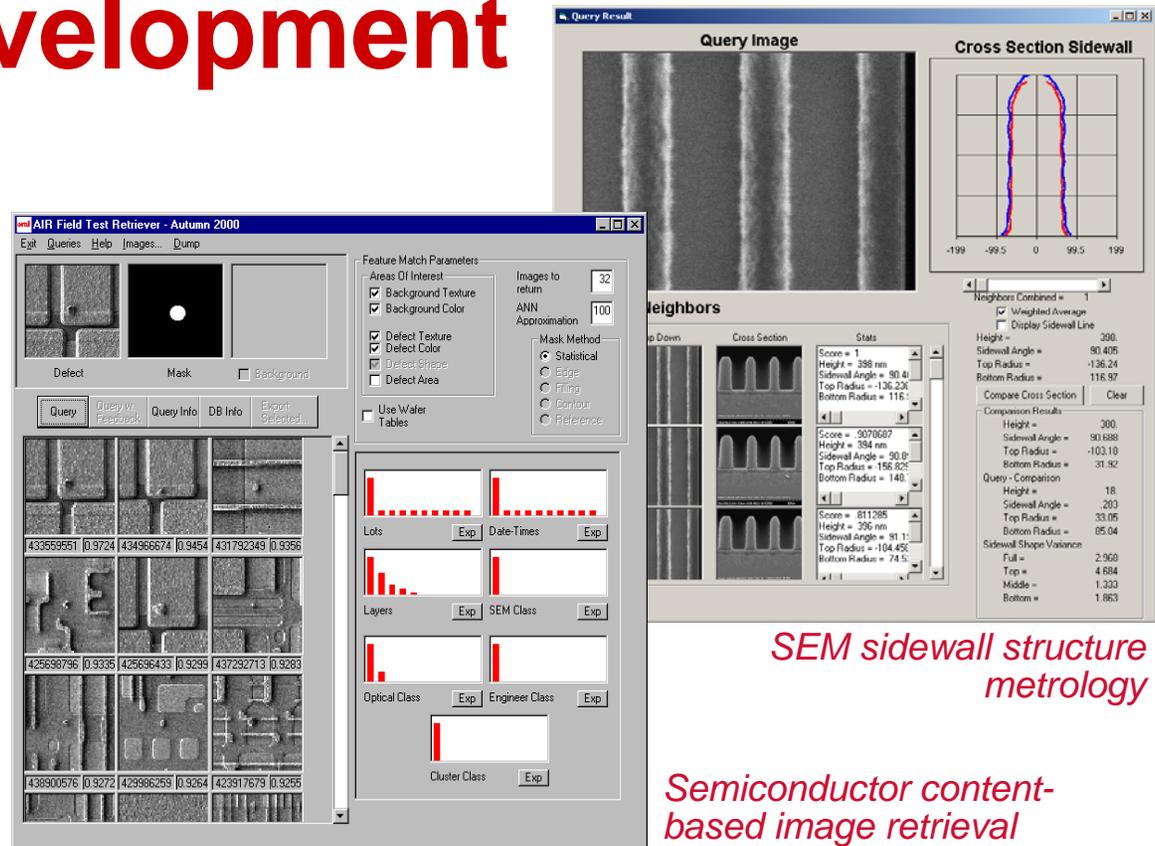


Image Science & Machine Vision Group

Engineering Science & Technology Division

Non-Federal Work-For-Others Program Development



Kenneth W. Tobin, Ph.D.
Corporate Research Fellow
Group Leader

*SEM sidewall structure
metrology*

*Semiconductor content-
based image retrieval*



The Image Science & Machine Vision Group at Oak Ridge *(Est. 1987)*

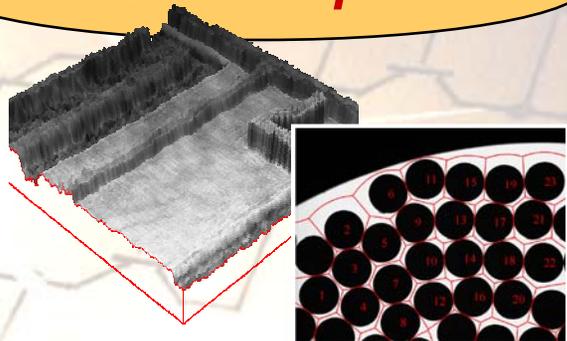
Our group was established in 1987 to conduct pure and applied research to develop technologies that provide human-like decision making capabilities for computers and robots

