

# Services Offered

---

## Pricing Information

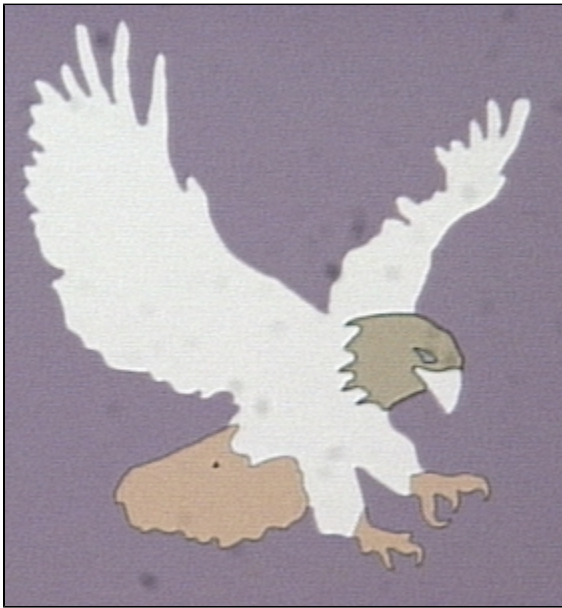
[Information on the hourly rates for SMFL tools and mask prices](#)

---

## SMFL Services and Capabilities

The capabilities of the SMFL include:

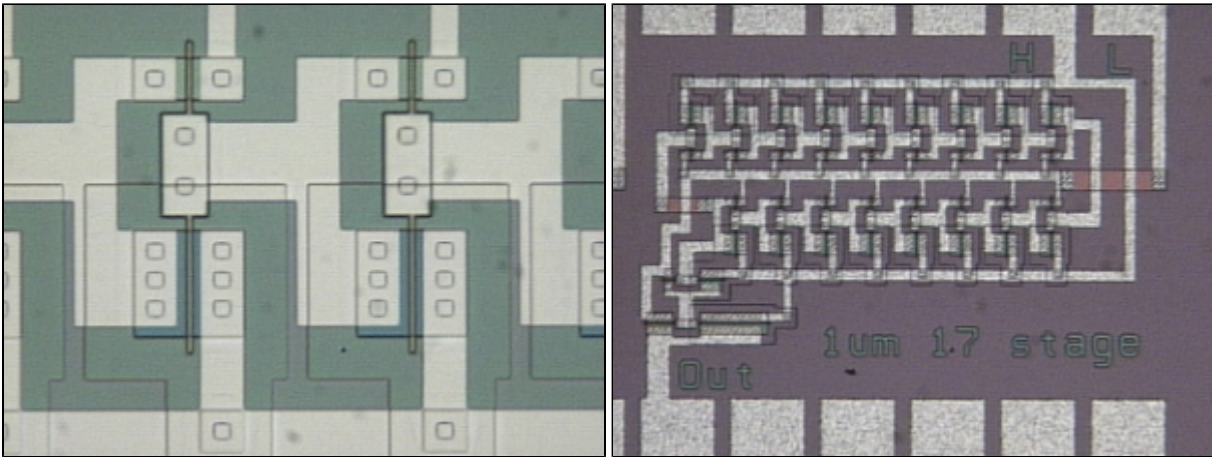
- Wafer cleaning, ion implantation and diffusion, and high temperature processing both with conventional tube furnaces and RTP systems.
- CVD / PECVD deposition capabilities are available for oxides, nitrides, and polysilicon. A variety of vacuum systems are available for sputtering and thermal evaporation of metals and dielectrics.
- Lithography, including automated coating and development systems combined with a set of two 5:1 steppers with capabilities down to 0.40 microns, as well as 1:1 contact lithography and an electron beam exposure system for photo mask production.
- Plasma etch capabilities for silicon, oxides, nitrides, and metals and provision for a broad variety of wet chemical etch processes as well as copper electroplating and CMP.
- Complete prototyping of devices and systems with help from the electrical and surface analytical characterization labs, microelectronics layout and computer simulation facilities, and in-house industry-standard electronics packaging capability.



The SMFL offers a wide range of services from single process up to foundry services. It is by no means a complete list, please [contact us](#) so that we can discuss your needs.

