# WearGenix: From Smartwatch Streams To Druggable Genes

**Mark Gerstein, PhD**
**Williams Professor of Biomedical Informatics**
**Yale University**

WearGenix

Digital Health × Genomics × Therapeutics
Blavatnik Fund Accelerator

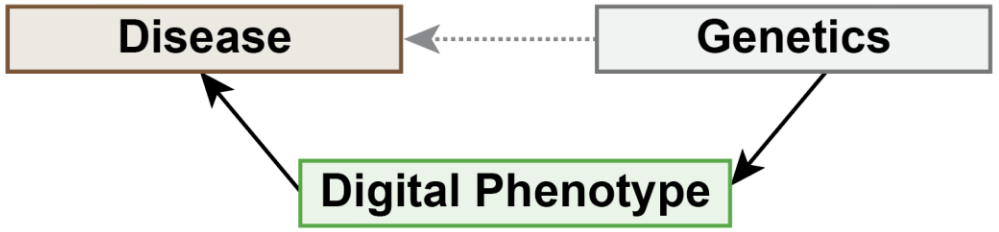
# Overall Problem:
# Drug Targets for Brain Disease are Elusive

**>100M in US with neurological or neuropsychiatric conditions**
& strong evidence that genetics plays an important role (overall >60% “twin heritability” for some conditions)

BUT **drug discovery is difficult** because:
- Difficult to directly assay living brains
- Difficult to precisely correlate specific genetic loci with diseases (i.e., brain "phenotypes”)
    - hard to objectively define the phenotype
    - high inter-individual phenotype variability

THUS:
- Need very large cohorts (>100k-1M) to identify potential target loci with sufficient power
- Targets may not work consistently due to misdiagnosis & heterogeneity

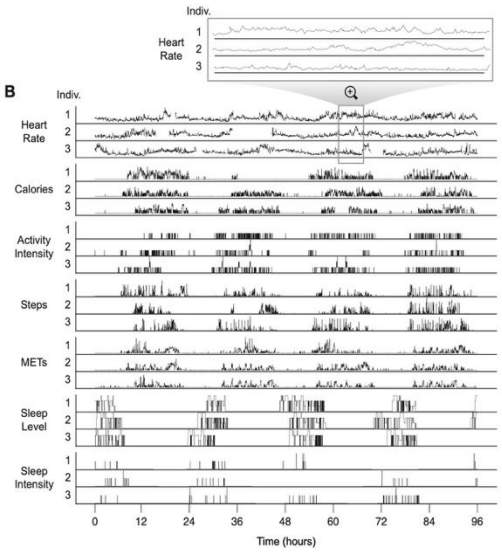
Specific GAP:
- **Need more objective/precise “Digital Phenotypes”**
  to be more precisely correlated specific variants –
  thus, better identifying druggable targets