National Security

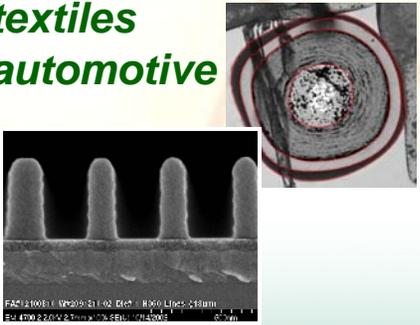
- biometrics
- video forensics
- x-ray / γ -ray inspection
- surveillance / face ID
- nuclear verification



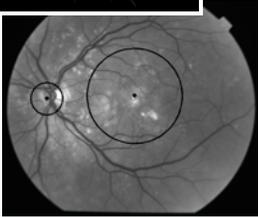
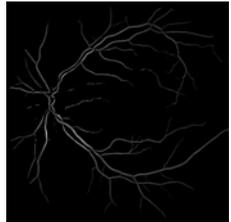
Industrial Inspection



- semiconductors
- technical ceramics
- forest products
- textiles
- automotive



Biomedical Imaging



- digital mammography
- small animal CT/SPECT
- retinal diagnostics
- telemedicine

- Three programs devoted to applied computer vision R&D
- 10 researchers (4 PhD, 5 MS, 1 BS – EE, CS, NE)
- Experience
 - Image modeling
 - Microscopy
 - Metrology
 - Inspection
 - Pattern recognition
 - Image management
 - System integration

OAK RIDGE NATIONAL LABORATORY
U. S. DEPARTMENT OF ENERGY

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Outline

- **What is (Non-Federal) Work-for-Others?**
- **Challenges to Establishing a WFO Agreement**
- **WFO Mechanisms**
 - WFO
 - CRADA
 - MSOF
- **Why Pursue WFO?**
- **Semiconductor Industry WFO**
- **Role of Intellectual Property in WFO**
- **Conclusion**

What is (Non-Federal) Work-For-Others?

- **Any research and/or development performed by ORNL for non-DOE customers**
 - Congress and the DOE provide that national laboratories are available to conduct work for private customers on a reimbursable basis
 - This research is not directly funded, in whole or in part, by DOE
- **“Non-federal” refers primarily to U.S. industry and consortiums** (although non-U.S. companies are eligible if benefit to U.S. economy can be shown)
- **Benefits to industry**
(<http://home.ornl.gov/divisions/contracts/wfo/contents.htm>)
 - Access top-level scientific and engineering capabilities,
 - Realize significant cost savings from using existing technologies and facilities,
 - Solve difficult problems with solutions that may be unobtainable elsewhere,
 - Advance critical technologies, and
 - Promote national economic interests

Challenges to Establishing a WFO Agreement

- **We cannot guarantee our work**
 - Either party can terminate at any time
- **Our DOE contract requires indemnification of ORNL**
- **Company must furnish up-front funds prior to beginning work** (typically a % of the budget)
- **Negotiating Terms and Conditions can be arduous**
 - What if we invent? What rights do they have?
 - What if they invent? What rights do we have?
 - What if we invent jointly?
 - What are the fields of use? How can this be limited?
- **This is a three-way contract (at least) between ORNL, DOE, and the company**
 - Lots of personalities and preconceived notions to overcome (i.e., many people are afraid to work with the government)

