Session IV: Accelerating Drug Development Based on Patient Data (45 mins)

Panelists: Merit Cudkowicz, Mark Frasier, Ralph Kern, Omar Khwaja,

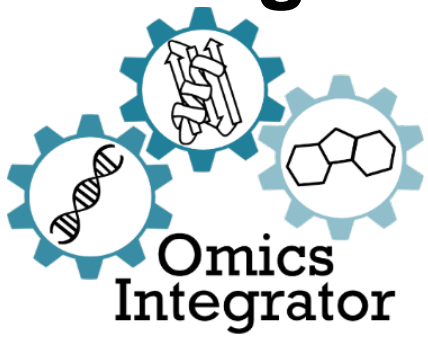
- *How can the ND community leverage genomic and clinical data, patient-derived iPSCs, etc. to accelerate drug development? What are the challenges?*
- *Are there current exemplars in other disease areas that the ND community should look to model?*
- *Does industry perceive value in a consortium approach utilizing pooled data sets?*

Disclosure

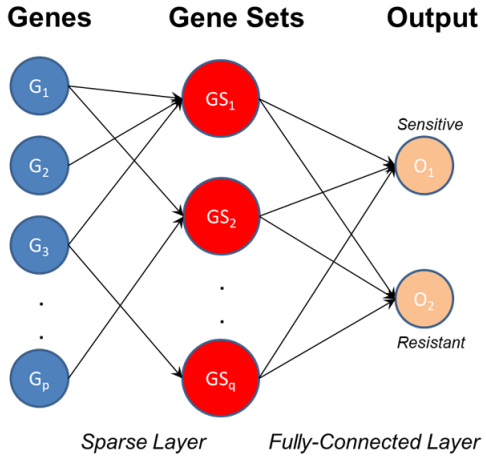
ReviveMed
AI-Driven Drug Discovery using Metabolomics
Co-founder

My Research Focus

Data Integration



Interpretable AI



Accelerating Discovery

Clinical trials are mostly linear and terminate on failure

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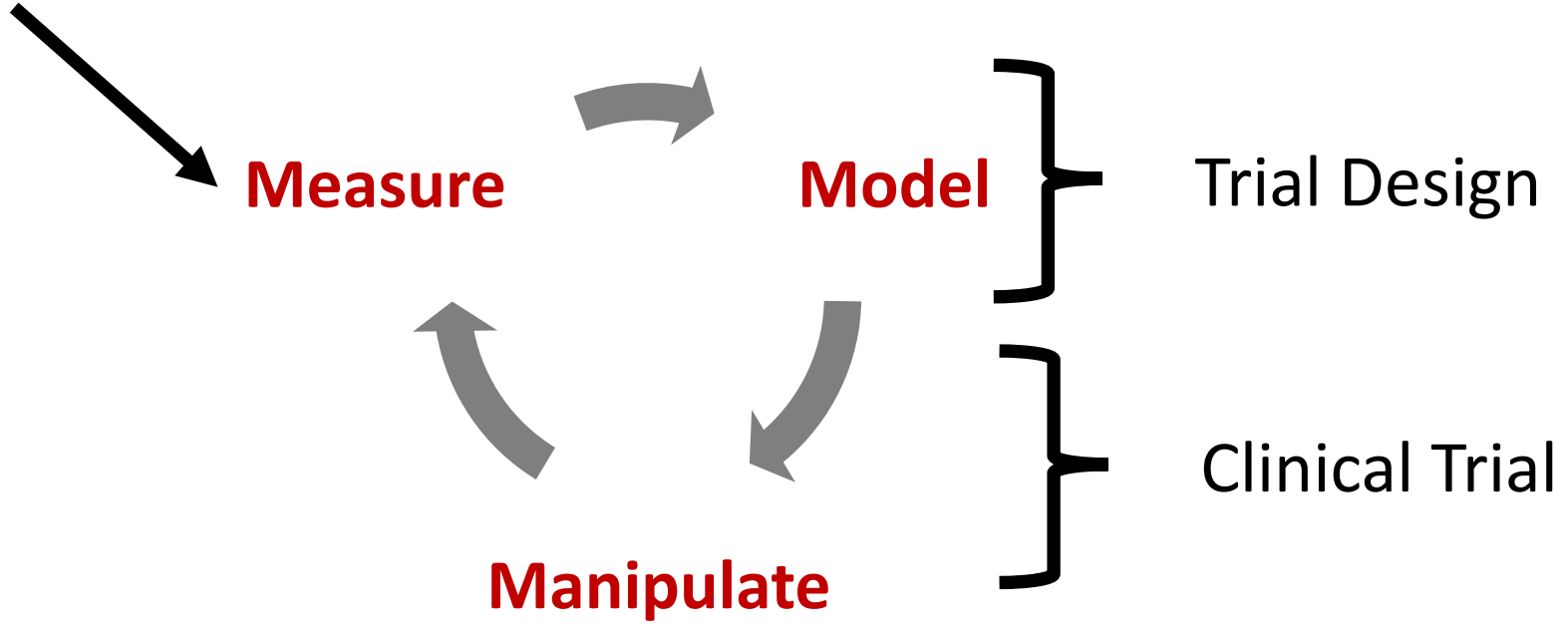
In engineering, failure is part of the design process.