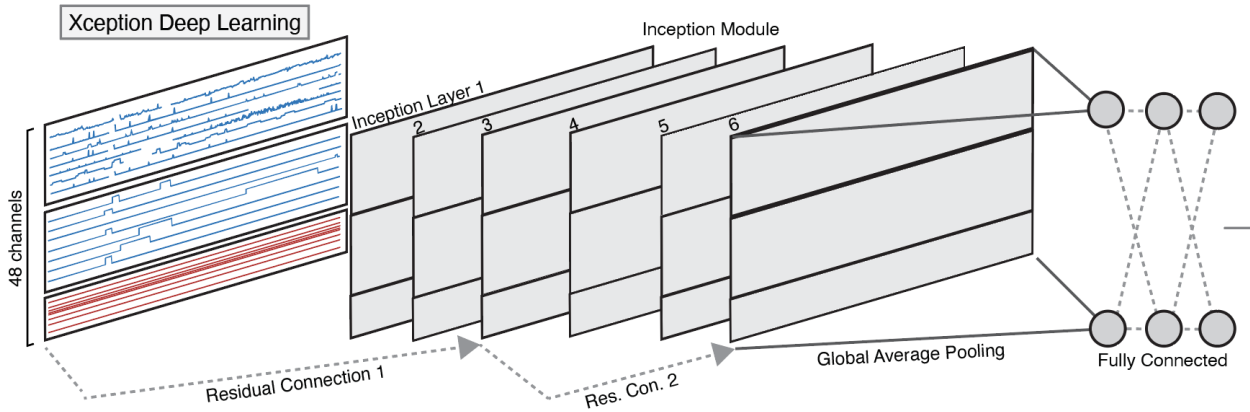


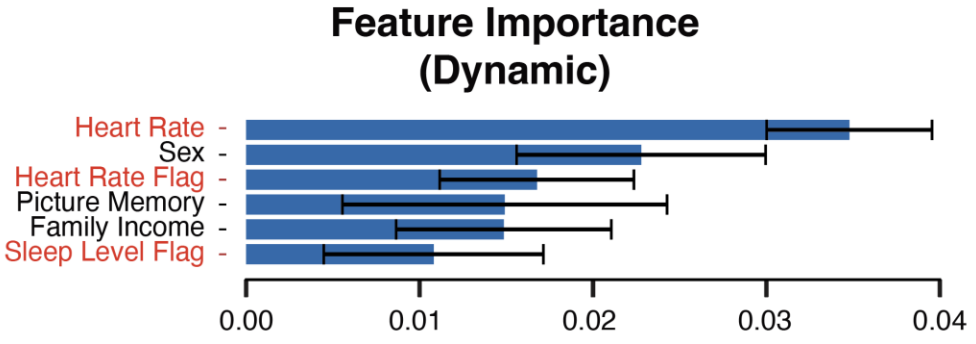
# Our Solution: Identifying Digital Phenotypes from Smartwatches

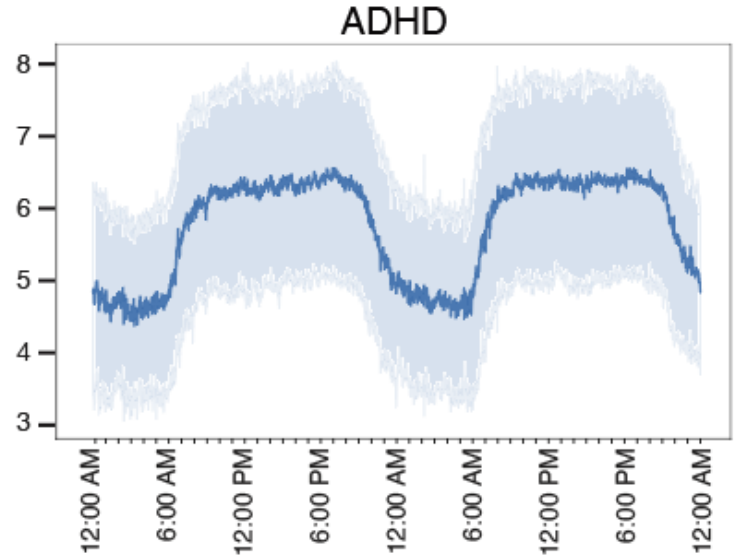
**AI-driven** processing and feature engineering of **raw** smartwatch data yields dynamic, digital phenotypes that provide

