Sonia Baee

Linklab (Olsson Hall - Second Floor), University of Virginia, Charlottesville, VA 22903

(434) 466-7628 | sb5ce@virginia.edu | soniabaee | sonia-baee | https://soniabaee.com

Research Summary

I am a PhD student in the Department of System and Information Engineering at the University of Virginia, where I am part of the Sensing Systems for Health lab. My work is understanding macro and micro-level human behaviors manifest in the wild. My primary research interests lie at the intersection of human-AI interaction, mobile sensing, and reinforcement learning. In my PhD research, I design intelligent systems to understand the dynamics of human behavior in terms of their well-being and their daily activities such as driving. More importantly, I build different computational methods and models to employ structural (tabular, databases) and unstructured (text, images) data sources including social media (Reddit, Twitter, Instagram), responsibly and ethically, passive monitoring sensors, cameras, self-report measures, physiological data, and environmental and perceptual measures toward understanding human behavior to improve health and increase safety. My field of research involves characterizing how human interact not only with each other but also by AI-systems, understanding how these interactions changes based on human moods and environmental effects, and identifying adaptive/personalized just in time health/safety interventions for the prediction of human changes scenarios in the wild.

Education

Ph.D. in Systems and Information Engineering — *Charlottesville, Virginia*

Department of Systems and Information Engineering, University of Virginia — *August 2017 - Present*

- Advisor: Dr. Laura Barnes

M.Sc. in Computer Science (Artificial Intelligence) — *Tehran, Iran*

Department of Mathematics and Computer Science, Amirkabir University (Tehran Polytechnic) — *Sep. 2011 - Oct. 2013*

- Advisor: Prof. S. Mehdi Hashemi Tashakori

B.Sc. in Computer Science — *Tehran, Iran*

Department of Mathematics and Computer Science, Amirkabir University (Tehran Polytechnic) — *Sep. 2007 - Oct. 2011*

- Advisor: Prof. S. Mehdi Hashemi Tashakkori and Dr. Farshad Eshghi

Experience

Research Assistant — *August 2017 - Present*

University of Virginia – *Supervision: Dr. Laura Barnes*

Researcher — *Sep. 2015 - July 2017*

Knowledge Representation (KR) Lab - Texas Tech University – *Supervision: Prof. Michael Gelfond and Dr. Yuanlin Zhang*

Researcher and Developer — *Feb. 2011 - Oct. 2014*

Intelligent Transportation Systems Research Institute (ITSRI) - Amirkabir University of Technology – *Supervision: Prof. S. Mehdi Hashemi Tashakkori*

Researcher — *Sep. 2011 - Nov. 2013*

Network and Optimization Center (NORC) - Amirkabir university of Technology – *Supervision: Dr. Farshad Eshghi and Prof. S. Mehdi Hashemi Tashakkori*

Computer Skills

Programming Language	Python, Java, R, C/C++, MATLAB, SQL programming
Deep Learning	TensorFlow, PyTorch
Web	HTML, AngularJs, Javascript, CSS
OS/ Others	Linux, Git, LaTeX, LINGO, LINDO

Publications

DeepTake: Prediction of Driver Takeover Behavior using Multimodal Data — *CHI 21*

Pakdamanian, Erfan, Shili Sheng, **Sonia Baee**, Seongkook Heo, Sarit Kraus, and Lu Feng. ACM Conference on Human Factors in Computing Systems (CHI 2021).

A Framework for Addressing the Risks and Opportunities In AI-Supported Virtual Health Coaches — *PervasiveHealth 20*

Baee, Sonia, Mark Rucker, Anna Baglione, Mawulolo Ameko, and Laura Barnes. 14th EAI International Conference on Pervasive Computing Technologies for Healthcare

A Generalized Framework for Understanding the Relationship between Social Media Discourse and Mental Health — *CSCW 20*

Sanjana Mendu, Anna Baglione, **Sonia Baee**, Congyu Wu, Brandon Ng, Adi Shaked, Gerald Clore, Mehdi Boukhechba, and Laura Barnes

Redesigning the Quantified Self Ecosystem with Mental Health in Mind — *CHI 2020*

Sanjana Mendu,**Sonia Baee**, Anna Baglione, and Laura Barnes, Technology Ecosystems: Rethinking Resources for Mental Health Workshop

SocialText: A Framework for Understanding the Relationship Between Digital Communication Patterns and Mental Health. *ICSC 2019*

Sanjana Mendu, Mehdi Boukhechba, Anna Baglione, **Sonia Baee**, Congyu Wu, and Laura Barnes. In 2019 IEEE 13th International Conference on Semantic Computing (ICSC) (pp. 428-433). IEEE.

Do I really feel better? Effectiveness of emotion regulation strategies depends on the measure and social anxiety *Depression and anxiety 2019*

Katharine E Daniel, **Sonia Baee**, Mehdi Boukhechba, Laura Barnes, and Bethany Teachman.