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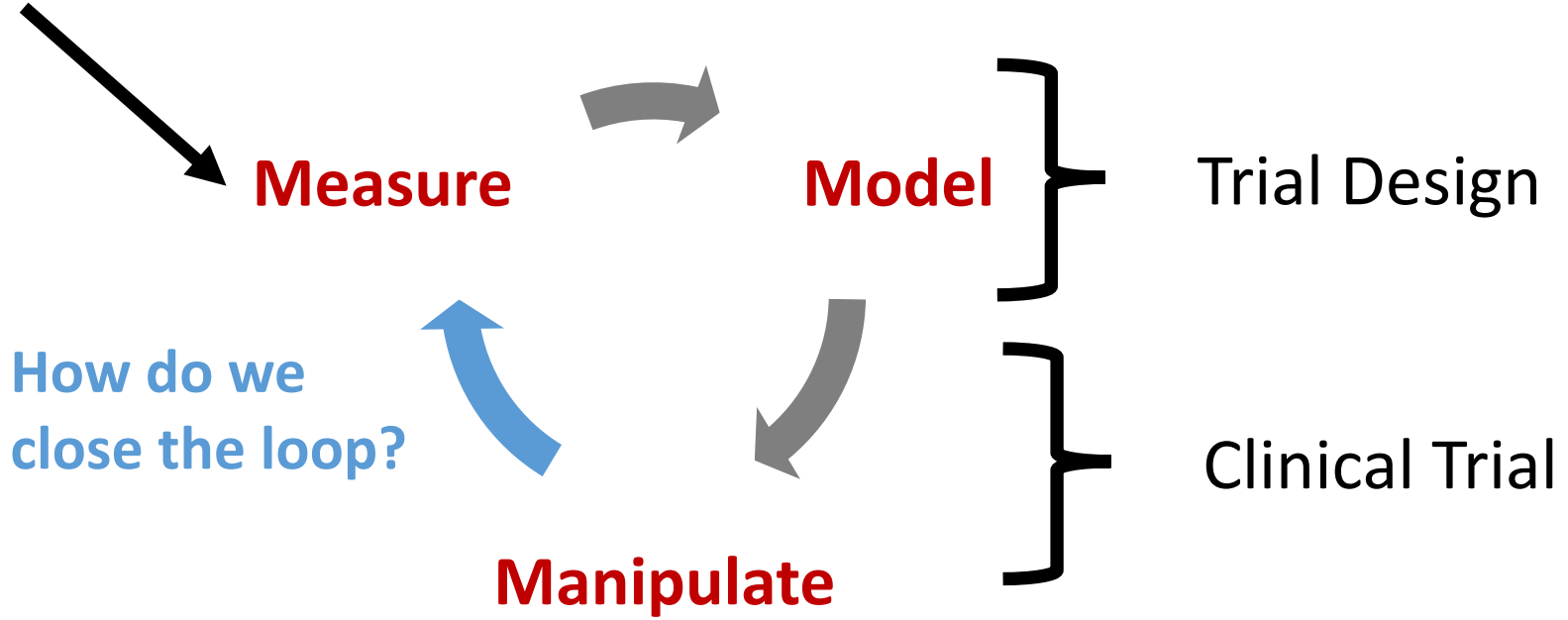

Accelerating Discovery

Clinical trial → STOP

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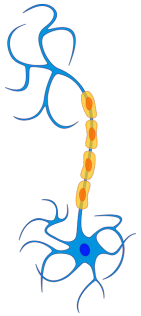
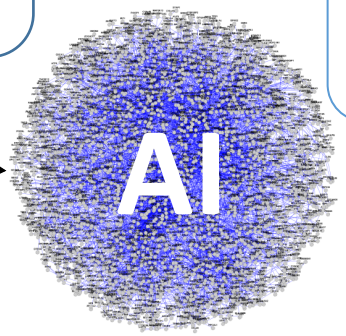
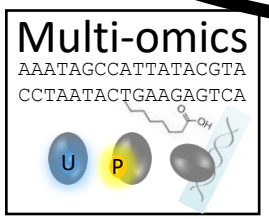


