Center for Digital Health Innovation at UCSF

Towards Deployment of AI in Healthcare: Clinical Decision Support (CDS) Algorithms

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Who is CDHI?

UC System : 430,000 Jobs
14 Million Patient Records
$46.3B Contribution to CA Economy

Facilities: 10+ Campuses
5 Medical Centers
3 National Laboratories

Research: Top in NIH Funding; Clinical + Research Data

UCSF is One of the Top Research Funded Academic Medical Centers:

1600 Active UCSF Inventions

1,000 Products From UCSF Technologies

5 Nobel Laureates

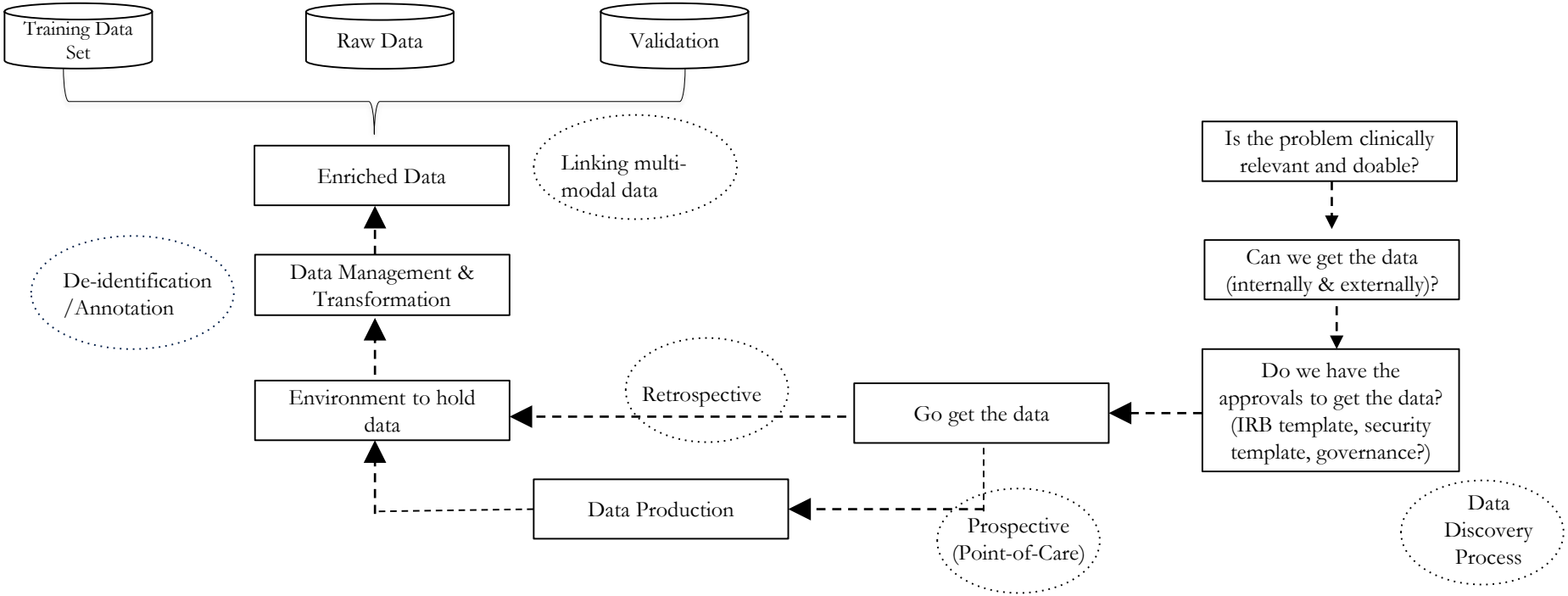
The Center for Digital Health Innovation collaborates with Industry and UCSF Scientific Innovators to envision and realize new solutions to improve the lives of providers and patients.

