

The Austin skyline, as seen from Sematech



click on the image to run the Tech Valley 2002 video.





Educating for Tech Valley

Doug Klein, Director
Center for Converging Technologies
Union College
March 28, 2003

Art and Science;
making Science & Technology accessible

Zero@Wavefunction: nano dreams & nightmares
<http://notime.arts.ucla.edu/zerowave/zerowave.html>

Victoria Vesna
James Gimzewski
Josh Nimoy

Tech Valley BOCES Career Centers
Meeting

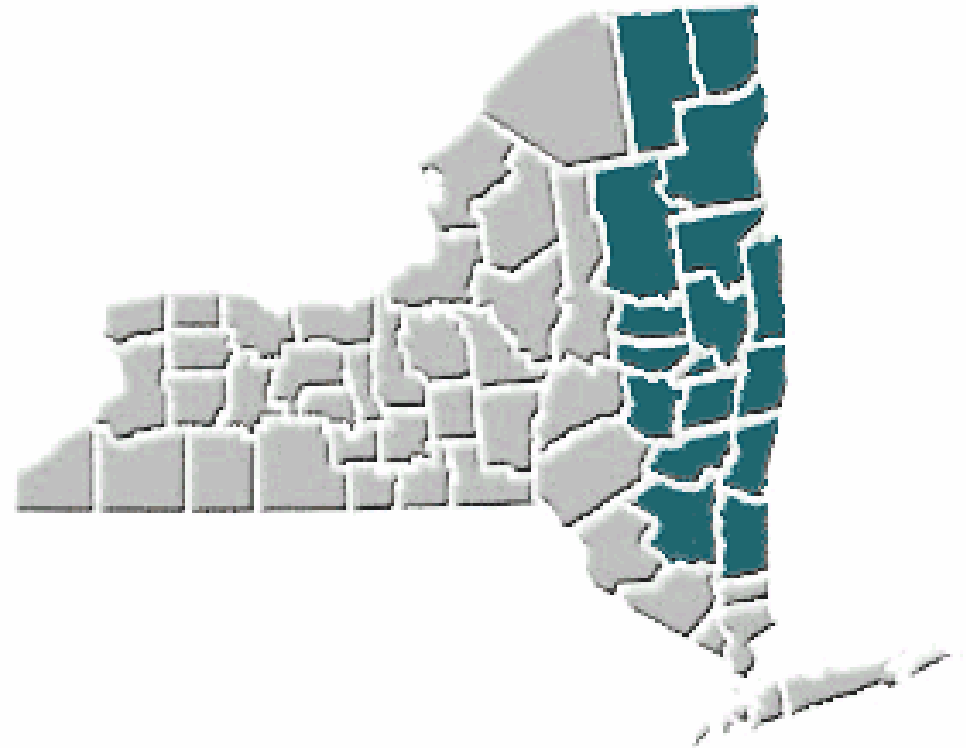


Tech Valley

New York's Tech Valley, encompassing 17 counties, stretches from Clinton County in the north to Dutchess County in the south, Fulton County to the west and Columbia County to the east.

Counties:

Albany	Montgomery
Clinton	Rensselaer
Columbia	Saratoga
Dutchess	Schenectady
Essex	Schoharie
Franklin	Ulster
Fulton	Warren
Greene	Washington
Hamilton	



March 28, 2003

Tech Valley web site www.techvalley.org



techvalley.org

World Class Consultants

[home](#) | [company listing](#) | [calendar](#) | [news](#) | [stock watch](#) | [contact us](#)

[click here for regional stock quotes](#)

Site Search

find

Site Resources

- [careers](#)
- [culture](#)
- [forums](#)
- [funding info](#)
- [guest column](#)
- [incubators](#)
- [legal resources](#)
- [profiles](#)
- [universities](#)

Weekly Poll

Who is the biggest name at the Summit in Tech Valley?

