

# Tinashe Michael **Tapera**

PHD STUDENT IN PERSONAL HEALTH INFORMATICS

Northeastern University, Boston, MA

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*I'm a PhD Student at Northeastern University, co-mentored by Varun Mishra and Stephen Intille. I study how to detect and intervene on mental health states using personal devices like mobile phones and smart watches.*

## Education

### Northeastern University

PHD PERSONAL HEALTH INFORMATICS

- Advisors: Varun Mishra, Stephen Intille

Boston, MA

Sep 2022 — May 2027

### Drexel University

ACCELERATED MSc. PSYCHOLOGY (DATA ANALYSIS TRACK)

- Thesis: Advanced Data Mining Methods for Psychological & Behavioral Research
- GPA: 3.70 (cum laude)

Philadelphia, PA

Sep 2017 — Jun 2018

### Drexel University

BSc. PSYCHOLOGY

- GPA: 3.52
- A.J. Drexel Scholarship
- Dean's List

Philadelphia, PA

Sep 2013 — Jun 2017

## Professional Experience

### UbiWell Lab, mHealth Lab, Northeastern University

GRADUATE STUDENT

- Interdisciplinary research at the intersection of mobile/wearable sensing, data science, human-centered computing, and behavioral science.

Boston, MA

Sep 2022 — Present

### Penn Lifespan Informatics & Neuroimaging Center

SENIOR NEUROIMAGING DATA ANALYST

- Developed data pipelines for ETL and analysis of large-scale neuroimaging data sets between data warehouses in Python, R, and Bash
- Preprocessed and analysed neuroimaging data using cutting-edge software (fMRIPrep, XCPEngine, QSIprep, ASLPrep)
- Maintained and supported multiple data curation software packages in Python and R

Philadelphia, PA

Oct 2018 — Aug 2022

### Salesforce

DATA SCIENCE INTERN

- Focused on discovery of organizational insight using internal human resources data sets
- Developed a semi-supervised learning algorithm to track employee performance by matching topic models of continuous feedback and goal-setting data
- Investigated comorbidity of employees' insurance claims data to dynamically classify claim types and employee phenotypes

San Francisco, CA

May 2017 — Oct 2017

### Arzoo LLC

PRIVATE EQUITY INTERN

- Developed data munging pipelines in Excel for scraping business profile data

Philadelphia, PA

Oct 2015 — Apr 2016

## Research Experience

### UbiWell Lab (Varun Mishra, PhD)

"STRESSFREE: ASSESSING THE SCALABILITY & FEASIBILITY OF DIGITALLY PHENOTYPING STRESS"

2022

- Aim: Developing tools and software to identify moments of heightened stress in Northeastern undergraduate students, with the long term goal of delivering just-in-time interventions to relieve stress with mobile-CBT approaches

Northeastern University

### Quantitative Psychology & Statistics Lab (Fengqing Zhang, PhD)

"MOMENTARY CHANGES IN HEART RATE VARIABILITY CAN DETECT RISK FOR EMOTIONAL EATING EPISODES."

2015 — 2019

- Aim: predicting emotional eating episodes in disordered eating patients using a combination of heart rate variability data and self-report
- Outcome: Paper published in Appetite (2019)

Drexel University

## Quantitative Psychology & Statistics Lab (Fengqing Zhang, PhD)

Drexel University

“APPLICATION OF ADVANCED DATA MINING MODELS TO IDENTIFY DIETARY PATTERNS ASSOCIATED WITH RISK OF CARDIOVASCULAR DISEASE.”

2015 — 2019

- Aim: compare the performance of unsupervised feature selection (PCA/FA) against regularization (L1/L2) in predicting cardiovascular disease biomarkers from high-dimensional food and behaviour survey responses
- Outcome: Master’s thesis topic (2018)

## Quantitative Psychology & Statistics Lab (Fengqing Zhang, PhD)

Drexel University

“IMPROVED MODELLING OF SMARTPHONE-BASED ECOLOGICAL MOMENTARY ASSESSMENT DATA FOR DIETARY LAPSE PREDICTION.”

2015 — 2019

- Aim: predicting dietary adherence lapses in participants using self-reported EMA
- Outcome: Neighbourhood-Based Balancing — A Novel Semi-Supervised Classification Algorithm for Imbalanced Data (“5-Minute Thesis”, themed talk at the Well Center Symposium 2018)

## Quantitative Psychology & Statistics Lab (Fengqing Zhang, PhD)

Drexel University

“IDENTIFYING AUTISM DIAGNOSTIC INTERVIEW: REVISED ALGORITHM ITEMS THAT SIGNIFICANTLY DISTINGUISH AUTISM SPECTRUM DISORDER AND DOWN SYNDROME.”