CDHI Approach

- Finding value in data
- Scalable Research & Development Platform
- Robust set of tools
- Enhance information commons vision
- New paradigm for Academic & Industry collaboration

Right Treatment to the Right Patient at the Right Time

Data Asset Management

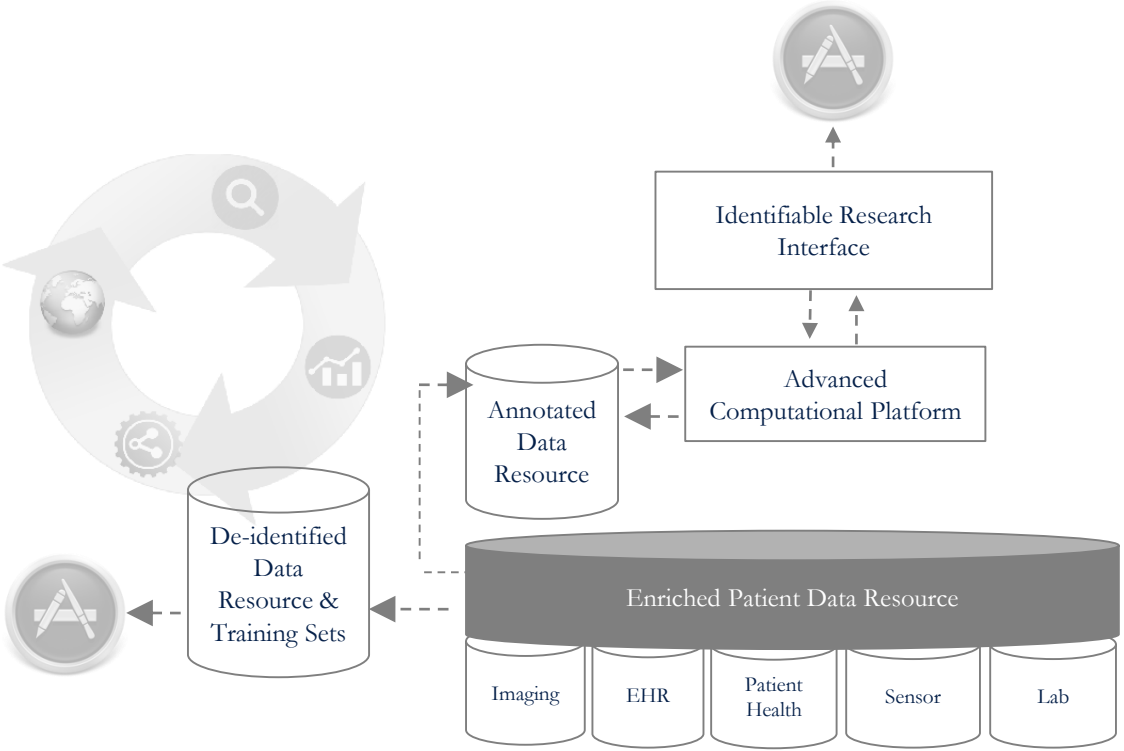


Collaborating with industry to create innovative platforms

