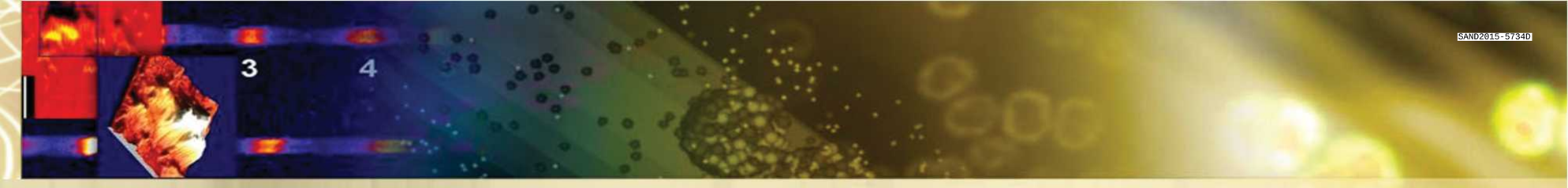
SANDIA BIOSCIENCE



SAND2015-5734D

Microsystems Engineering and Prototype Development for the Bioscience Mission

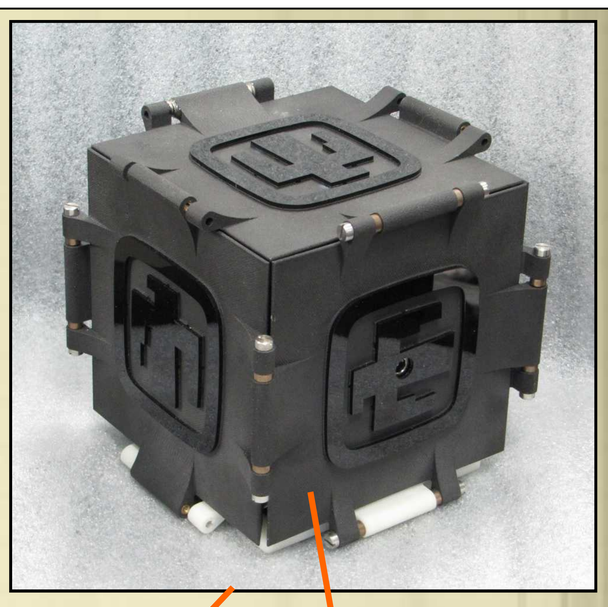
2nd Generation SpinDX Diagnostics Platform

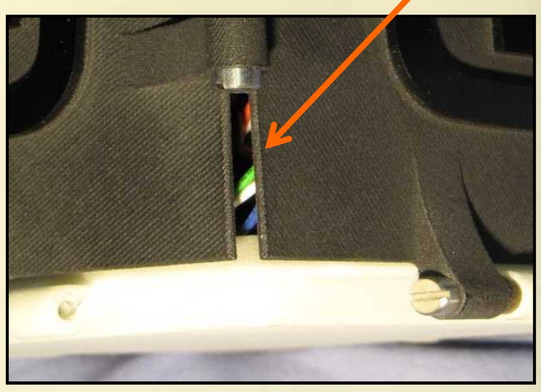
Engineering Team

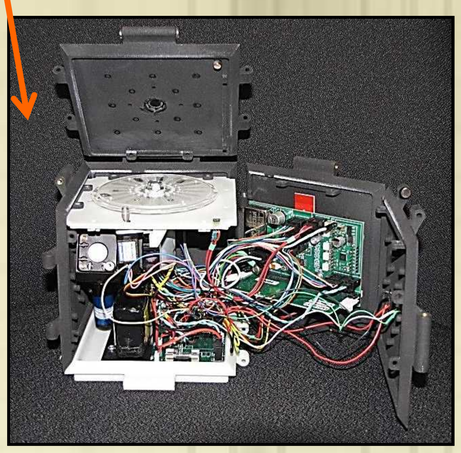
Dan Throckmorton, Jonathan Helm, John Warmouth,

Jim Van De Vreugde, and Jolene Gilbert

- **Full Body 3D printed SLA plastic construction**
- **Optical detection via epi-fluorescence**
- **Electronics designed in house**
- **Software and firmware developed in house**







Prototype Mechanical limitations

- Poor rigidity
- Poor tolerances leading to poor fitment
- Susceptible to mechanical failure
- Expensive relative to other methods and materials
- Bad choice for an optical detection system