2015 — 2019

- Aim: Identify phenotypic differences between children with autism spectrum disorder, down syndrome, and comorbid diagnoses using the Autism Diagnostic Interview-Revised (ADI-R)
- Outcome: Paper published in Research in Developmental Disabilities (2019)

## Quantitative Psychology & Statistics Lab (Fengqing Zhang, PhD)

Drexel University

“MODELING ZERO-INFLATED MVPA BOUTS USING A HIERARCHICAL LINEAR MODELING FRAMEWORK”

2015 — 2019

- Aim: predict participants’ moderate-to-vigorous physical activity (MVPA) bouts at timepoint 3 from previous timepoints using a zero-inflated Tweedie Poisson regression model in a growth curve modeling context
- Outcome: Final paper submitted in CFTP758 — Dyadic Analysis and Longitudinal Causal Modeling

## Statistical and Applied Mathematical Sciences Institute (SAMS I)

NC State University

“PREDICTING MULTIPLE SCLEROSIS (MS)”

2016

- Aim: classify participant diagnosis (MS patient vs. control) using lesion count along the corpus callosum in a diffusion dataset
- Outcome: Successfully predicted MS diagnosis using 3 different logistic regression segmentation approaches with 81% classification accuracy

## Laboratory for Innovations in Health-Related Behavior Change (Evan Forman, PhD)

Drexel University

“A COMPANION SMARTPHONE APP TO ENHANCE DIETARY ADHERENCE THROUGH PREDICTIVE MACHINE LEARNING”

2015

- Aim: Data collection, cleaning, and summarization with Excel and SPSS

# Publications

### First-author

#### Flywheeltools: data curation and manipulation on the flywheel platform

Frontiers in neuroinformatics

TM TAPERA, M CIESLAK, M BERTOLERO, A ADEBIMPE, GK AGUIRRE, ER BUTLER, ...

2021

#### DOES ECOLOGICAL MOMENTARY ASSESSMENT DATA REFLECT BASELINE SELF-REPORT IN WEIGHT LOSS TREATMENT?

ANNALS OF BEHAVIORAL MEDICINE

TM TAPERA, S GOLDSTEIN, BC EVANS, E FORMAN

2016

### Middle-author

#### Diffusion MRI head motion correction methods are highly accurate but impacted by denoising and sampling scheme

Human Brain Mapping

M CIESLAK, PA COOK, G SHAFIEI, TM TAPERA, H RADHAKRISHNAN, M ELLIOTT, ...

2024

#### Development of top-down cortical propagations in youth

Neuron

A PINES, AS KELLER, B LARSEN, M BERTOLERO, A ASHOURVAN, DS BASSETT, ...

2023

#### Functional Connectivity Development along the Sensorimotor-Association Axis Enhances the Cortical Hierarchy

BioRxiv

A LUO, VJ SYDNOR, A PINES, B LARSEN, AF ALEXANDER-BLOCH, M CIESLAK, ...

2023

#### Development of white matter fiber covariance networks supports executive function in youth

Cell reports

J BAGAUTDINOVA, J BOURQUE, VJ SYDNOR, M CIESLAK, AF ALEXANDER-BLOCH, ...

2023

#### ModelArray: An R package for statistical analysis of fixel-wise data

Neuroimage

C ZHAO, TM TAPERA, J BAGAUTDINOVA, J BOURQUE, S COVITZ, RE GUR, ...