Mechanisms for WFO

- **Standard WFO Agreement**
 - Usually assumes we are doing work similar to a subcontractor (i.e., we do work for them – it's not a collaboration)
 - Usually no pre-existing intellectual property; they want our expertise
 - T&Cs established to protect rights of both parties (and DOE)
- **Cooperative Research And Development Agreement (CRADA)**
 - Usually assumes a collaboration or partnership: both parties contribute to the work
 - Generally pursued when ORNL-developed IP is involved
 - T&Cs mutually established
 - Must develop an acceptable (and limited) field of use!
- **Material Service Order Form (MSOF)**
 - Useful for feasibility studies or evaluations
 - No IP will can be transferred! (although results can be developed with our IP)
 - There are no IP stipulations: if we invent, it's ours; if they invent, it's theirs
 - Very fast and easy to put in place (3 page contract)

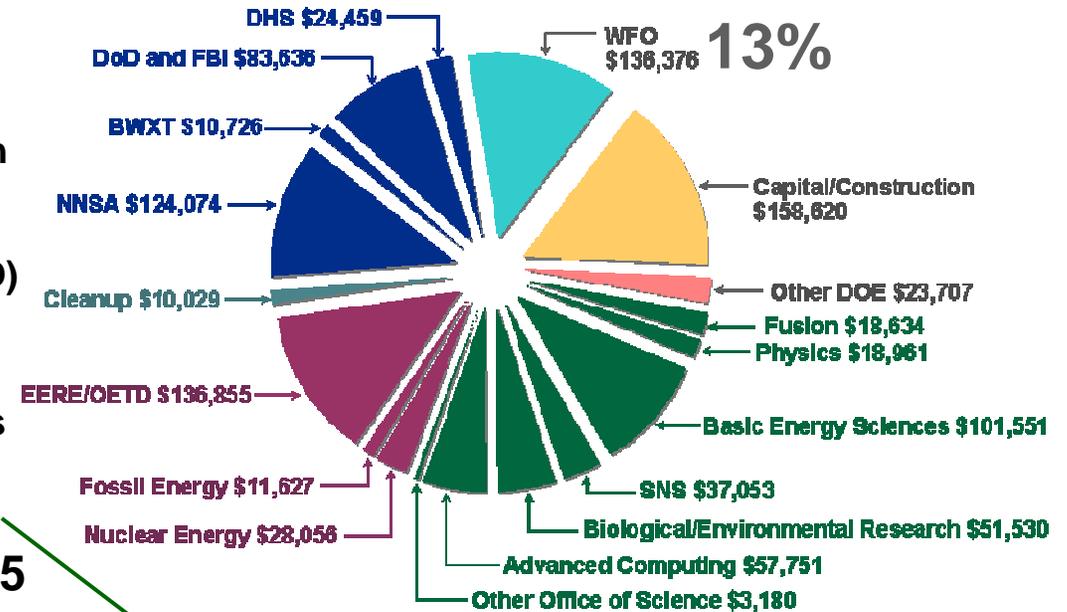
Statement of Work (SOW)

- All our WFO contracting mechanisms require a SOW
- This is the **ONLY** document that states what work will be performed under the contract
 - Be clear and concise
 - Carefully determine realistic
 - tasks
 - milestones
 - budgets
 - timelines
 - deliverables
 - Carefully set and maintain customer expectations
- It is best to convince your customer to agree to a longer term contract with higher budget than is required to perform the initial project
 - Reduces the number of trips back to DOE for incremental approvals
 - Remember, your goal is a long-term relationship
 - Customer is NOT obligated to pay anything other than what you have spent and they can terminate the work at any time
- This document must be agreeable to both parties before it becomes an appendix in the contract

