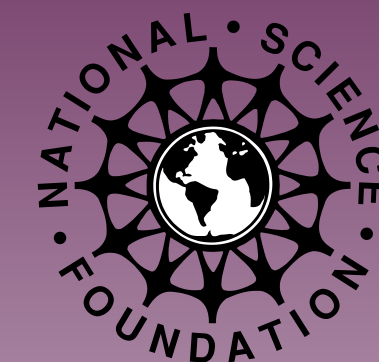


# CROSS-TRAINING TECHNICIANS & ENGINEERS FOR SEMICONDUCTOR MANUFACTURING

NSF ATE PROJECT #98-50310/01-01311

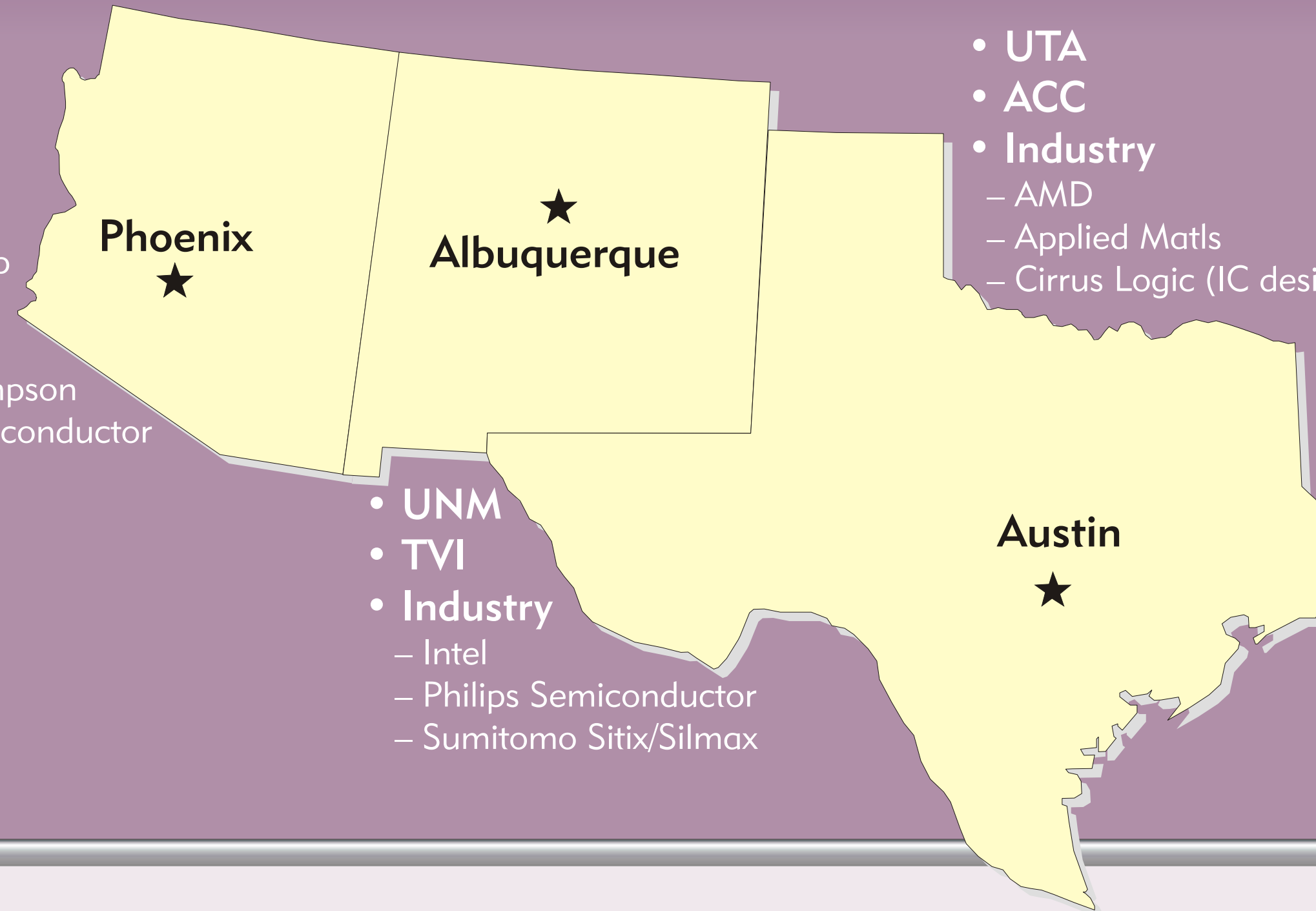


01.JULY.1998 – 30.JUNE.2004

## PROJECT PREMISE

- Observe:** Technicians and Engineers in semiconductor factories (fabs) **work together** as team members, but they are **not trained together** as team members.
- Premise:** Co-training technicians and engineers in teaching factories and virtual factories will **better prepare** them for real, interactive fab duties.
- Goal:** Cross-training technicians and engineers, such that they better understand the roles and skill sets of the other, will enhance their **effectiveness** as team members (less "in-plant" training)
- Technicians will get more exposure to math and science
  - Engineers will get more exposure to machine (tool) operations.

- ASU
- MCCC
- Industry
  - Intel
  - Microchip
  - MicroRel
  - Motorola
  - SG Thompson
  - ON Semiconductor
  - SITIX



- UTA
- ACC
- Industry
  - AMD
  - Applied Matls
  - Cirrus Logic (IC design)
  - Cypress
  - IBM (IC design)
  - Motorola
  - Samsung
  - SEMATECH
  - TI (Dallas)
- UNM
- TVI
- Industry
  - Intel
  - Philips Semiconductor
  - Sumitomo Sitix/Silmax

## PROJECT SUMMARY

- Team members will **develop and evaluate** computer-aided **lab/curriculum modules** to be integrated into factory-like labs and related courses:
- X-training labs (techs/engrs)
  - SMT labs
  - Engr labs
  - Conventional courses
- The multi-media **modules**:
- will cover S/C unit processes, and their facility demands, from both technician and engineering perspectives.
  - can serve training needs in real, mock or virtual factory-like labs.
  - CD used by 140 technicians and 490 engineering students

## SOFTWARE PANELS

The software panels include:
 

- Photolithography:** A detailed interface for lithography processes, including a Fishbone Diagram for failure analysis and a process flow chart.
- Tech-Engr:** A module for cross-training, featuring a 'Lithography -- Die Failure/Mask Issue' scenario with roles for a Probe Technician and a Probe Engineer.
- X-Training Loop:** A central module showing the integration of technical and engineering training.

## MODULE CONTENT & LEADS

Cross-training curriculum modules, and their computer implementations, cover unit processes, and factory-level operations.

### Unit processes

- Yr 1 – Lithography (contact, optical, e-beam) (MCCC, UTA)
- Yr 1 – Sputter & Metalization (evap, sputter) (TVI, UNM)
- Yr 2 – Thin-Film Deposition (oxides, nitrides, epi, CVD) (TVI, UNM)
- Yr 2 – Etch (wet, plasma) (ACC, UTA)
- Yr 3 – Oxidation (growth) (MCCC, UNM)
- Yr 3 – Diffusion, Implant and Thermal Processing (ACC, UTA)

### Factory Operations

- Yr 1 – Design of Experiments (DOE) (MCCC, ASU)
- Yr 2 – Characterization & Control (SPC) (MCCC, ASU)
- Yr 3 – Factory Dynamics (MCCC, ASU)

## CLEANROOM VENUES

Cleanroom venues include:
 

- UNM MTTC
- TVI
- UTA MRC
- ACC
- ASU

### FACULTY

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