- Lou Dobbs
- Dr. Alain Kaloyeros
- Gov. Pataki
- Dr. Michael Polcari

Vote

[View results](#)

[go to forum](#)



Tech Valley News |

Kaloyeros to speak at Summit in Tech Valley

Albany NanoTech Executive Director Dr. Alain Kaloyeros, one of the key players in the region's explosive high-tech industry, will be speaking at the Summit in Tech Valley. [FULL STORY >>](#)

Albany-Colonie Chamber's FAMtask to welcome newcomers

The Albany-Colonie Regional Chamber of Commerce is forming a task force to assist in welcoming individuals to the region. [FULL STORY >>](#)

Nanotech firm opens manufacturing site in Watervliet

Troy-based Evident Technologies Inc. has opened its new nanotechnology manufacturing facility in Watervliet. [FULL STORY >>](#)

Forbes report names Pataki a top tech leader

New York State Governor George E. Pataki was named one of the top 10 leaders in technology development on the list. [FULL STORY >>](#)

RPI's Lally School named to entrepreneurial list

Rensselaer Polytechnic Institute's Lally School of Management and Technology has been named one of the 25 best schools in the country. [FULL STORY >>](#)

Tech Valley Tidbits:

Rensselaer Polytechnic Institute (Troy) won a five-year \$3.5 million grant from the National Science Foundation. [FULL STORY >>](#)

Tech Valley Press

Forbes magazine: Tech Valley ranked third in "The Best Places with the Best Education"

Austin American-Statesman: Albany a Top Contender for High-Tech Jobs

New York Newsday: Transforming Albany into a High-Tech Mecca

Summit 2003

THE SUMMIT IN TECH VALLEY

Date: April 28, 29 2003

[2003 Summit Invitation](#)

[Register for the Summit](#)

[100K Business Plan Competition](#)

[Innovative Educator Awards](#)

[Tech Month Events](#)

Tech Valley Chamber Coalition



Adirondack Regional Chambers of Commerce
Albany-Colonie Regional Chamber of Commerce
Bethlehem Chamber of Commerce
Columbia County Chamber of Commerce
Fulton County Regional Chamber of Commerce and

The Albany Nanotech web site

www.albanynanotech.org

March 27, 2003

... HOME ... ABOUT ... NEWS ... EVENTS ... CAREERS ... CONTACT ...

ALBANY NanoTech

Albany Nanotech - Leading the Nanotechnology Revolution

- centers and programs
- infrastructure and facilities
- technology focus
- school of nanosciences and nanoengineering
- business acceleration

Search



Albany NanoTech is a global research, development, technology deployment and education resource supporting accelerated high technology commercialization and job creation through leveraged partnerships between business, government and academia.



Albany NanoTech complex with Business Incubator/Technology Accelerator on left, 300 mm wafer R&D fab in center (both under construction) and existing 200mm wafer R&D facility on right.

Nanotechnology innovations are driving the dramatic growth in the information technology, biomedical and energy industries.

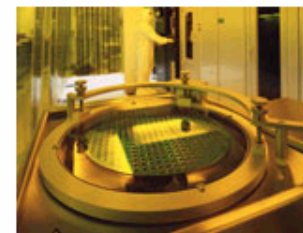
Albany NanoTech at the University at Albany - SUNY serves as an integration point bringing together the nanoelectronics, nanosystems and nanophotonics technologies that will power the nanotechnology revolution.



Center of Excellence in Nanoelectronics is announced.