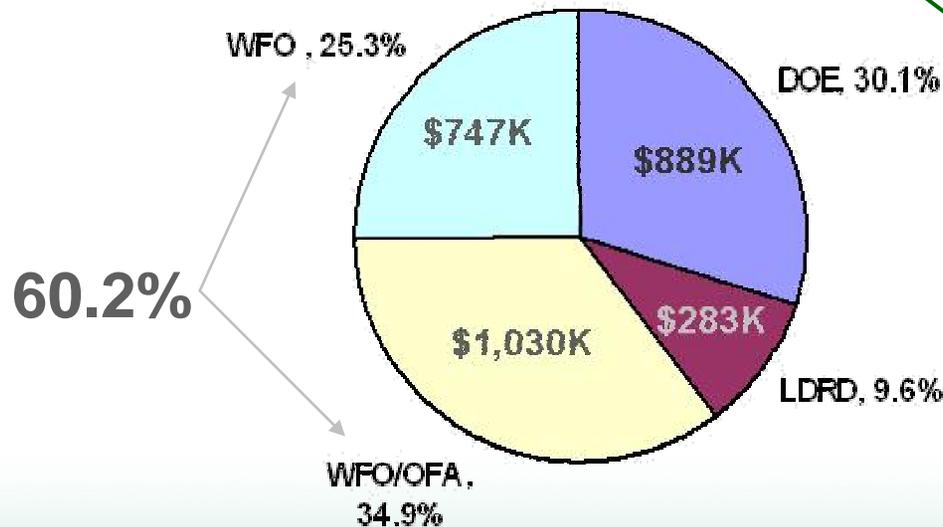
Why Pursue WFO?

- The WFO budget continues to grow at ORNL
- Can substantially augment your research portfolio (i.e., chargeout)
- Very relevant to our applied research areas (little DOE support for applied R&D)
- U.S. economic development
- Entrepreneurial experience is rewarding
- Can be financially rewarding to inventors (15% royalty sharing w/ inventors)