What is effective? Assessing different aspects of emotion regulation effectiveness in daily life. *APS 2019*

Katharine Daniel, **Sonia Baee**, Laura Barnes, Bethany Teachman. The Association for Psychological Science Annual Convention, Washington, D.C.

Ecological Momentary Assessment of Differential Impact of Emotion Regulation Strategies on Negative Affect Based on Social Anxiety Severity. *ABCT 2018*

Katharine Daniel, **Sonia Baee**, Laura Barnes, Bethany Teachman. Regulating Emotions Effectively: New Approaches to Understanding Effects of Time, Person, and Development. 52nd Annual Association for Behavioral and Cognitive Therapies Convention, Washington D.C.

A social cognitive theory-based framework for monitoring medication adherence applied to endocrine therapy in breast cancer survivors. *BHI 2018*

Sonia Baee, Mehdi Boukhechba, Alicia Nobles, J. Gong, K. Wells, and Laura Barnes. IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI).

Passenger Boarding/Alighting Management in Urban Rail Transportation *2013*

Sonia Baee, Farhad Eshghi, S. Mehdi Hashemi, and Rayehe Moienfar. 2012 Joint Rail Conference

Web-based Interpretation Training for Anxiety: Testing Target Engagement and Effectiveness for a Treatment Seeking Community Sample *Under review*

Julia Ji,**Sonia Baee**, Diheng Zhang, J. Meyer, Laura Barnes, Bethany Teachman ,

EyeCar: Modeling the Visual Attention Allocation of Drivers in Semi-Autonomous Vehicles *Submitted arXiv: 2019*

Sonia Baee, Erfan Pakdamanian, Vincente Ordonez Roman, Inki Kim, Lu Feng, and Laura Barnes. arXiv preprint arXiv:1912.07773 (2019).

Peacock: Reinforcement Learning Augmented Influencer on Twitter *Submitted arXiv: 2018*

Sonia Baee, Akshat Pandey, Hannah Leung, Ab Boxley, and Peter A. Beling

LonelyText: A Short Messaging Based Classification of Loneliness *Submitted arXiv: 2018*

Mawulolo Ameko, **Sonia Baee**, Hongning Wang, and Laura Barnes

Attrition Prediction for eHealth Interventions *Near Submission*

***Sonia Baee**, Anna Baglione, Tyler Spears, Bethany Teachman, and Laura Barnes*

Effectiveness of Cognitive Based Interpretation and TeleCoaching for Anxious people *In Preparation*

Jeremy Eberle, Katharine Daniel, **Sonia Baee**, Anna Baglione, Henry Behan, Claudia Calicho-Mamani, Alexandra Silverman, Noah French, Nicola Hohensee, Julie Ji, Alexandra Werntz, Mehdi Boukhechba, Daniel Funk, Laura Barnes, and Bethany Teachman.

A Framework for Attrition Pattern of Participant in Digital Mental Health Studies. *In Preparation*

Sonia Baee, Anna Baglione, Bethany Teachman and Laura Barnes.

Types of Conversations in a Network of Patients with HIV. *In Preparation*

Sonia Baee, Debajyoti Datta, Tabor Flickinger, Rebecca Dillingham, and Laura Barnes.

Politeness in Conversation of Patient With HIV With Healthcare Staff *In Preparation*

Debajyoti Datta, **Sonia Baee**, Tabor Flickinger, Rebecca Dillingham, and Laura Barnes.

Selected Academic Projects

- Implementation of a natural language model for understanding a digital communication of patients with HIV, **Python**, 2020
- Implementation of a network of conversation for patient with cancer, **Python**, **JavaScript**, 2020
- Implementation of data processing framework in digital mental health studies, **Python**, **R**, **SQL**, 2020
- Implementation of an attrition framework in digital mental health studies, **Python**, 2020
- Implementation of a model for evaluating behaviors of individuals with anxiety after using cognitive behavior modification program. **Python**, **Java**, **JavaScript**, **R**, *https://mindtrails.virginia.edu*, 2017- Present
- Implementation of an efficient way to detect the emotion regulation strategies of anxious people by using location and ecological momentary assessment pattern, **R**, 2019
- Implementation of "EyeCar: Modeling the Visual Attention Allocation of Drivers in Semi-Autonomous Vehicles", **Python**, **MATLAB** 2019
- Implementation of "Peacock: Reinforcement Learning Augmented Influencer on Twitter", **Python**, 2018
- Implementation of "LonelyText: A Short Messaging Based Classification of Loneliness", **Python**, 2018

- Implementation of "A Framework for Understanding the Relationship Between Digital Communication Patterns and Mental Health", **Python**, 2019
- Implementation of "Web-based Interpretation Training for Anxiety", **Python**, **R**, 2019
- Implementation of monitoring medication adherence of people with breast cancer, **Python**, **R**, 2018
- Implementation of "ALM: creating a compiler for modular action language", **Java**, 2016
- Implementation of a business intelligent model to recommend the product to the user based on their history of orders, **C#**, **Java**, 2011 - 2014
- Implementation of detecting passenger behavior in urban rail transportation, **Python**, **MATLAB**, 2013
- Implementation of an energy management model in hospital, **MATLAB**, 2011 - 2012 Implementation of a decision support system for dynamic resource allocation for assigning clinicians to patients, **MATLAB**, **C#**, 2010