**precise & objective features for disease characterization**



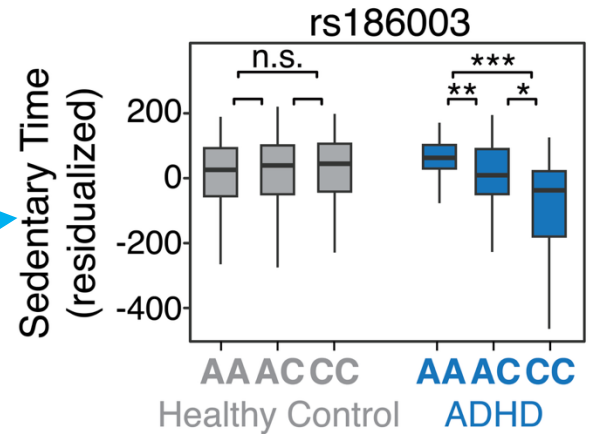



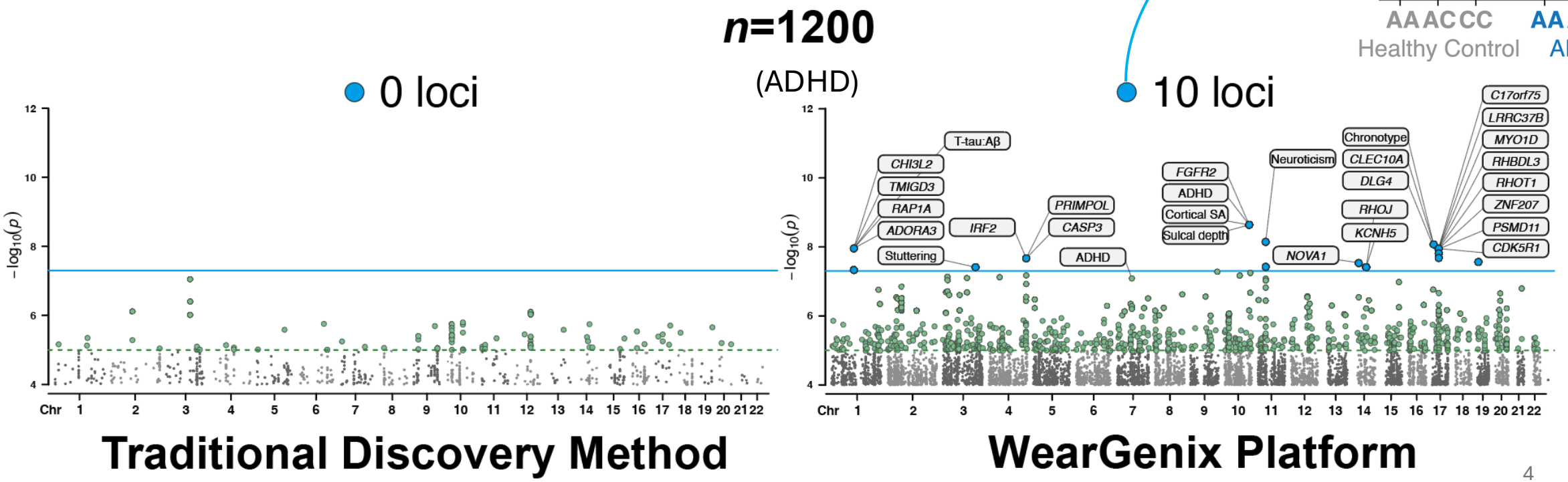

**Processing Raw/Noisy Data** → **AI-driven Platform** → **Digital Markers**

# WearGenix Platform for Druggable Gene Discovery

Links smartwatch data to genetics to identify target genes (i.e., via GWAS)

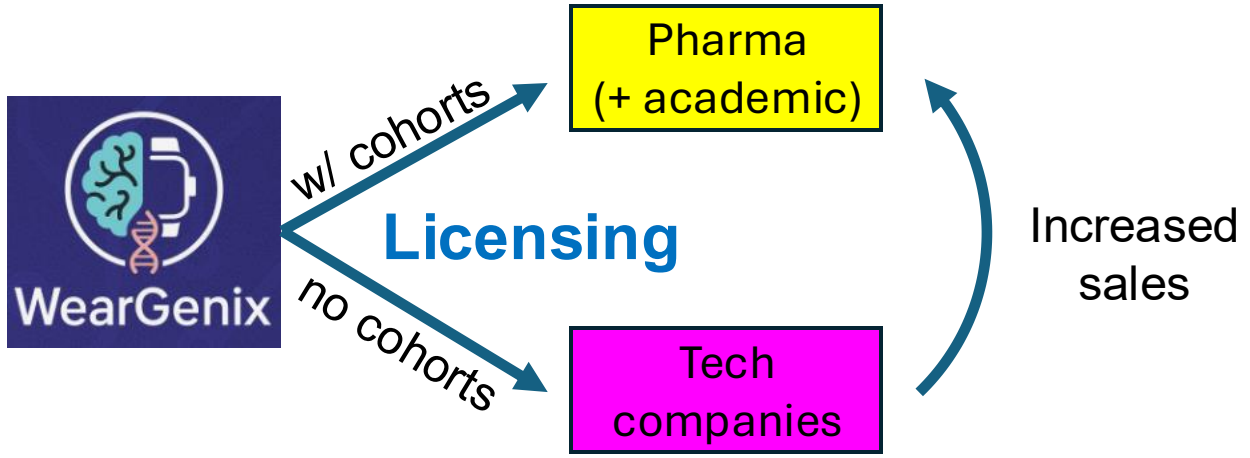
- Our digital phenotypes improve correlation with genetics beyond traditional subjective phenotypes
- ~30x more statistical power **(i.e., more hits from smaller cohorts)**



# Opportunity & Business Model

- **Liu*, Borsari* … Gerstein. *Cell* '25**
- Now positioned to accelerate target discovery by generating digital markers of brain disease
- Scalable to neurodegeneration (PD/AD), behavior (addiction), &c.
- Provisional patent for WearGenix platform IP




Business Model

- Licensing software to help with target discovery
- *Not running our own cohorts*, but aimed at helping others with cohorts focused on drug discovery

- 1st customer: pharma &/or tech companies
  **- Initial interest from and discussion with med-tech and pharma**

# Budget & Milestones

Ask:
$30 K Blavatnik Accelerator Award for Phase 2

- Phase 1: Proof of concept AI pipeline
- Further development of pipeline for robustness & accuracy
  – $20K GPUs
- Expansion to additional diseases (e.g., Parkinson's & Addiction)
  – $5K data access
- Storage of processing & results
  – $5K SSD storage server
- Phase 3: External Validation

# Yale Team & Competitive Edge

Principal Investigator/Inventor

Mark Gerstein
Biomedical Informatics Prof.

>725 publications, H-index:199

Project Leads/Inventors

Jason Liu, PhD
&
Beatrice Borsari, PhD

Digital Health, Genomics, AI

Clinical Advisors

Clinical Psychiatry
Walter Roberts

Internal Medicine
Garrett Ash

AI Developer

AI/CS
Yunyang Li

Licensing
& IP

## Competitive Edge

- More genetics expertise than tech companies
- More AI/biosensor experience than pharma
- Integration is key