

# HOMA RASHIDISABET

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🔄 January 2021

## EDUCATION

### University of Illinois at Chicago (UIC), Chicago, IL

Ph.D. in: Bioengineering  
Areas of research: Machine Learning and Statistics in health-focused problems

Fall 2018 -  
(Expected) Fall 2023

### University of Tehran (UT), Tehran, Iran

B.Sc. in: Applied Mathematics  
Thesis: Dynamical Systems in Neuroscience

Fall 2012 - Fall 2016

## WORK

### The Janssen Pharmaceutical Companies of Johnson and Johnson (JnJ)

#### EXPERIENCE

- Worked as an R & D data scientist intern in a cross-functional team to pre-process and engineer sensor data collected through wearable devices to develop personalized predictive models for detecting individuals' anomalous behavior (i.e., depression relapse) using deep learning methods.

May 2020 - Sep 2020

### CoNECt Lab, UIC

- Worked as a research assistant to examine the ubiquitous 'virtual mental-health footprints' or 'signatures' of anomalies in people suffering from mood disorders as well as investigating the association of the depression severity, and age on the engineered features from the typing dynamics data collected through **BiAffect** mobile health application using Machine Learning and Statistics.
- Collaborated with a highly interdisciplinary team of specialists in statistics, psychiatry, mathematics, computer science, and data science to maintain and improve the BiAffect application and its data collection process.

Jan 2019 - Jan 2021

### Laboratory of Product and Process Design, UIC

- Worked as a research assistant on processing medical images and solving large-scale systems of equations via numerical optimization methods for dynamic simulation of the blood flow and pressure in human brain vasculature (cerebral arterial trees).

Aug 2018- Jan 2019

### Teaching assistant, UIC

- Biostatistics (BIOE 339)
- Elastography (BIOE 594)
- Physiological Modeling Data and Systems (BIOE 240)

Spring 2019

Fall 2020

Fall 2019 - Spring 2020

### Teaching assistant, UT

- Theory of Differential Equations

Fall 2015

## PUBLICATION

### Journal Papers

- *A systems biology approach to the digital behaviorome*. Rashidisabet, H., Thomas, P., Ajilore, O., Zulueta, J., Moore, R., Leow, A. Current Opinion in Systems Biology. 2020 Jul 7. [Link](#).
- *Effects of mood and aging on keystroke dynamics metadata and their diurnal patterns in a large open-science sample: A BiAffect iOS study*. Vesel, C., Rashidisabet, H., Zulueta, J., Stange, J., Duffecy, J., Hussain, F., Piscitello, A., Bark, J., Langenecker, S., Young, S., Mounts, E., Omberg, L., Nelson, P., Moore, R., Koziol, D., Bourne, K., Bennett, C., Ajilore, O., Demos, A., Leow, A. Journal of the American Medical Informatics Association (2020). [Link.https://doi.org/10.1093/jamia/ocaa057](https://doi.org/10.1093/jamia/ocaa057)

Fall 2020

Spring 2020

### Work in Progress

- *A deep-learning-based anomaly detection method for unobtrusive detection of depression relapse from in-the-wild actigraphy sensor data*. Narayan, V., Li, Q., Vairavan, S., Rashidisabet, H., Raghavan, N. (In a collaboration with JnJ)
- *A statistical method for identification of multiple underlying generative distributions of in-the-wild human typing dynamics: a framework for developing a digital biomarker for mood prediction*. Rashidisabet, H., Zulueta, J., Langenecker, S., Moore, R., Ajilore, O., Leow, A., and Demos, A.

Summer 2020

Fall 2020

## TECHNICAL SKILL

Programming language: Fluent in Python, and R. Experienced in C++, and Java  
Python package: NumPy, Pandas, SciPy, scikit-learn, Keras, PyOD, Matplotlib  
R package: dplyr, corrplot, psych, caret, logspline, fitdistrplus, lme4, lmerTest  
Software: Matlab, Tableau, Microsoft Office, RapidMiner

## REVIEWER

- NewInML at NeurIPS 2020. [Link](#).