Class 10 clean room occupied with 200 mm wafer metrology



Micrascan II DUV Stepper Scanner Photolithography

Tech Valley Chamber trip to Austin; Feb. 2003

International SEMATECH North

EUV Lithography

Integrated Circuits in the
Age of Nanotechnology

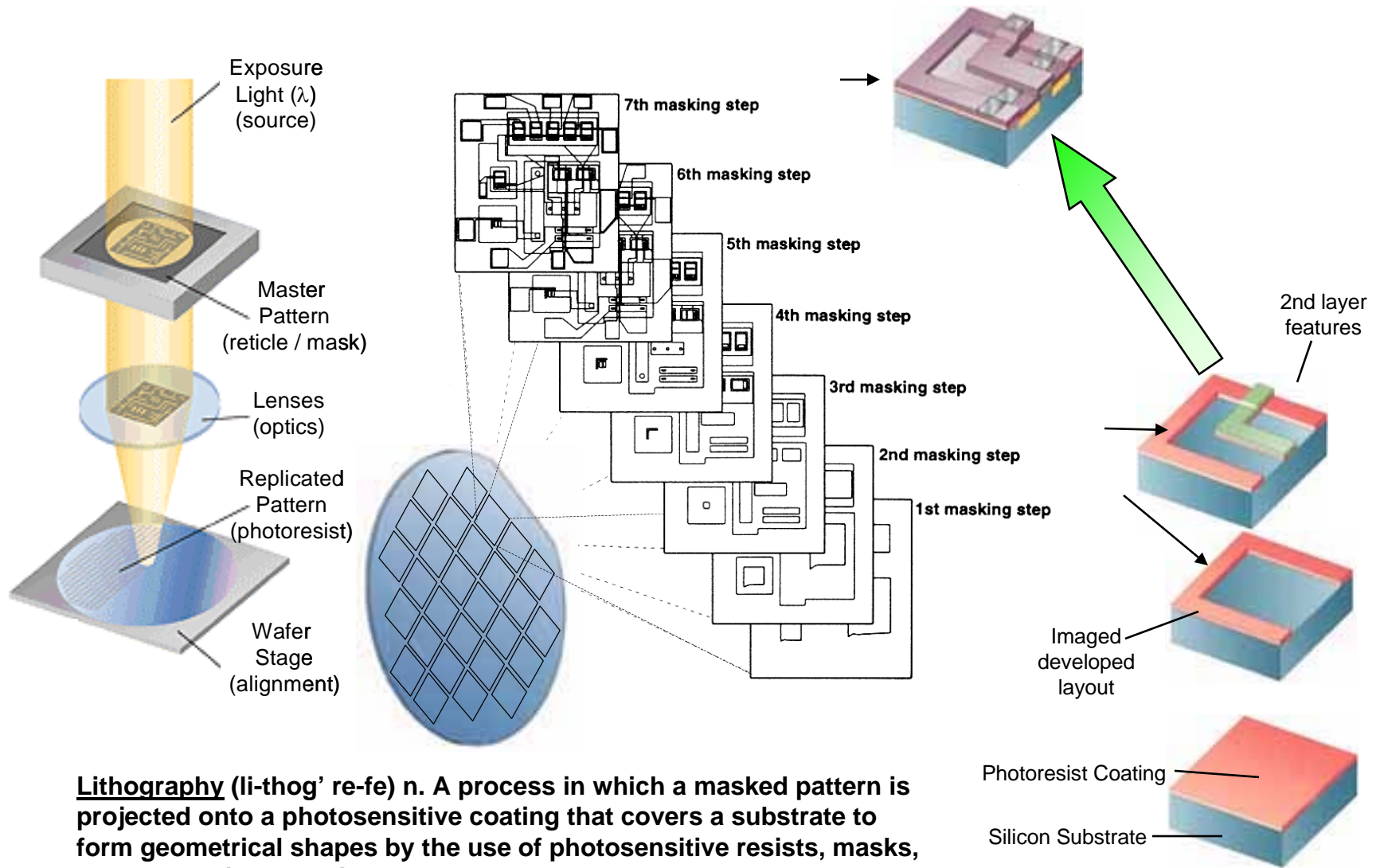
Kevin Kemp

EUV Lithography Program Manager

The following slides are from the Sematech
presentation, Feb. 3, 2003

INTERNATIONAL
SEMATECH

Lithography is the process that creates features on a silicon wafer to form an Integrated Circuit.

