredze, Ayers. 2020. Examining Peer-to-Peer and Patient-Provider Interactions on a Social Media Community Facilitating Ask the Doctor Services. Proc of AAAI Conference on Web and Social Media (ICWSM).

3. **Nobles**, Leas, Latkin, Dredze, Strathdee, Ayers. 2020. #HIV: Alignment of HIV-Related Visual Content on Instagram

with Public Health Priorities in the US. AIDS and Behavior.

4. **Nobles**, Leas, Noar, Dredze, Strathdee, Ayers. 2020. Automated Image Analysis of Instagram Posts: Implications for Risk Perception and Communication in Public Health using a Case Study of #HIV. PLOS ONE.

5. **Nobles**, Leas, Caputi, Zhu, Strathdee, Ayers. 2020. Responses to Addiction Help-Seeking from Alexa, Siri, Google Assistant, Cortana, and Bixby Intelligent Virtual Assistants. Nature Digital Medicine.

6. Leas, Prochaska, Ayers, **Nobles**, Henrikson. 2020. What to do when tobacco advertisers co-opt anti-tobacco social media campaigns to sell tobacco. Tobacco Control.

7. **Nobles**, Leas, Althouse, Dredze, Longhurst, Smith, Ayers. 2019. Requests for Diagnoses of Sexually Transmitted Diseases on a Social Media Platform. JAMA.

8. Leas, **Nobles**, Caputi, Ayers. 2019. Trends in Internet Searches for Cannabidiol (CBD) in the United States. JAMA Open.

9. Strathdee, **Nobles**, Ayers. 2019. Harnessing Digital Data and Data Science to Achieve 90-90-90 Goals to End the HIV Epidemic. Current Opinion in HIV and AIDS.

10. **Nobles**, Dredze, Ayers. 2019. "Repeal and Replace": Increased Demand for Intrauterine Devices Following the 2016 Presidential Election. Contraception.

11. Ayers, **Nobles**, Dredze. 2019. Media Trends for SAMHSA's 800-662-HELP Addiction Treatment Referral Services Following a Celebrity Overdose. JAMA Intern Med.

12. **Nobles**, Curtis, Ngo, Vardell, Holstege. 2019. Health Insurance Literacy of College Students: A Mixed Methods Analysis. J Am Coll Health.

13. Caputi, **Nobles**, Ayers. 2019. Internet Searches for Sexual Harassment and Assault, Reporting, and Training Following #MeToo. JAMA Intern Med.

14. **Nobles**, Dreisbach, Keim-Malpass, Barnes. 2018. "Is this a STD? Please help!": Online Information Seeking for STDs on Reddit. Proc of AAAI Conference on Web and Social Media (ICWSM).

15. **Nobles**, Glenn, Kowsari, Teachman, Barnes. 2018. Identification of Imminent Suicide Risk Among Young Adults using Text Messages. Proc of ACM Conference on Human Factors in Computing Systems (CHI).

16. Boukhechba, Baee, **Nobles**, Gong, Wells, Barnes. 2018. A social cognitive theory-based framework for monitoring medication adherence applied to endocrine therapy in breast cancer survivors. Proc of IEEE EMBS International Conference on Biomedical & Health Informatics (BHI).

17. **Nobles**, Goodall, Fitch. 2017. Comparing the Cost of Onsite Best Management Practices to Nutrient Credit Offsets for Stormwater Management: Case Study for VDOT. JAWRA.

18. **Nobles**, Vilankar, Wu, Barnes. 2015. Evaluation of Data Quality of Multisite Electronic Health Record Data for Secondary Analysis. Proc of IEEE Conference on Big Data.

19. **Nobles**, Goldstein, Goodall, Fitch. 2014. Investigating the Cost Effectiveness of Nutrient Credit Use as an Option for VDOT Stormwater Permitting Requirements. FHWA/VCTIR 15-R9 Report 15-R9.

