

Status of 3D Sensors for FP420

**US420 Meeting
July 28, 2005**

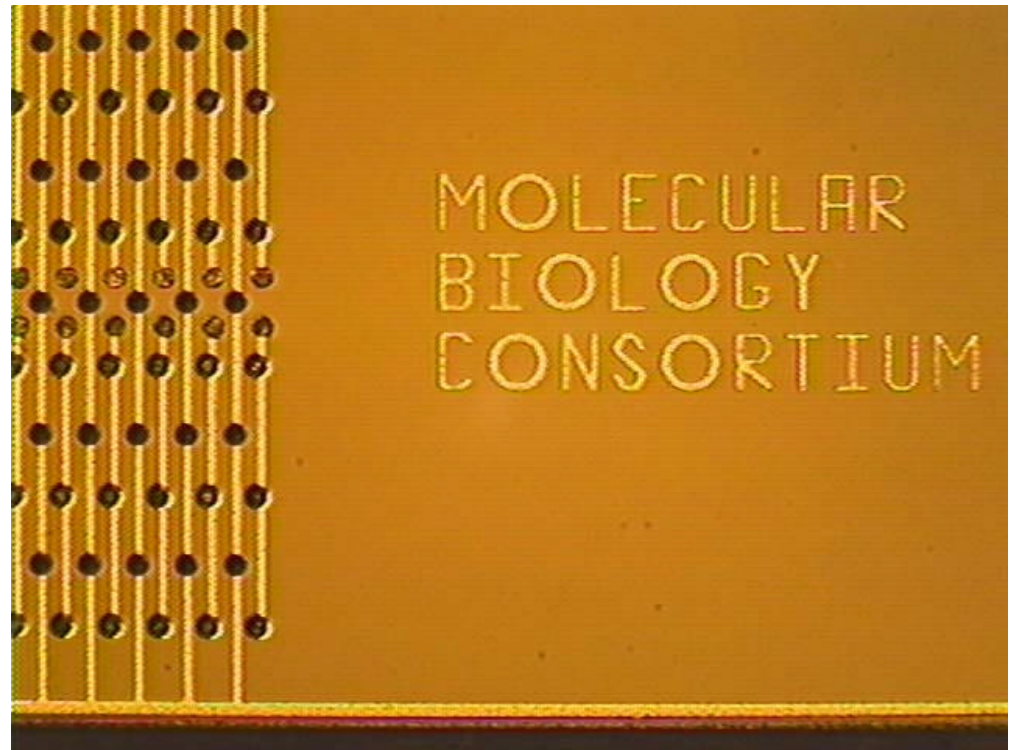
Chris Kenney

Project Members

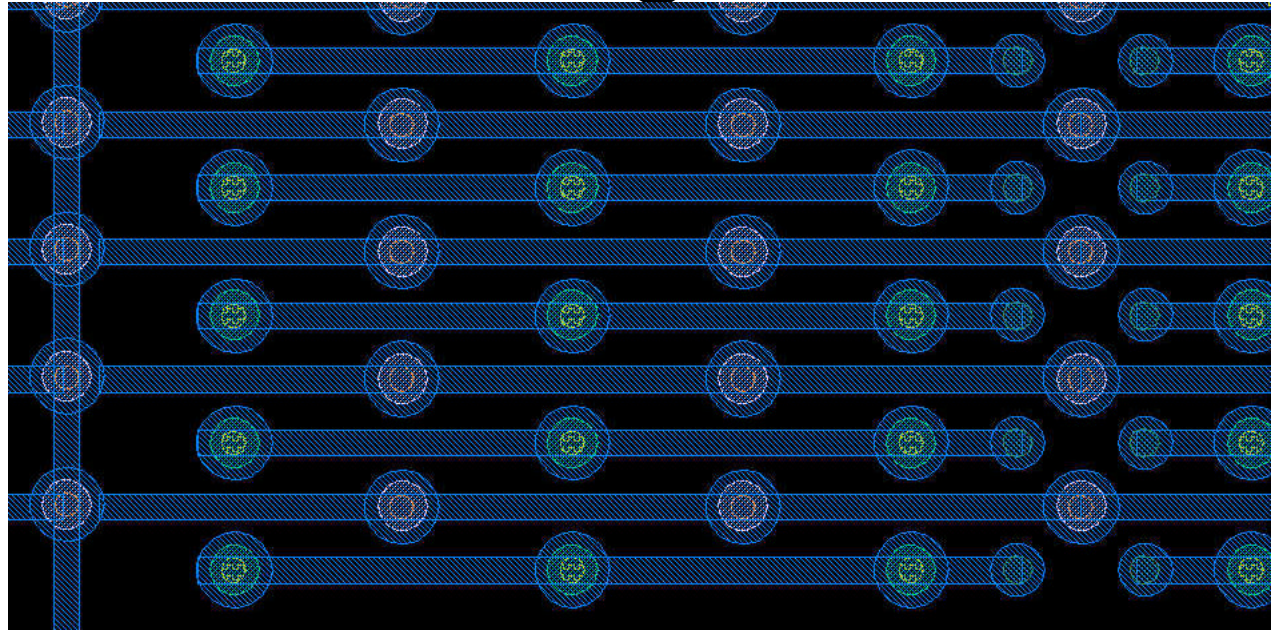
- **Brunel University** - J. Hasi, A. Kok, C. da Via, S. Watts
- **Molecular Biology Consortium** - C. Kenney, E. Westbrook
- **University of Hawaii** - S. Parker
- **Lawrence Berkeley Lab** – K. Einswellier, M. Garcia-Sciveres

ATLAS Compatible

- 50 microns by 400 microns pixels
- Active Edges
- Radiation Hard Cell
- 200 microns thick