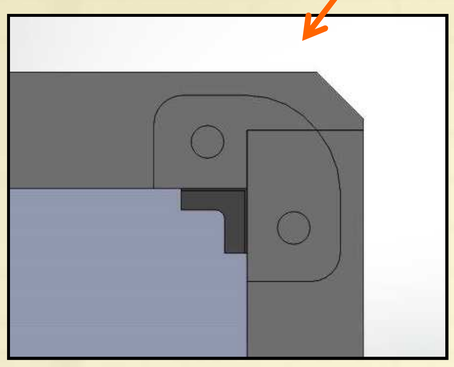
Prototype electrical/software issues

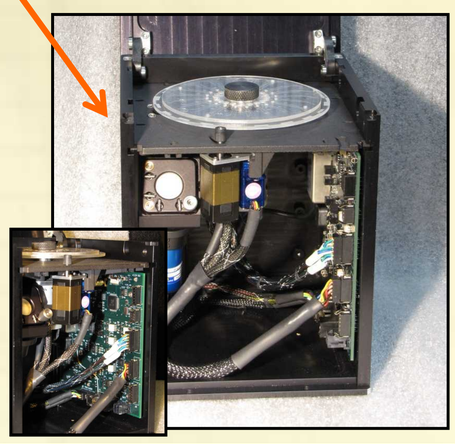
•Consists of 2 motherboards, 1 daughter board, and many development boards

•Wiring loose, some connectors, some straight soldered wires

•Very susceptible to disconnection, pinching, cutting, frying, etc…

- **Full Body 6061 Aluminum construction**
- **Optical detection via epi-fluorescence**
- **Electronics designed in house by experienced electrical engineer**
- **Software and firmware contracted for development**





Prototype Mechanical Advances

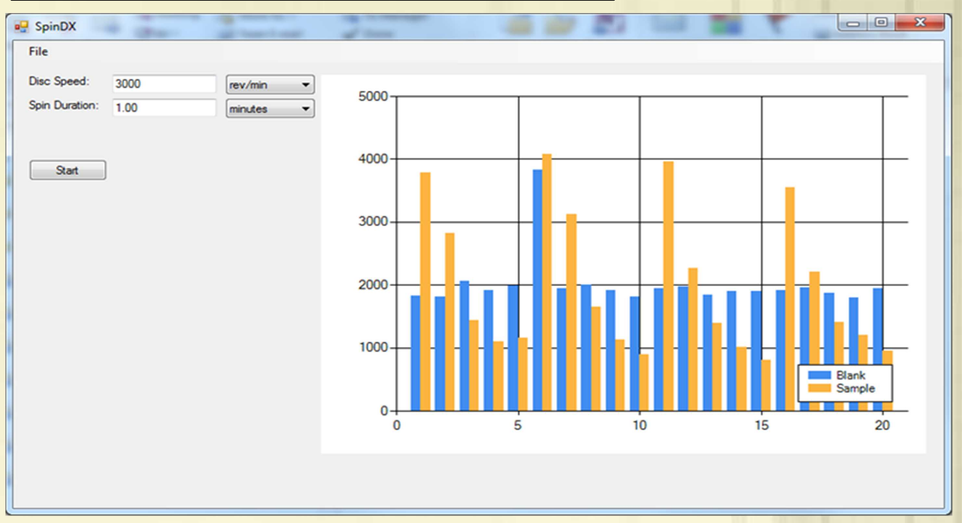
CNCed 6061 Aluminum Construction

- Very rigid
- Tight tolerances excellent fitment
- Overlapping on all edges creating light tight build
- Simple build for easy assembly
- Half the price of 3D printed SLA

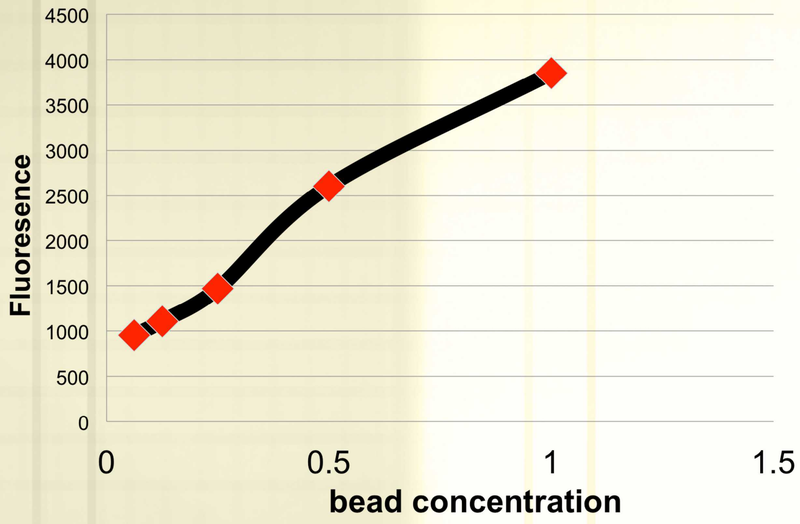
Electrical/Software Advances

- Epi-fluoresence based optical detection
- Dual motor system utilizing high res stepper motor for channel reads and high rpm DC motor for centrifugal assay
- 1 integrated circuit board performing all functions required to run SpinDx
- All wires terminated with connectors
- All wires protected by wire sleeving
- Clean and compact design

Data collection and software user interface



Calibration curve on the new platform



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