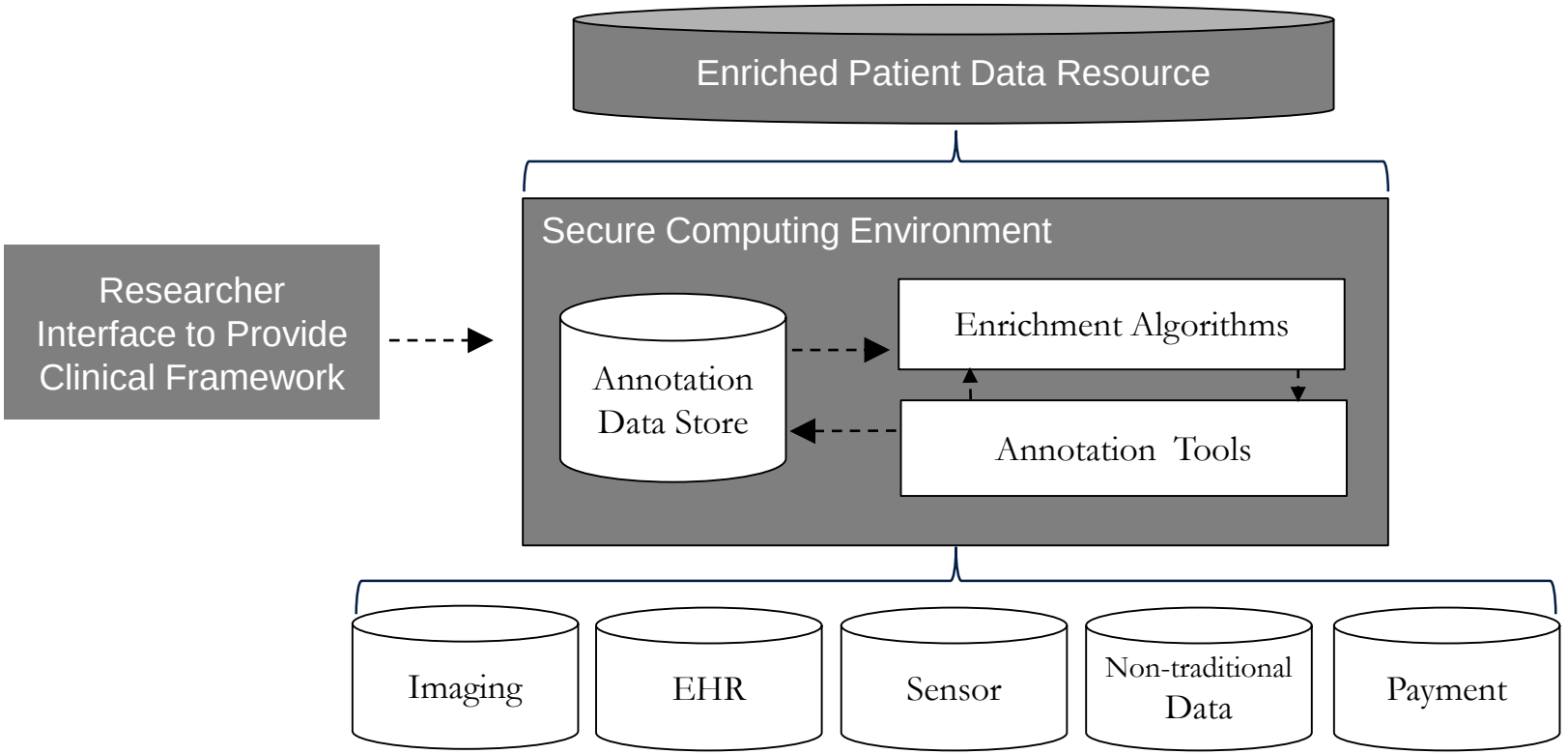
A historic computational platform built upon up-to-date data science methodologies and capacities that transcend traditional reductionism:

GE - Creates access to all health workflows throughout the world

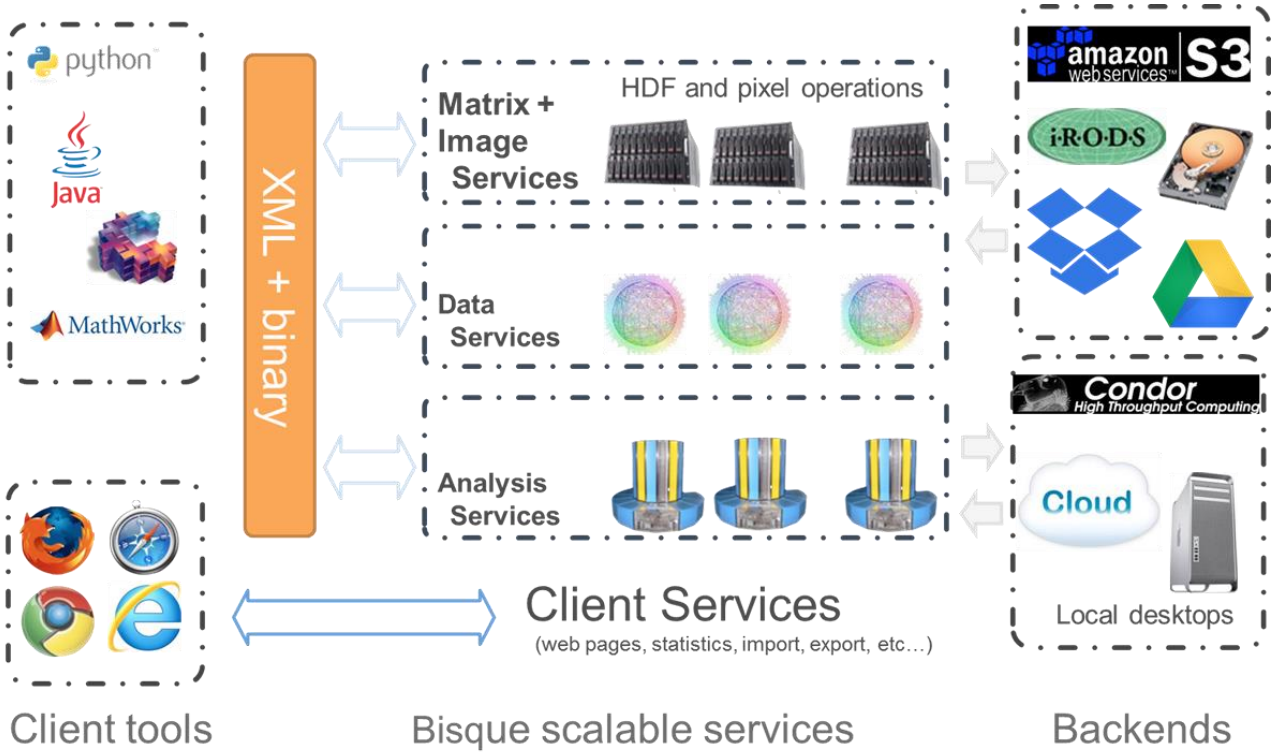
Intel - Enables world wide scalability of advanced analytics and Artificial Intelligence in Medicine