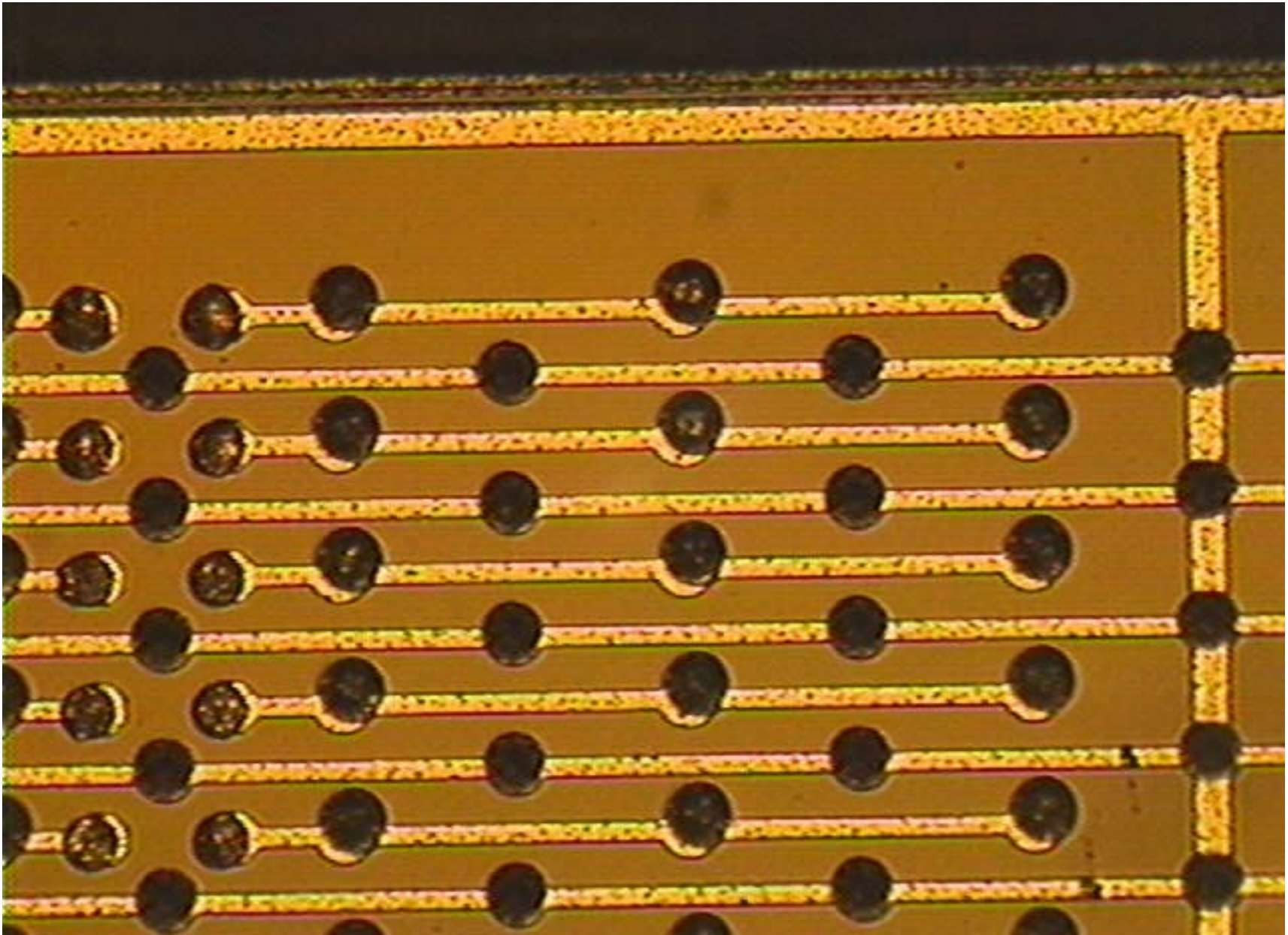


3E Cell Design



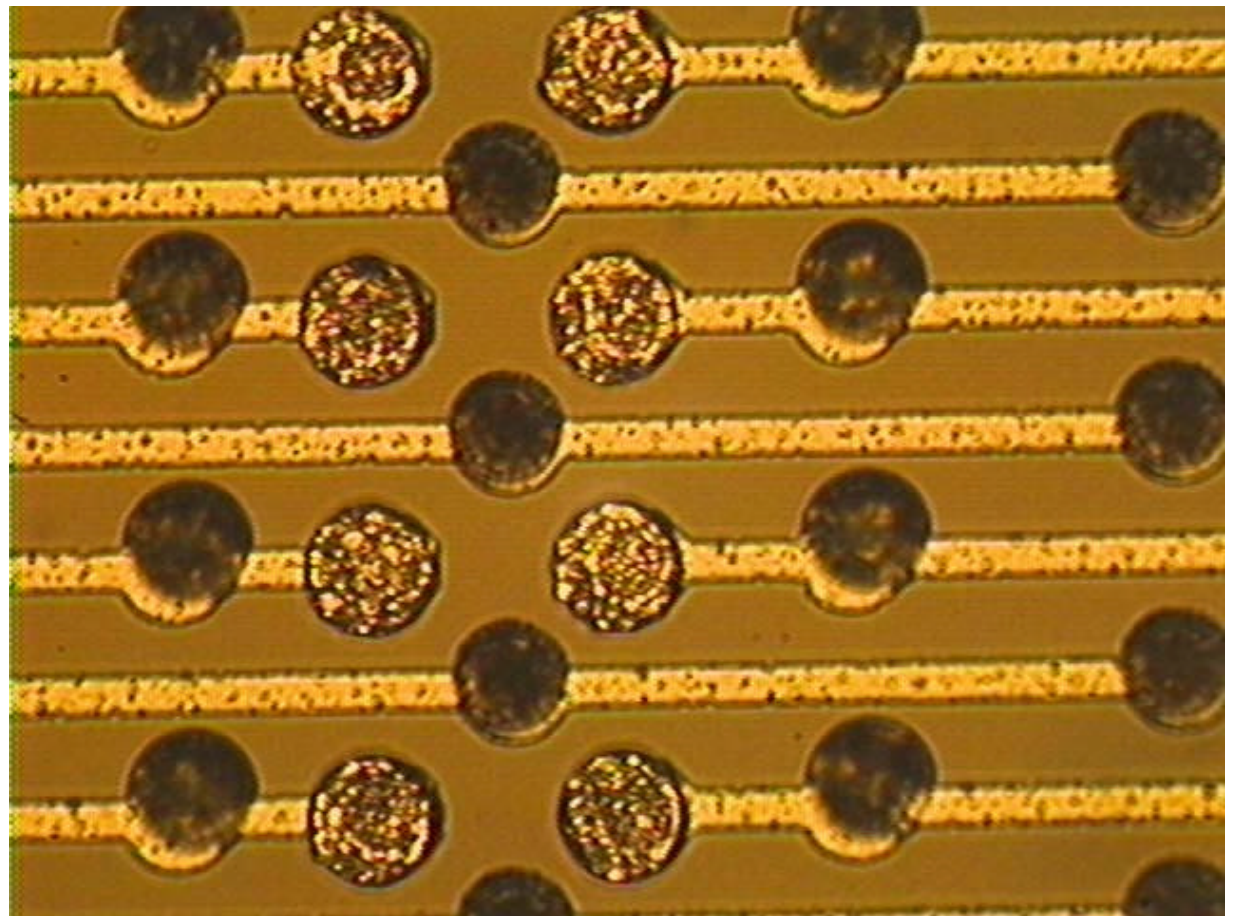
- 3 Collection and 3 Field Electrodes per Cell
- Depletion Distance Under $75\ \mu\text{m}$
- Electrode Area 8 percent of Cell
- Electrodes partially sensitive