ORNL Funding by Source, FY 2005



ISMV Funding by Source, FY 2005

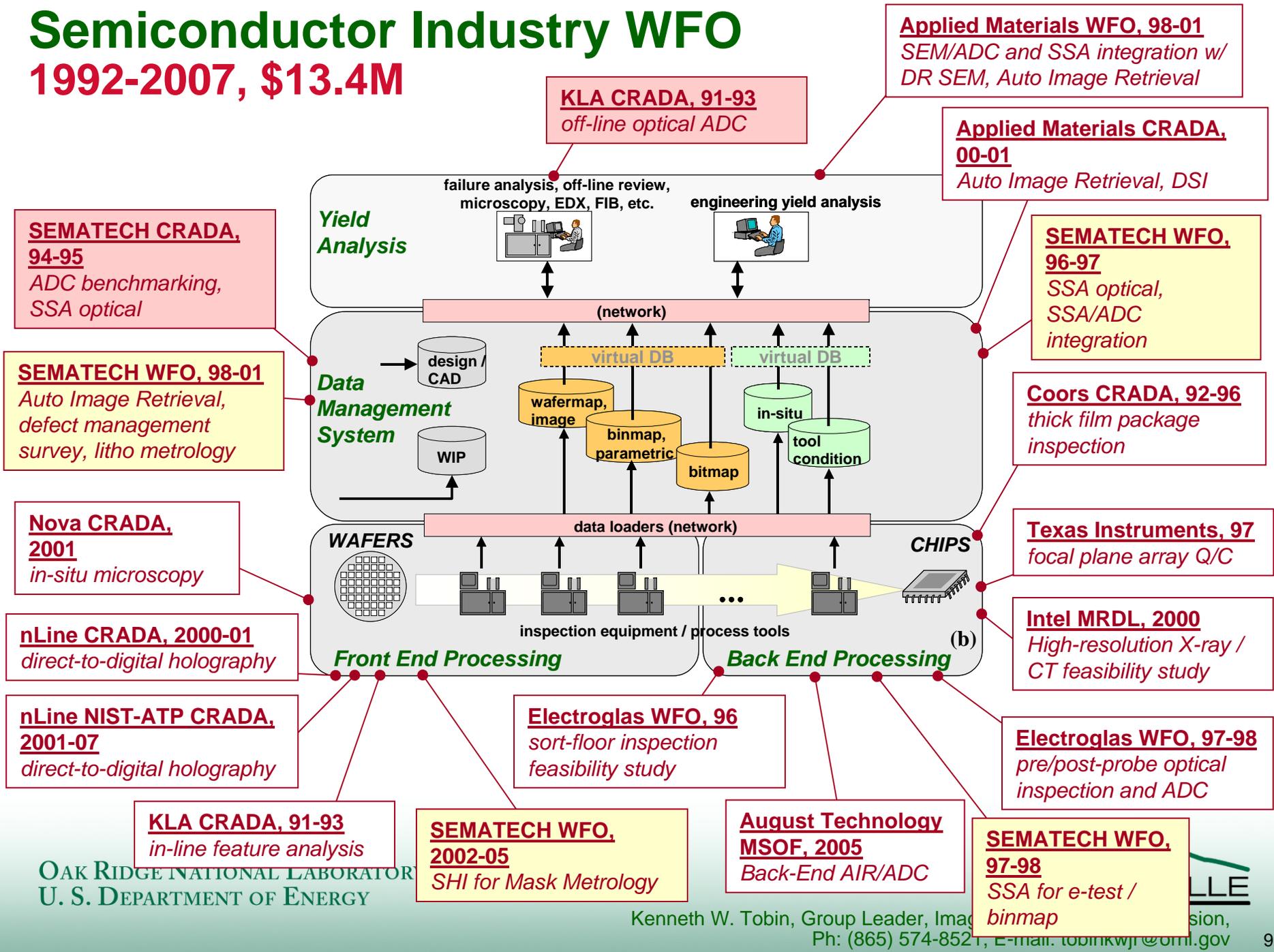


Total \$1.05B

Total \$3M

Semiconductor Industry WFO

1992-2007, \$13.4M

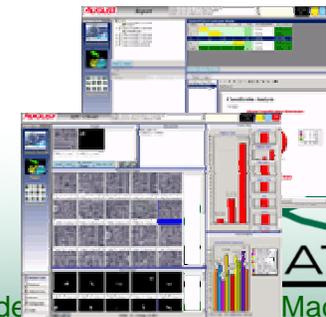
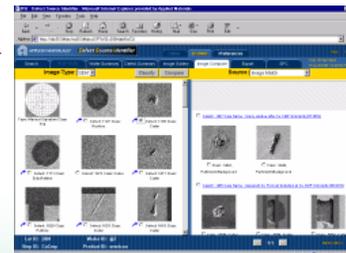
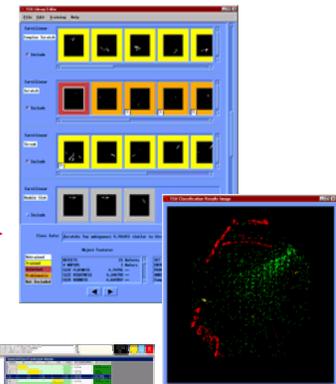
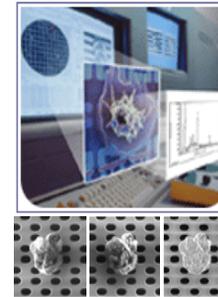


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Role of Intellectual Property in WFO

- **MicroCAT technology**
 - ImTek, Inc., Knoxville, TN
- **ADC Customization**
 - Applied Materials, Inc., Santa Clara, CA
- **Postfab Wafer ADC**
 - Electroglas, Inc., San
- **Digital Holography**
 - nLine Corp., Austin, TX
- **Spatial Signature Analysis**
 - IBM, Intel, TI, AMD, National, HP, ...
 - Inspex, Knights, DYM, Applied Materials, Sleuthworks, ...
 - (20 licenses in total)
- **Automated Image Retrieval**
 - Applied Materials, Santa Clara, CA
 - August Technology, Bloomington, MN



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ATTELLE

Conclusions

- **Relationships are key to WFO funding**
 - One successful relationship can lead to many others
- **Build strong (complimentary) collaborations**
 - You can do more with others than you can by yourself
- **Build your reputation through publications, conference participation, and intellectual property**
 - Think of IP in terms of the unique value it provides to a customer; why else would he/she come here?
- **Use Seed Money and MSOF to lay a technical foundation, perform feasibility studies (lowered risk), etc.**
 - Protects / isolates your ideas
- **Get to know your TTED representative and work with him/her on a regular basis!** (... and learn the systems: eWFO, IDEAS, SAP, etc.)