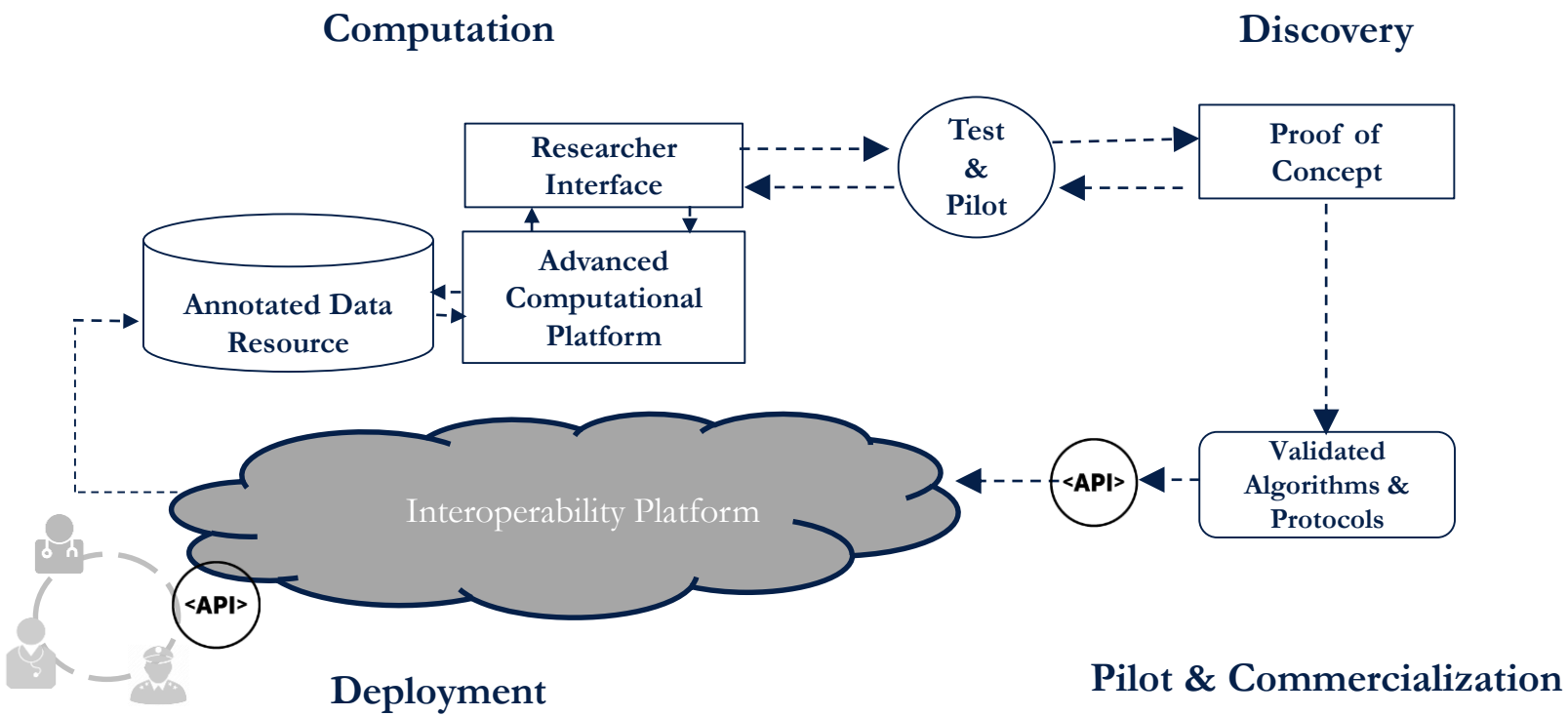
Challenges: Supporting Research at Scale with Infrastructure