3E Sensor Cell

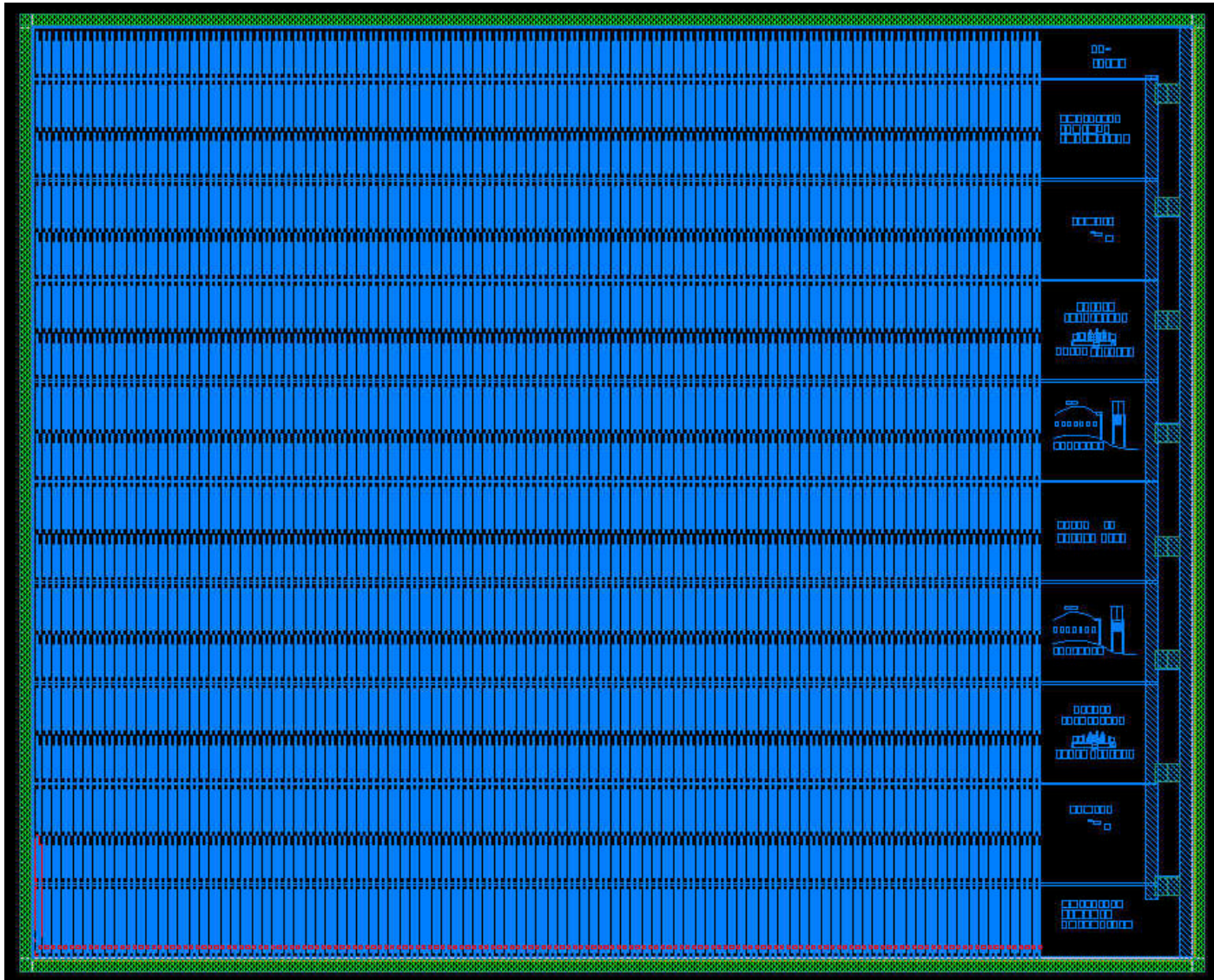


Indium Bumps

- ATLAS Sensors Bumped at Stanford
- Wafer Bumped in Germany
- Flip-Chip Bonding Done
- Testing at LBL