Selected Courses

- Statistical Modeling
- Recommendation System
- Reinforcement Learning
- Natural Language Processing
- Machine Learning
- Human-Computer Interaction
- Computational Methods in Optimization
- Dynamic Programming
- Stochastics
- Mobile Sensing

Reviewing Papers

- Computers in Human Behavior Journal (peer-reviewed journals)
- Journal of Medical Internet Research (peer-reviewed journals)
- IEEE EMBS International Conference on Biomedical Health Informatics (BHI)
- ACM CHI Conference on Human Factors in Computing Systems (CHI)

Honors and Awards

2021 **Virginia Commonwealth Cyber Initiative**, Graduate student grant, University of Virginia
2020 **Ripple Fellowship**, Engineering grant, University of Virginia
2018-2020 **Leidos Ph.D. Fellowship**, Engineering grant, University of Virginia
2019 **Distinguished Graduate Student Award**, University of Virginia
2018 **NSF Travel Awards**, IEEE - EMBS
2017-2022 **Distinguished Fellowship**, One of the most prestigious fellowships at the University of Virginia
2015-2016 **Presidential Fellowship**, This fellowship was funded in part by General Motors at Texas Tech University
2013 **Ranked 2nd**, Among Computer Science M.Sc. students, Amirkabir University of Technology, Tehran, Iran
2011 **Distinguished B.Sc. student award**, With honorary acceptance for the M.Sc. program
2010 - 2011 **Ranked 1st**, Among Computer Science and Mathematics B.Sc. students, Amirkabir University of Technology

Teaching and Presentation

Presenter *2020*

14th EAI International Conference on Pervasive Computing Technologies for Healthcare (Pervasive Health)

- A Framework for Addressing the Risks and Opportunities In AI-Supported Virtual Health Coaches

Presenter and Volunteer *2020*

The 21st Annual Meeting of the Special Interest Group on Discourse and Dialogue

- Personalization and system personality for dialogue systems

Presenter *2018*

Biomedical and Health Informatics Conference 2018

- A social cognitive theory-based framework for monitoring medication adherence applied to endocrine therapy in breast cancer survivors.

Guest lecturer, Texas Tech University *Fall 2016*

CS 2413: Data Structure

- Teaching different types of search algorithms

Teaching Assistant, Amirkabir University of Technology *Fall 2011*

CS 1316104: Principle of Computer 2 – C/C++ programming

- Developed the assignments, final project and grade them
- Held office hours

Teaching Assistant, Amirkabir University of Technology *Spring 2011*

CS 1316004: Principle of Computer 1 – C/C++ programming

- Developed the assignments, final project and grade them
- Held office hours

Co-Instructor, Amirkabir University of Technology *Spring 2012*

CS 1316163: Principle of Software Design

- Developed some of the assignments, final project and grade them
- Developed course instructions and course materials

Extracurricular Activity

Data Science and Analytics Club (DSAC) *University of Virginia*

Vice President *Summer 2020 - Present*

- A main mentor in workshop series related to data science and machine learning.

LinkLab Student Committee on Culture and Livability *University of Virginia*

Academic and Industry Chair *2018 - 2019*

- Proposed various marketing and network activities to raise awareness of diversity in engineering departments.
- Mentoring more than four workshops related to computer science for girls in high school
- Mentoring student of high school who are interested in engineering majors.

Graduate Society of Women in Engineering *University of Virginia*

Webmaster *2018 - 2019*

- Creating a website for the organization.
- Part of planning teams for speaker series and collaborating with other organizations.

Engineering Recruiter *University of Virginia*

SWE, NSBE *2018*

Research Experiences for Undergraduates *University of Virginia*

Core mentor *2018 and 2019*

- Creating personalized-content for anxious people in the study.
- Detecting mental health disorder (e.g., anxiety, depression) from social media data.

Research Experiences for Undergraduates *Texas Tech University*

Core mentor *2016*

- Declarative Approaches to Knowledge Intensive Applications.

IRSA *University of Virginia*

Vice President *2018 - 2019*

References

Laura Barnes

Associate Professor

- Department of System and Information Engineering, University of Virginia
- Email: lb3dp@virginia.edu

Vicente Ordonez Roman

Assistant Professor

- Department of Computer Science, University of Virginia
- Email: vicente@virginia.edu

Bethany A. Teachman

Professor

- Department of Psychology, University of Virginia
- Email: bat5x@virginia.edu

Alicia Nobles

Assistant Professor

- Department of Medicine, UC San Diego
- Email: alnobles@ucsd.edu