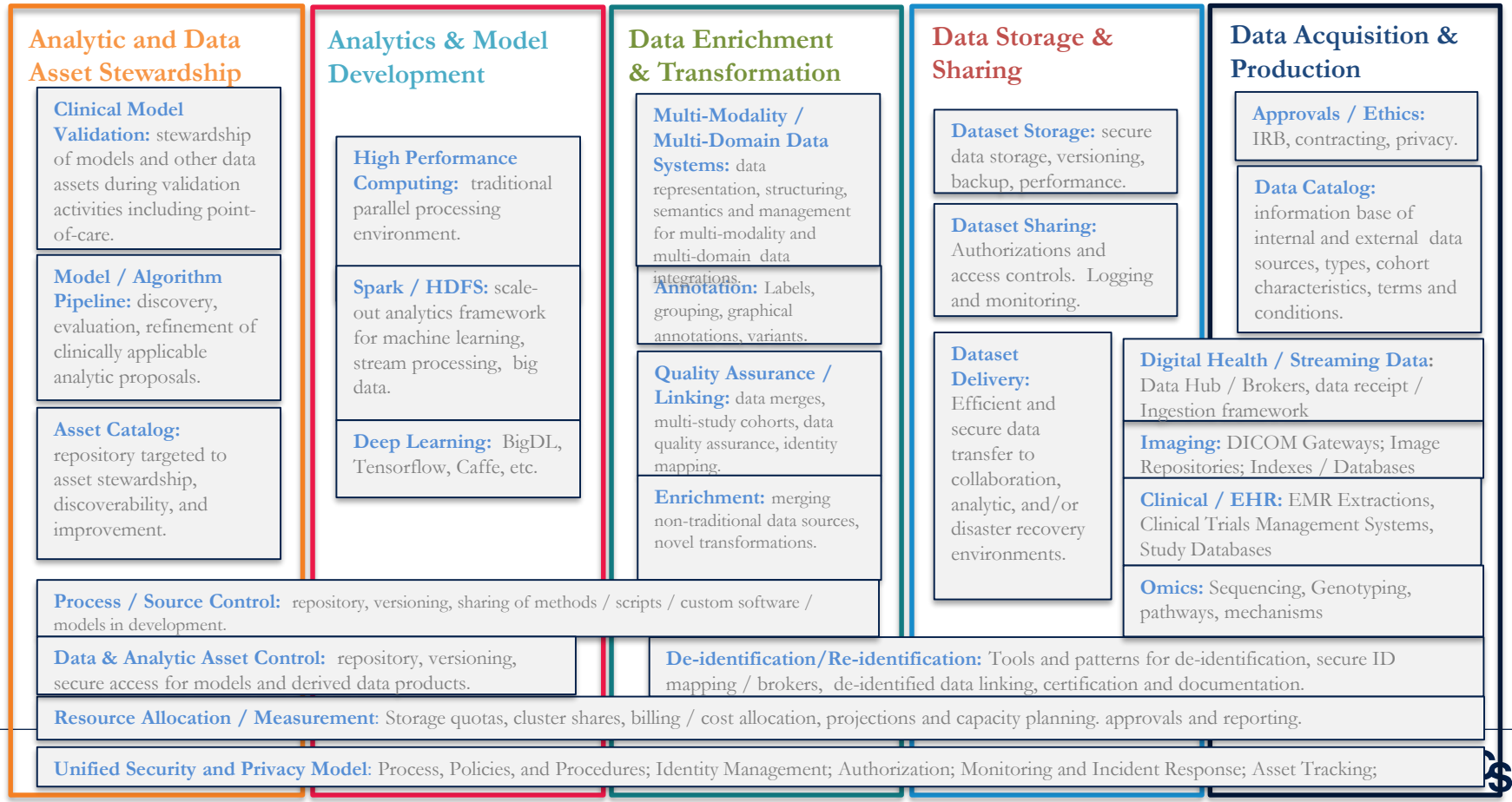
- Allows integration of analysis tasks over images and metadata that can be automatically scaled across compute grids