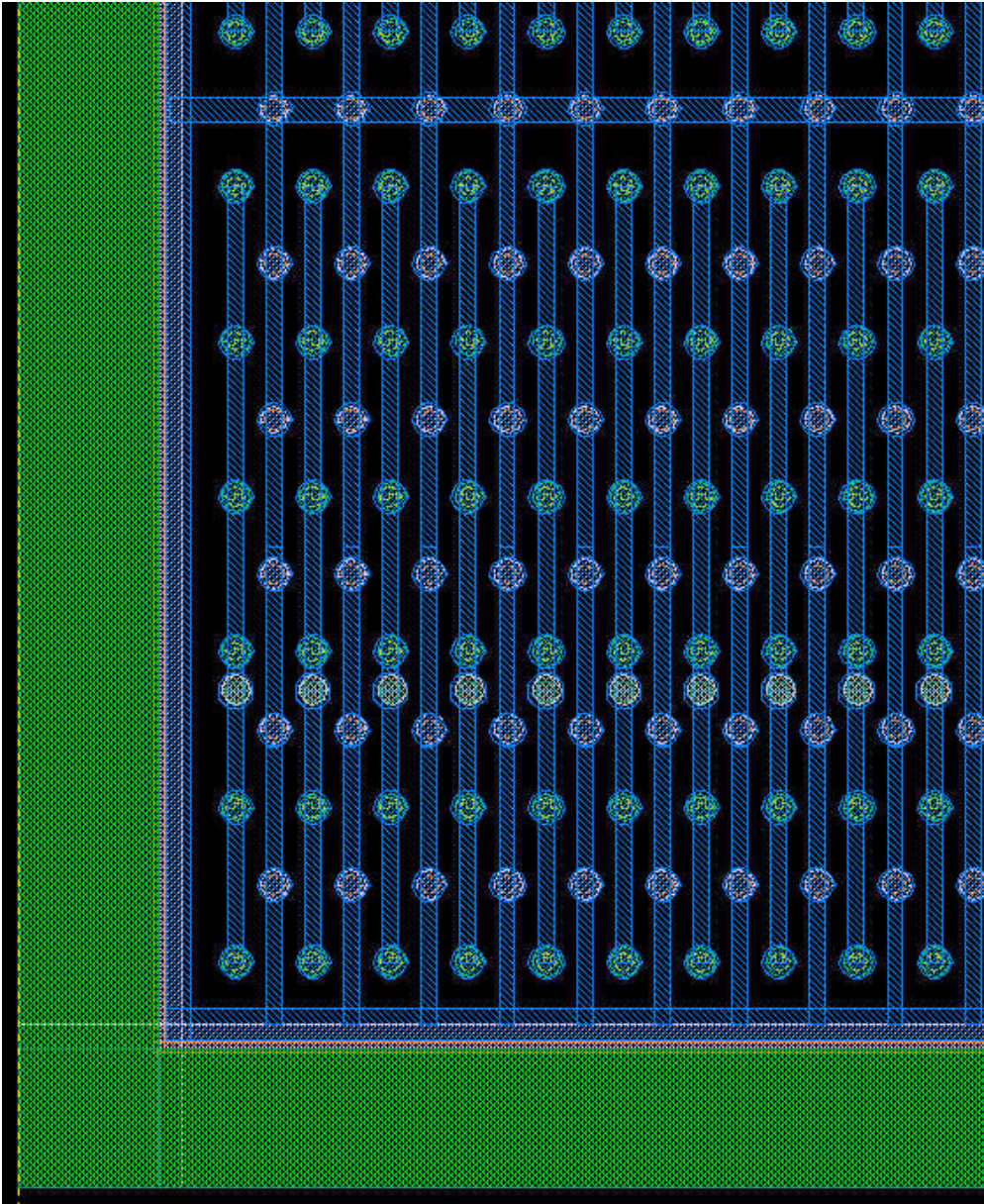


4E ATLAS Sensor



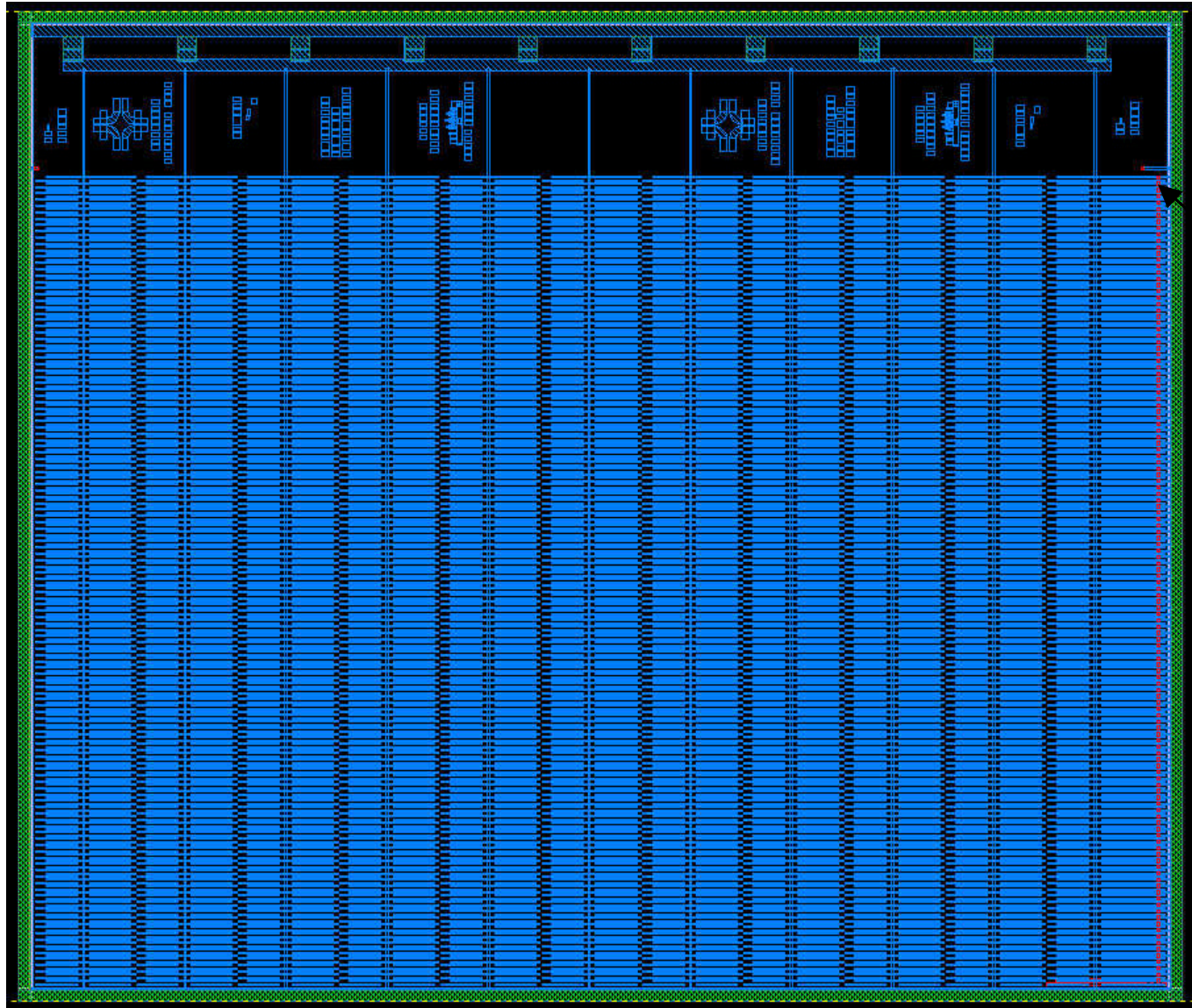
Wire Bond
Pads to Bias
Field
Electrodes
and Edges

4E Edge Cell



Follow ATLAS in
Extending the Edge
Pixels from 400 microns
to 600 microns

FPIX2 Sensor

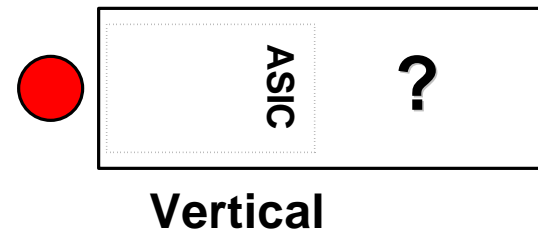
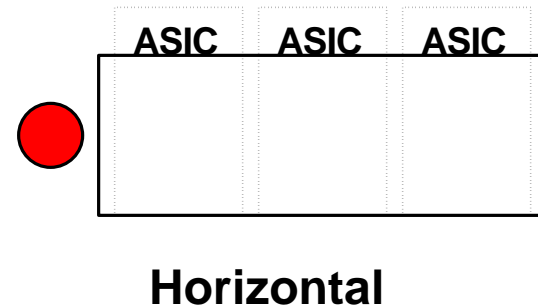


Wire Bond
Pads to Bias
Field
Electrodes
and Edges

Sensor Bias
Via the ASIC
on a Special
Bump

Multi-ASIC Sensor Modules?