Presentations and Invited Talks

1. **Nobles**. 2020. Pulling Back the Curtain on the Research Process. Lean In San Diego. (invited talk)

2. **Nobles**. 2020. Ethics of Online Research. PyData San Diego. (invited talk)

3. **Nobles**. 2019. Using Social Media to Obtain a Crowd-Diagnosis. Promoting Research in Social Media and Health Symposium (PRISM). (symposium poster)

4. **Nobles**. 2018. "Is this a STD? Please help!": Online Information Seeking for Sexually Transmitted Diseases. Dept of Engineering Management & Systems Engineering, George Washington University. (invited seminar talk)

5. **Nobles**. 2018. "Is this a STD? Please help!": Online Information Seeking for Sexually Transmitted Diseases. Division of Infectious Disease and Global Public Health, University of California San Diego. (invited seminar talk)

6. **Nobles**, Dreisbach, Keim-Malpass, Barnes. 2018. "Is this a STD? Please help!": Online Information Seeking for STDs on Reddit. Proc of AAAI Conference on Web and Social Media (ICWSM) Stanford, CA. (conference poster)

7. **Nobles**, Glenn, Kowsari, Teachman, Barnes. 2018. Identification of Imminent Suicide Risk Among Young Adults using Text Messages. Proc of ACM Conference on Human Factors in Computing Systems (CHI). Montreal, Québec. (conference presentation)

8. **Nobles**. 2017. Health Insurance Literacy of College Students: Implications for the Student Health Insurance Plan. Institutions in Context: Healthcare Institutions and Policy. Tampere, Finland. (workshop presentation)

9. **Nobles**, Curtis, Ngo, Holstege. 2017. Health Insurance Literacy of College Students. 2017 ACHA Annual Meeting. Austin, TX. (conference poster)

10. **Nobles**, Glenn, Teachman, Barnes. 2017. Novel Methods to Predict Suicide Attempts by Young Adults using Personal Communication and Social Media Data. 2nd Symposia on Computing and Mental Health, SIGCHI Conf Hum Factor Comput Syst (CHI-17). Denver, CO. (workshop poster)

11. **Nobles**, Curtis, Ngo, Holstege. 2017. Health Insurance Literacy of College Students. 2017 Curry Research Conference. Charlottesville, VA. (conference presentation)

12. Glenn, **Nobles**, Barnes, Teachman. 2016. Utilizing Machine Learning Techniques to Improve Prediction and Prevention of Suicide and Self-Injury. 2016 ABCT. New York City, NY. (conference presentation)

13. **Nobles**, Vilankar, Wu, Barnes. 2015. Evaluation of Data Quality of Multisite Electronic Health Record Data for Secondary Analysis. Proc of IEEE Conference on Big Data. San Jose, CA. (conference presentation)

14. **Nobles**, Goldstein, Goodall, Fitch. 2015. Investigating the Cost-Effectiveness of Nutrient Credit Use as an Option for VDOT Stormwater Permitting Requirements. 2015 TRB Annual Meeting. Washington, D.C. (conference presentation)

15. Convers, Newman, **Nobles**. 2007. An Improved Global Energy to Moment Ratio Catalog: More Events, Stations, and Rupture Durations. Eos Trans. AGU, 88(52), Fall Meet. Suppl., Abstract S52B-02. (conference poster)

Workshops Organized

1. Pater, Nobles, Gilbert, Zimmer, Fiesler. 2020. Data is People. AAAI Conference on Web and Social Media (ICWSM).

Research Experience with Select Projects

Postdoctoral Fellow   2018 - 2020
Research Group: Steffanie Strathdee, John Ayers, Mark Dredze
Division of Infectious Diseases & Global Public Health, Dept of Medicine
University of California San Diego

- Highlighted missed opportunities to leverage intelligent virtual assistants (e.g., Siri) to link those seeking help for addiction to existing, free, evidence-based services.
- Identified "crowd-diagnosis" on Reddit using mixed methods (data science and qualitative coding).
- Identified disparities in news reporting of celebrity drug overdoses. Partnered with CNN and Reuters to include helplines in reporting of drug-related news.

Visiting Scholar   2018
Research Group: Mark Dredze
John C. Malone Center for Engineering in Healthcare & Dept of Computer Science
Johns Hopkins University

- Identified themes in HIV-related Instagram images using computer vision software and unsupervised learning.
- Identified unprecedented Google searches (86% higher; 40-54 million more) for sexual violence in response to #MeToo using time series modeling.

Graduate Research Fellow   2014 - 2018
Research Group: Laura Barnes
Dept of Systems & Information Engineering
University of Virginia

- Track record of communicating ideas resulting in $330k of funding for my PhD research from 6 fellowships and grants and 22 collaborators across fields.
- Developed an online survey to evaluate health insurance literacy of young adults. 88% of participants couldn't determine their cost-sharing. Partnered with student health to supply additional training.
- First to identify imminent suicide risk by applying a n-gram model to over 1+ million text messages of suicide attempters.
- Identified unprecedented Google searches (15% higher; 10-21 million more) for intrauterine devices correlated with uncertainty of US health reform using time series modeling.