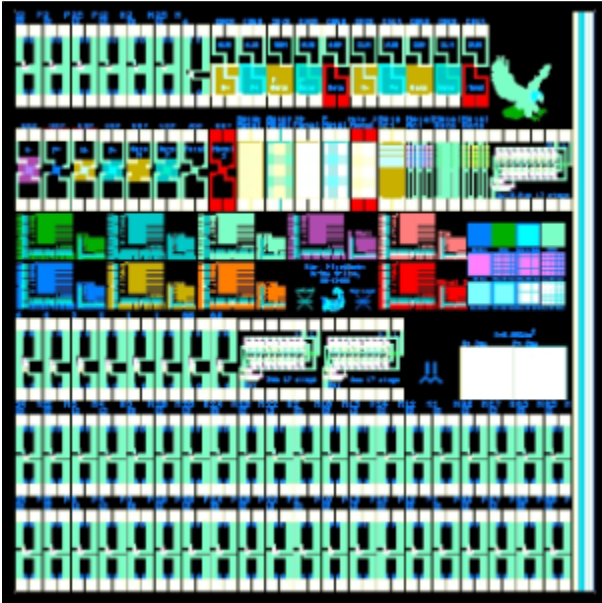
---

## Foundry Services



The SMFL has a 2um CMOS process with an effective L of 1.5um.

- We have run this process for customers using their design and incorporating our test structure for test verification.
- Aluminum and Tungsten gate metals have been processed - others are possible.
- Our Vt's are well matched but implant splits are possible.
- Typical run time is ~8 weeks



[Details about the SMFL CMOS Process, Performance, Specifications, and Options](#)

If you require this information or a quote on your process, please contact [T. Grimsley](#)

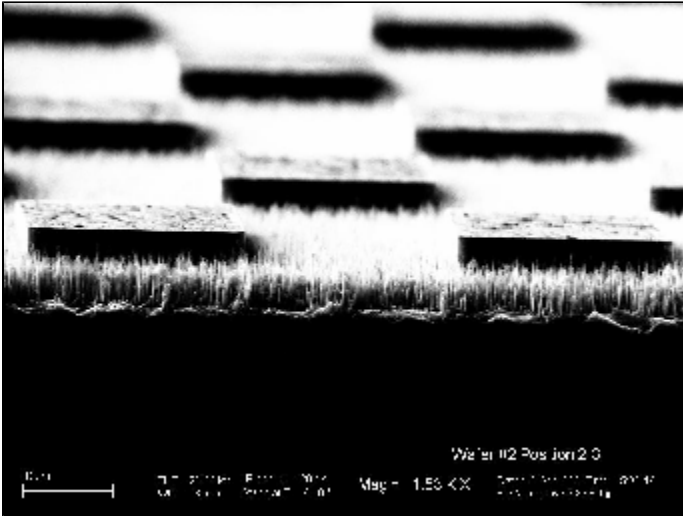
---

## Single Process Services

Metrology

Scanning Electron Microscopy

LEO EVO 50 LaB6 system.



### Film Thickness - Ellipsometry

- [Woollam VASE](#) with Autoretarder operating at wavelengths from 240-1700nm and variable angle of incidence.
- [Rudolph Auto EL IV](#) operating at three wavelengths

### Film Thickness - Profilometry

- [Tencor P2](#) is a long length scanning profilometer useful for measuring step heights.

### Film Thickness - Optical

- [Prometrix SpectraMap SM300](#) and two [Nanometrics Spectrophotometers](#) that provide noncontact optical film thickness measurement mapping - Resist, oxide, nitride.

### Resistivity Measurements'

- [CDE Res Map](#) provides sheet resistance and resistivity mapping of silicon wafers and films.

## Thin Film Deposition

### Sputter Deposition

- The SMDL has a variety of DC and RF deposition tools. The [PE 4410](#) is loadlocked and has sputter etch capability.
- A wide variety of targets exist in bonded 8" form and unbonded 4" targets for the sputter head on the [CVC 601 Sputter](#).
  - Al/Si, Ti, Cr, W/Ti, Cu, Mo, Ta - 8" bonded, water cooled targets
  - Cu, Ti, Ni, Cr, Ge, InSn, Mo, NiCr - 4" target for sputter head

### Thermal Evaporation

- The SMFL has [two thermal evaporators](#) - one is a basket style for various metals and the other is a flash evaporator for deposition of aluminum.

### Electron Beam Evaporation

The SMFL has a [CHA Ebeam Evaporator](#) with a 3KV electron beam gun with an eight pocket carousel.

### Plasma Enhanced Chemical Vapor Deposition (PECVD)

The SMFL has an Applied Materials P5000 systems equipped with two deposition chambers

- [TEOS Oxide](#) from a few nanometers to many microns can be deposited
- [PECVD nitride and amorphous silicon](#) can also be deposited.

### Low Pressure Chemical Vapor (LPCVD)

- Our [ASM LPCVD](#) system is capable of depositing Nitride, Poly and Low Temp Oxide.

---

## Short Courses

The SMFL has run hands on courses in Cleanroom Etiquette, MEMS Processing, and Thin Films.

We can can custom tailor a course to suit the needs of your organization. [Please contact us and we can discuss your requirements.](#)

---

A complete listing of all of the [Tools in the SMFL can be found here](#)