- Pro - Mechanical Issues
- Pro – Easier Alignment
- Con – Fabrication Yield
- Con – Bump Bond Yield
- Con – Only One Coordinate Possible Without Dead Region



Module Options

Horizontal 50 micron Pitch

- Multi-ASIC Sensor
- Tile Single-ASIC Sensor
- Shingle Single-ASIC Sensors

Vertical 50 micron Pitch

- Shingle Single-ASIC Sensors
- Can Tile or Multi-ASIC, But with Large Dead Areas within a Plane

FP420 Mask

Mask Design Almost Done

32 3E ATLAS Single Chips

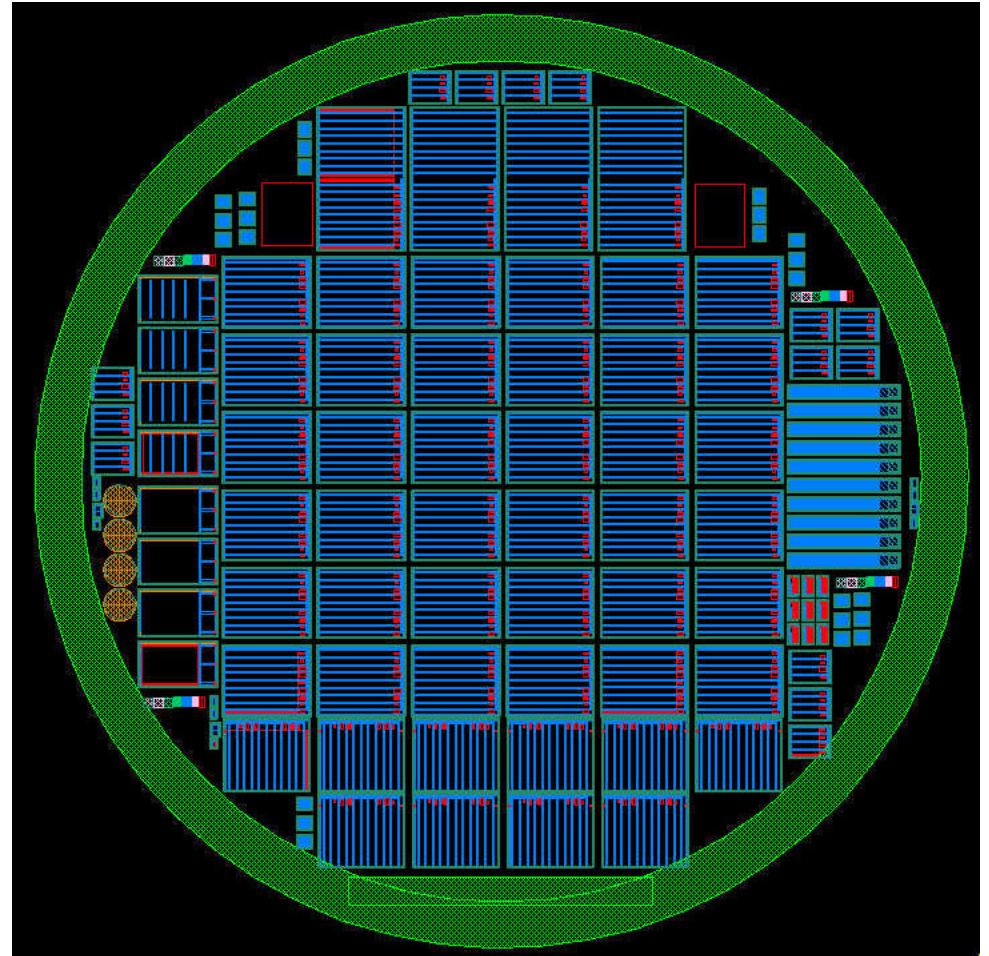
12 4E ATLAS Single Chips

Quarter Size ATLAS Chips

ATLAS Test Structures

10 3E FPIX2 Single Chips

Modules Removed From Mask!



FP420 Run

- Start 6 Wafers
- 200 microns Thick
- P Sprays Implants are Done
- Estimated Finish End of September