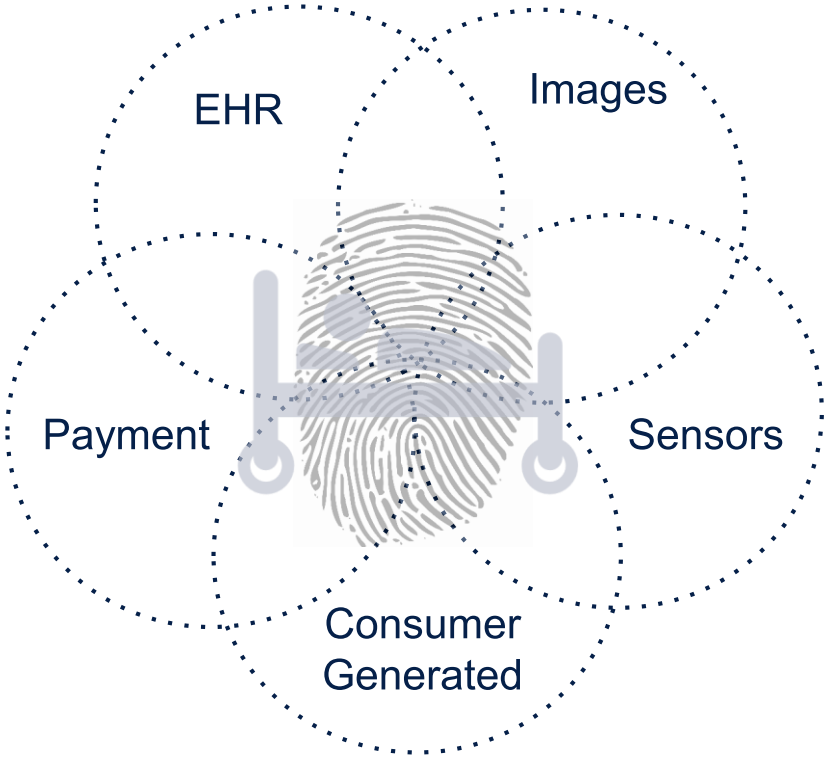
Innovation platform



CDHI Advanced Analytic Environment –Target Capabilities



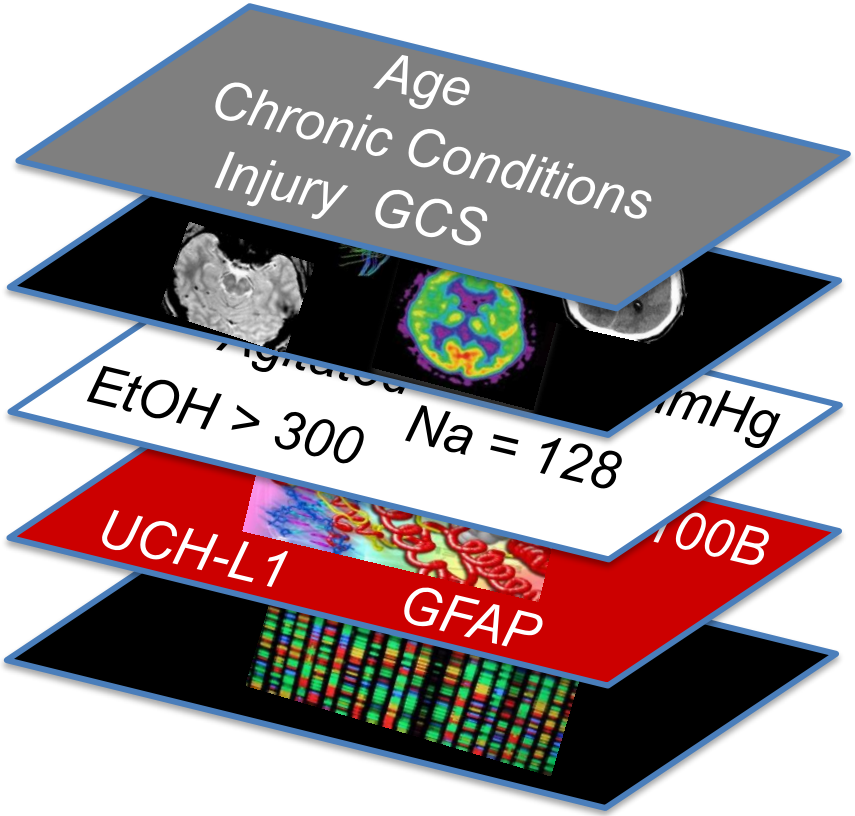
Leveraging Multi-modal Data



Machine-based algorithms can help to:

- Automate triage
- Predict disease trajectories
- Design therapies
- Expedite workflow
- Define next generation treatment paths
- Automate individual patient context

Trauma: a Precision Medicine Approach



Demographic/Injury

Imaging

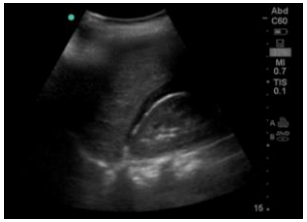
Clinical Data/Physiology

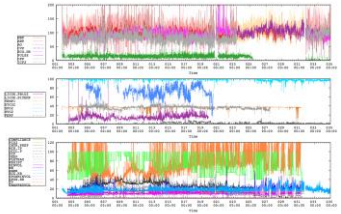
Proteome

Genome

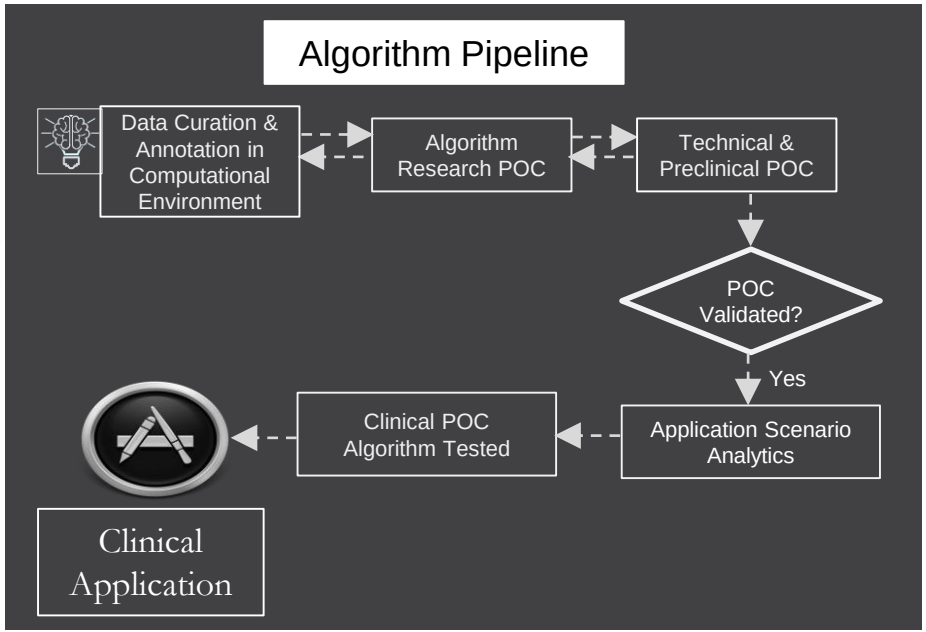
Crossing from CDS to Analytics as Devices:

Initial Use Case





Additional Data Streams



- Field Triage
- Bleeding?
- Intraop Resuscitation
- CT?
- ICU Bedside volume?
- Remote Decision Support
- Battlefield Triage & Treatment

Advantages of Our Approach

- Horizontal model that is not discipline or domain specific
- Modular proof of concept projects adhere to UCSF privacy and protection policies, creating a more flexible way to collect, analyze, and utilize data
- Multidisciplinary team of basic scientists and researchers, clinicians, data scientists, and forward-thinking business professionals
- Scalable infrastructure from storage and computational bandwidth and expertise

Creating Machine-based Algorithms is Now Possible

- Next generation data science techniques are providing powerful new capabilities
- Very large, curated clinical data sources provide unparalleled opportunity
- Availability of off-the-shelf, affordable tools is enabling scalable innovation
- New data sources are rapidly evolving

. . . but most development lacks the clinical content expertise within the context of the care delivery environment

Challenges & Promise:

- Devices as Analytics
- Data & Workflow Interoperability
- CDS Software
- Leveraging new technology to streamline the regulatory process

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