Clinical Data

Wearables
Phone Apps
Wireless



Multi-omics

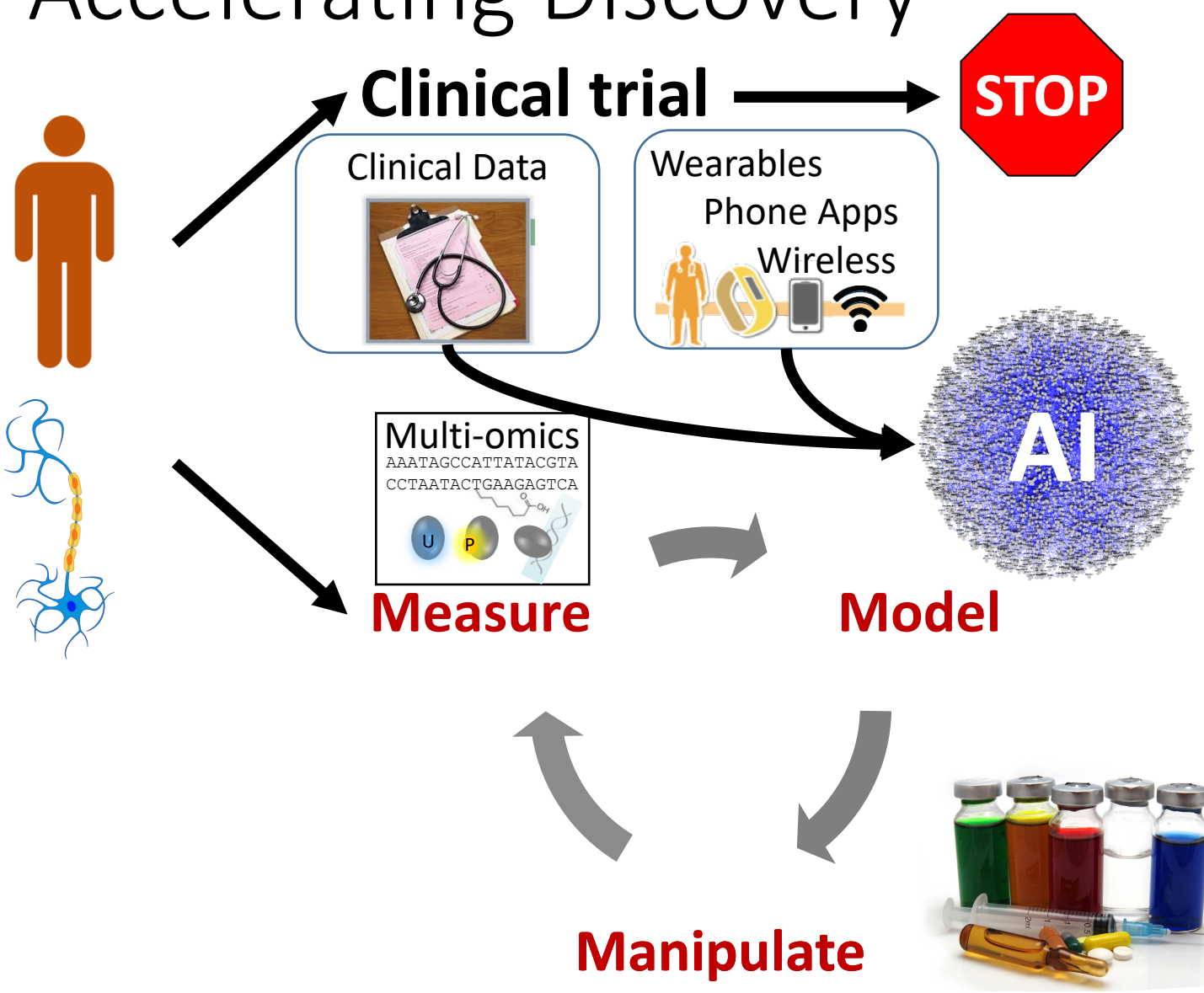


Measure → **Model** → **Manipulate** → **Measure**

Guide trial design

Learn from failed trials

Accelerating Discovery



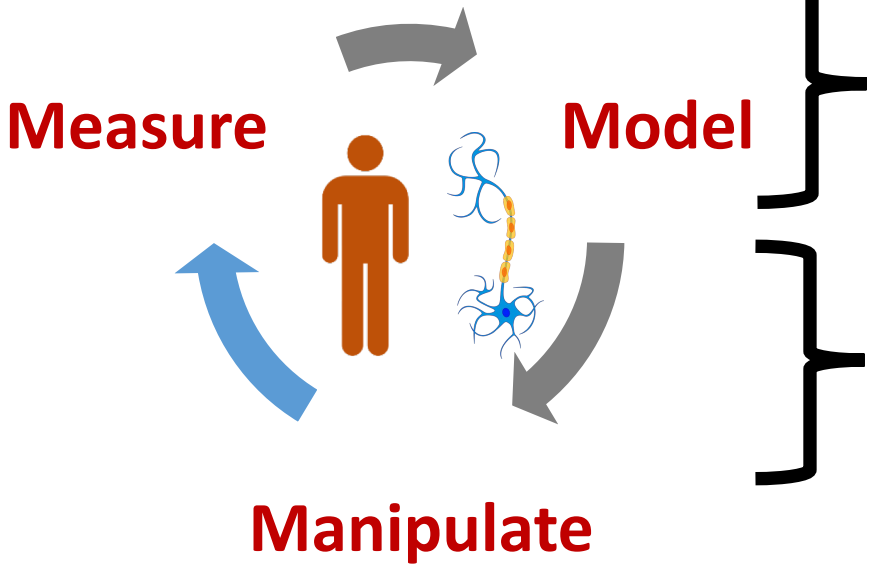
Cells are **NOT** "avatars" and provide **limited** "real-time" clinical insight.
Cells can reveal the **molecular** basis of failure and guide **new** therapies.

Guide trial design

Learn from failed trials

Barriers to Engineering Therapeutics

- Expertise is scattered
- Incentives are missing



Guide trial design

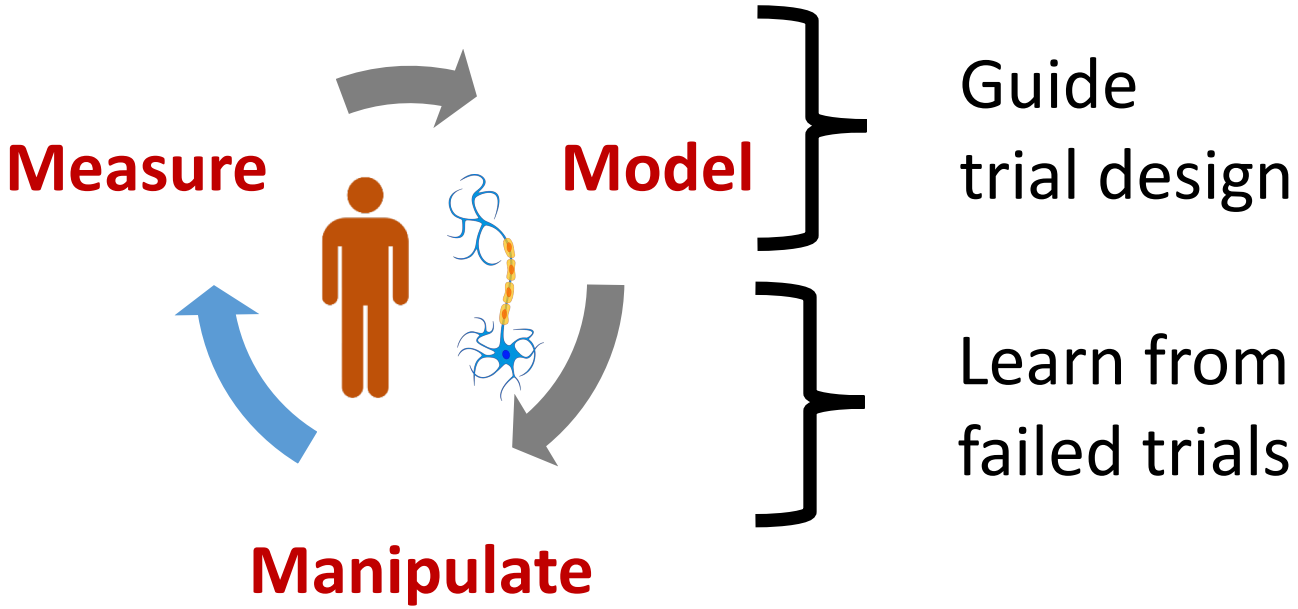
Learn from failed trials

A Proposal for Engineering Therapeutics

Fund integrative teams
- Clinical research sites
- Experts in AI

Return valuable data to industry
- Clinical and cellular responses

Plan tiered data release
- Time-tables agreed in advance to balance competing incentives



Funding agencies can foster collaboration

POSTED JANUARY 30, 2018

STAND UP TO CANCER AWARDS $11M CONVERGENCE RESEARCH PROGRAM USING AI TO INVESTIGATE IMMUNOTHERAPIES

Accelerating Drug Development Based on Patient Data. **Questions for the Panel:**

- Which data are most useful for accelerating drug development?
- What are the potential benefits for data-driven approaches?
- What are the barriers?
- Is there something urgently needed that no existing organization will fund?
- What types of talent do we need to recruit to this challenge?
- What approaches have been successful in other diseases?
- How can we best get industry engaged?