Graduate Research Fellow   2012 - 2014
Research Group: Jon Goodall
Dept of Civil Engineering
University of Virginia

- Linked siloed Access & GIS databases for first ever cost-benefit analysis of stormwater nutrient credit banking in the US. Provided evidence for VDOT to purchase $2 million of nutrient credits jump-starting the market in the US.

Teaching Experience

<u>Instructor</u>

Linear Statistical Models (co-listed undergraduate/graduate)   Fall 2017

- Received award for All University Teaching Award for exceptional teaching for co-listed class of 118 students. Awardees are top 5% of teachers across the entire university.

<u>Teaching Assistant</u>

Systems Integration (graduate)   Spring 2018

Calculus II (undergraduate)   Fall 2014, Spring 2015, Spring 2018

<u>Guest Lecturer</u>

"Ethics of Online Research", Ethics in Public Health Research & Practice (graduate)   Winter 2020

"Health Insurance Literacy", Healthcare for the consumer (undergraduate)   Spring 2016

<u>Pedagogical Training</u>

Tomorrow's Professor Today   2017 - 2019

- Competitive two-year program that focuses on pedagogy.

Professional Experience

Civil Engineer   2008 - 2012
Environmental Services
CH2M

- Managed large-scale $8 million groundwater remediation projects including design, permitting, staffing, report preparation, and public relations.
- Managed budget, staffing, and schedule for 44 environmental investigation sites in US and Caribbean. Authored 44 reports in less than 3 weeks saving $20,000 of a $60,000 budget coordinating with personnel in 10+ offices. Authored proposal that was awarded $1.2 million for follow-up investigation.
- Onsite quality assurance manager for a $90 million large-scale, multi-site environmental remediation in a low resource environment in Caribbean.
- Created standardized data collection plan template and trained a small business to use the template for 21 sites on a $40 million small business joint venture.

Mentoring

Derek Johnson, postdoc (Public Health), University of California San Diego   2020
Social Media Monitoring for HIV and Substance Use

Ashli Perkins, MPH (Public Health), University of California San Diego   2020
Using Social Media for Physician Education

An Ran, PhD in progress (Mathematics), University of California San Diego   2020
Using Google Trends to Predict Patterns in Population Mental Health

Dylan Hazlett, BS (Engineering), University of Virginia   2017 - 2018
Online Reproductive Health Information Seeking

Brett Curtis, BS (Education), University of Virginia   2016 - 2018
Health Insurance Literacy

Hillary Goldstein, BA (Economics), University of Virginia   2013 - 2014
Nutrient Credit Trading

Mentored multiple junior engineers in industry, CH2M   2008 - 2012

Honors & Awards

<u>Research</u>

Altmetric Top 5% of All Research Outputs

NSF Graduate Research Fellowship (honorable mention)

<u>Professional</u>

New Faces of Engineering (nomination)

Beyond Performance (4 times)

<u>Teaching</u>

All University Teaching Award at University of Virginia

Relevant Training

<u>Courses</u>

- agent based models
- big data in health
- computational research
- data mining
- epidemiology
- environmental epidemiology
- GIS
- US health policy
- linear statistical models
- machine learning
- optimization
- research ethics
- stochastic modeling
- text mining

<u>Workshops</u>

Big Data Coursework for Computational Medicine (Weill Cornell Medicine)

Healthcare Data Analytics (Oregon Health & Science University)

Institutions in Context: Healthcare (University of Tampere)

Catalyzing Advocacy in Science and Engineering (AAAS)

<u>Training Grants</u>

Transdisciplinary Big Data Science (NIH T32; Division of Infectious Diseases & Global Public Health, Dept of Medicine, University of California San Diego)

Substance Use, HIV, and Related Infections (NIH T32; Dept of Biomedical Engineering, University of Virginia)

Service

<u>Outside University</u>

Journal Reviewer for JAMA, AJPH, AMIA	Current
Speaker Selection Committee: Women in Data Science San Diego Conference	2020
Student Volunteer: AMIA Symposium	2016 - 2017
Mentor: Computers 4 Kids	2014 - 2016
Pharmacy Tech/Exit Interview Volunteer: Charlottesville Free Clinic	2013 - 2014

<u>Inside University</u>

Graduate Student Representative: Student Health Insurance Committee	2012 - 2018