Since Sep 2020

RESEARCH EXPERIENCE	<b>Feature engineering and data pre-processing</b>	
	<ul style="list-style-type: none"> <li>Employed entropy analysis, supervised and unsupervised learning, and data mining methods to engineer clinically relevant features from keystroke dynamics metadata and other sensor information within <b>Bi-Affect</b> (smartphone health application) across different diagnostic groups (<a href="#">Link to the resulting poster</a>).</li> <li>Developed algorithms and pipelines for engineering non-trivial features from sleep/awake periods using the raw accelerometer data collected through actiwatch wearables (resulted in an internal poster presented at the annual QS 2020 Conference at JnJ and a working paper).</li> </ul>	<p>Feb 2019 - Apr 2019</p> <p>May 2020 - Sep 2020</p>
	<b>Multivariate time-series anomaly detection</b>	
	<ul style="list-style-type: none"> <li>Developed a hybrid method for detecting personalized depression relapse by integrating the state-of-the-art Deep Learning methods (e.g., LSTM, LSTM-encoder-decoder) with an existing unsupervised and nonparametric anomaly thresholding approach using sensor actigraphy data (resulted in a working paper in collaboration with JnJ company).</li> </ul>	Since May 2020
	<b>Learning naturalistic human typing dynamics behavior</b>	
	<ul style="list-style-type: none"> <li>Developed a statistical method to model multiple underlying generative distributions of the naturalistic human typing dynamics data, and developed a potential digital biomarker (clinically relevant feature) for mood prediction using the proposed method (resulted in a <a href="#">close-to-submission journal paper</a>, and a poster. <a href="#">Link to the poster</a>).</li> </ul>	Since Mar 2020
	<b>Association study through statistical models</b>	
	<ul style="list-style-type: none"> <li>Employed statistical methods to show unobtrusively collected keystroke dynamics metadata is significantly associated with mood despite diurnal patterns and effects of age and thus could serve as a foundation for constructing digital biomarkers (<a href="#">Link to resulting paper</a>, and <a href="#">Link1</a>, <a href="#">Link2</a> to resulting posters).</li> </ul>	Feb 2019 - May 2020
	<b>Image processing</b>	
	<ul style="list-style-type: none"> <li>Image processing (e.g., segmentation, reconstruction, filtering, object-recognition, classification, dimensionality reduction) using medical MRI/MRA images as well as <a href="#">MIT face recognition project</a> dataset via convolutional neural networks (CNN), K-nearest neighbors (KNN), Support Vector Machine (SVM), principal component analysis (PCA), and two-dimensional discrete Fourier series.</li> </ul>	Aug 2018 - Jan 2019
	<b>Large-scale cerebral blood flow simulations in brain (voluntary research)</b>	
POSTER PRESENTATION	<ul style="list-style-type: none"> <li>Generated anatomically accurate 3D surface/volume meshes from medical images and improved mesh quality via optimization algorithms.</li> </ul>	Jan 2017 - Fall 2018
	<ul style="list-style-type: none"> <li>Simulated subject-specific dynamic blood flow and pressure in cerebral arterial trees by solving &gt;100 million nonlinear systems of equations using numerical optimization methods, and quantified near-wall hemodynamic risk factors for providing neurosurgeons with better diagnostic and planning for neurovascular interventions.</li> </ul>	Jan 2017 - Fall 2018
	<ul style="list-style-type: none"> <li><i>Characterizing Passively Collected Real-World Keyboard Dynamics in Mood Disorders as a Function of Age and Time-of-Day.</i> Rashidisabet, H., Vesel, C., Demos, A., Bennett, C., Zulueta, J., Stange, J., Duffecy, J., Hussain, F., Piscitello, A., Bark, J., Langenecker, S., Young, S., Mounts, E., Omberg, L., Nelson, P., Moore, R., Ajilore, O., Leow, A. <i>Biological Psychiatry</i> 87.9 (2020): S150. Poster e-presented (due to Covid-19 pandemic) at the 2020 Society of Biological Psychiatry (SOBP). <a href="#">Link</a></li> <li><i>Diurnal Patterns as Evidenced by Over Eleven Million Smartphone Keystrokes During Daily Usage: An iOS BiAffect Study.</i> Vesel, C., Rashidisabet, H., Demos, A., Zulueta, J., Stange, J., Duffecy, J., Hussain, F., Piscitello, A., Bark, J., Langenecker, S., Young, S., Mounts, E., Omberg, L., Nelson, P., Moore, R., Ajilore, O., Leow, A. Poster presented at the 11th Annual National Network of Depression Centers Conference; 2019 Sept 24-25; Ann Arbor, MI. <a href="#">Link</a>, and was selected as a <b>travel award poster</b>. Also, the poster presented at the ACNP 58th Annual Meeting: Poster Session II. Neuropsychopharmacol. 44, 230–384 (2019). <a href="#">Link</a>.</li> <li><i>Complexity of keyboard dynamics in bipolar disorder: A BiAffect digital phenotyping study.</i> Bark, J., Demos, A.P., Zulueta, J., Stange, J., Duffecy, J., Hussain, F., Piscitello, A., Vesel, C., Rashidisabet, H., Langenecker, S., Young, S., Mounts, E., Omberg, L., Nelson, P., Moore, R.C., Ajilore, O., Leow, A. Poster presented at the 2019 Society of Biological Psychiatry (SOBP). Chicago, IL.</li> <li><i>The CAN-BIND Collaborative Study: Replicating Models of MDD Relapse: The Challenges and Opportunities of Digital Biomarkers.</i> Li, Q., Raghavan, N., Rashidisabet, H., Vairavan, S., Narayan, V., Kennedy, S. Poster presented at the internal QS 2020 Conference at JnJ company.</li> </ul>	
AWARD AND HONOR	<ul style="list-style-type: none"> <li>Doctoral scholarship, Bioengineering Department, UIC, Chicago, IL.</li> <li>Governmental scholarship, Department of Mathematics, Statistics and Computer Science, UT, Iran.</li> <li>Ranked top 0.5% among more than 500,000 participants of the national university entrance exam, Iran.</li> </ul>	<p>Since Fall 2018</p> <p>2012 - 2016</p> <p>Fall 2012</p>