2023

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| <b>Developmental coupling of cerebral blood flow and fMRI fluctuations in youth</b><br>EB BALLER, AM VALCARCEL, A ADEBIMPE, A ALEXANDER-BLOCH, Z CUI, RC GUR, ...  | Cell reports<br>2022                           |
| <b>ASLPrep: a platform for processing of arterial spin labeled MRI and quantification of regional brain perfusion</b><br>A ADEBIMPE, M BERTOLERO, S DOLUI, M CIESLAK, K MURTHA, EB BALLER, ...   | Nature methods<br>2022                         |
| <b>Curation of BIDS (CuBIDS): A workflow and software package for streamlining reproducible curation of large BIDS datasets</b><br>S COVITZ, TM TAPERA, A ADEBIMPE, AF ALEXANDER-BLOCH, MA BERTOLERO, ...                                  | NeuroImage<br>2022                             |
| <b>Spatially-enhanced clusterwise inference for testing and localizing intermodal correspondence</b><br>SM WEINSTEIN, SN VANDEKAR, EB BALLER, D TU, A ADEBIMPE, TM TAPERA, ...   | NeuroImage<br>2022                             |
| <b>Mobile footprinting: linking individual distinctiveness in mobility patterns to mood, sleep, and brain functional connectivity</b><br>CH XIA, I BARNETT, TM TAPERA, A ADEBIMPE, JT BAKER, DS BASSETT, ...                               | Neuropsychopharmacology<br>2022                |
| <b>QSIPrep: an integrative platform for preprocessing and reconstructing diffusion MRI data</b><br>M CIESLAK, PA COOK, X HE, FC YEH, T DHOLLANDER, A ADEBIMPE, ...   | Nature methods<br>2021                         |
| <b>A simple permutation-based test of intermodal correspondence</b><br>SM WEINSTEIN, SN VANDEKAR, A ADEBIMPE, TM TAPERA, ...   | Human brain mapping<br>2021                    |
| <b>Developmental coupling of cerebral blood flow and fMRI fluctuations in youth</b><br>EB BALLER, AM VALCARCEL, A ADEBIMPE, A ALEXANDER-BLOCH, Z CUI, RC GUR, ...  | BioRxiv<br>2021                                |
| <b>ASLPrep: a generalizable platform for processing of arterial spin labeled MRI and quantification of regional brain perfusion</b><br>A ADEBIMPE, M BERTOLERO, S DOLUI, M CIESLAK, K MURTHA, EB BALLER, ...                               | BioRxiv<br>2021                                |
| <b>Mobile footprinting: linking individual distinctiveness in mobility patterns to mood, sleep, and brain functional connectivity</b><br>CH XIA, I BARNETT, TM TAPERA, Z CUI, TM MOORE, A ADEBIMPE, ...                                    | BioRxiv<br>2021                                |
| <b>Mapping Physiology-Function Coupling in Youth</b><br>E BALLER, A ADEBIMPE, A VALCAREL, A ALEXANDER-BLOCH, Z CUI, J DETRE, ...   | Biological Psychiatry<br>2021                  |
| <b>Momentary changes in heart rate variability can detect risk for emotional eating episodes</b><br>AS JUARASCIO, RJ CROCHIERE, TM TAPERA, M PALERMO, F ZHANG  | Appetite<br>2020                               |
| <b>QSIPrep: An integrative platform for preprocessing and reconstructing diffusion MRI</b><br>M CIESLAK, PA COOK, X HE, FC YEH, T DHOLLANDER, A ADEBIMPE, ...  | Biorxiv<br>2020                                |
| <b>Autism spectrum disorder (ASD) symptom profiles of children with comorbid Down syndrome (DS) and ASD: A comparison with children with DS-only and ASD-only</b><br>M GODFREY, S HEPBURN, DJ FIDLER, T TAPERA, F ZHANG, CR ROSENBERG, ... | Research in Developmental Disabilities<br>2019 |
| <b>Application of a new dietary pattern analysis method in nutritional epidemiology</b><br>F ZHANG, TM TAPERA, J GOU   | BMC medical research methodology<br>2018       |
| <b>A PRELIMINARY INVESTIGATION OF A PERSONALIZED RISK ALERT SYSTEM FOR WEIGHT CONTROL LAPSES</b><br>E FORMAN, S GOLDSTEIN, B EVANS, S MANASSE, A JUARASCIO, M BUTRYN, ...  | ANNALS OF BEHAVIORAL MEDICINE<br>2016          |
| <b>IS PROMPTING PROBLEMATIC?: CONSIDERATIONS FOR LONG-TERM ECOLOGICAL MOMENTARY ASSESSMENT</b><br>SP GOLDSTEIN, BC EVANS, TM TAPERA, E FORMAN, S MANASSE, A JUARASCIO, ...   | ANNALS OF BEHAVIORAL MEDICINE<br>2016          |

## Software & Project Contributions

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| <b>FlywheelTools</b><br>A SUITE OF SOFTWARE TOOLS FOR CURATING YOUR NEUROIMAGING DATA INTO BIDS ON FLYWHEEL<br>• R, Python, MongoDB, RMarkdown Reports, Docker | 10.5281/zenodo.4752798<br>2021 |
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- R, Shiny, Qualtrics API

## Teaching Experience

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### Teaching Assistant

2018 MSc. Psychology — Statistics I & II

Drexel University

## Service

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2022 to  
present Member, Mentor

R 4 Data Science  
Community  
(R4DS.io)

2013 to  
2021 Member, Alumni Mentor

Drexel University  
Gospel Choir

2013 to  
2018 Peer Counselor, VP of Scheduling & Communications

Drexel University  
Peer Counseling  
Helpline

## Skills

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### Analytical

DATA SCIENCE, STATISTICAL MODELLING, REPRODUCIBLE RESEARCH, PARAMETERIZED & INTERACTIVE REPORTS, PLOTTING & VISUALISATION, OBJECT-ORIENTED PROGRAMMING

### Programming languages

R, PYTHON, BASH

### Packages

TIDYVERSE, RMARKDOWN/QUARTO, GGPLOT2, TIDYMODELS, GITHUB PAGES, NILEARN

### Tools

GIT, DOCKER, SINGULARITY, RSTUDIO, VSCODE, JUPYTER NOTEBOOKS, CIRCLECI