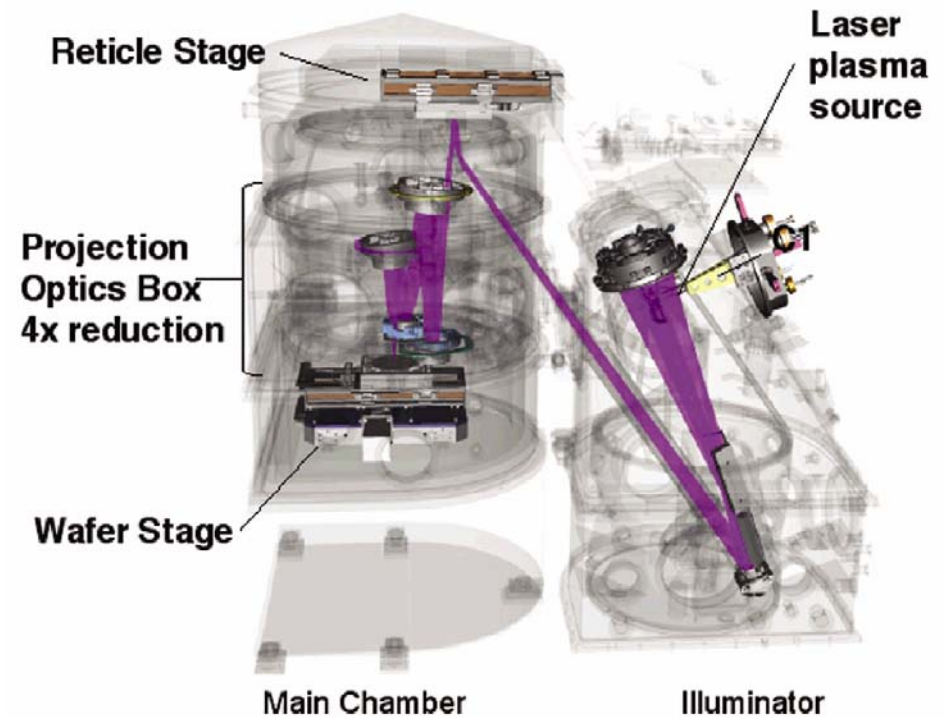


Lithography (li-thog' re-fe) n. A process in which a masked pattern is projected onto a photosensitive coating that covers a substrate to form geometrical shapes by the use of photosensitive resists, masks, and developing techniques

March 28, 2003

INTERNATIONAL
SEMATECH

Extreme Ultra Violet (EUV) Lithography



Prototype EUV exposure tool (VNL/EUV-LLC)

Courtesy EUV-LLC
March 28, 2003

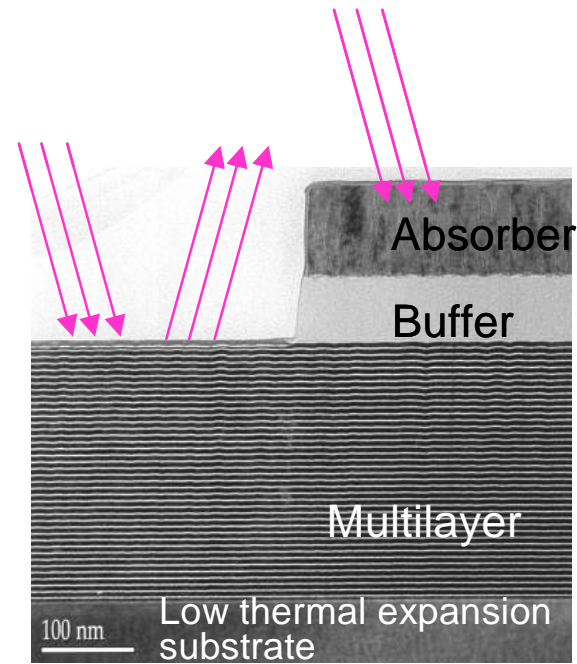
INTERNATIONAL
SEMATECH

EUV masks

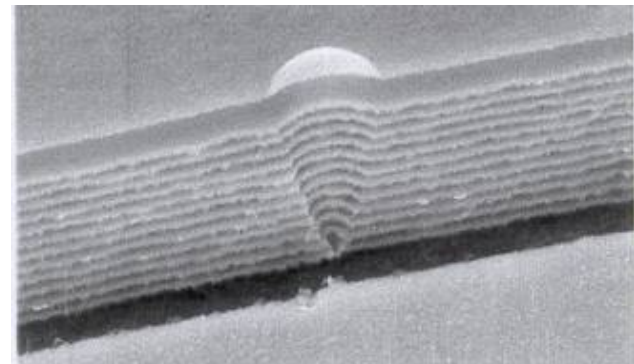
- Masks must be extremely flat and defect free.
- We will have a major development effort on EUV mask blanks at ISMTN.



EUV mask



EUV mask construction



Defect in multilayer

International SEMATECH North:

A partnership between International SEMATECH and Albany Nanotech of the University at Albany-SUNY

- 5-year strategic alliance to develop infrastructure for EUV lithography.
- EUV Mask Blank Development Center will accelerate the development of commercial EUV masks.
- EUV Resist Test Center will support the development of commercial EUV photoresists to meet production requirements.
- State-of-the-art equipment and capability to develop and test tools, materials and processes.



March 28, 2003

INTERNATIONAL
SEMATECH

Facility

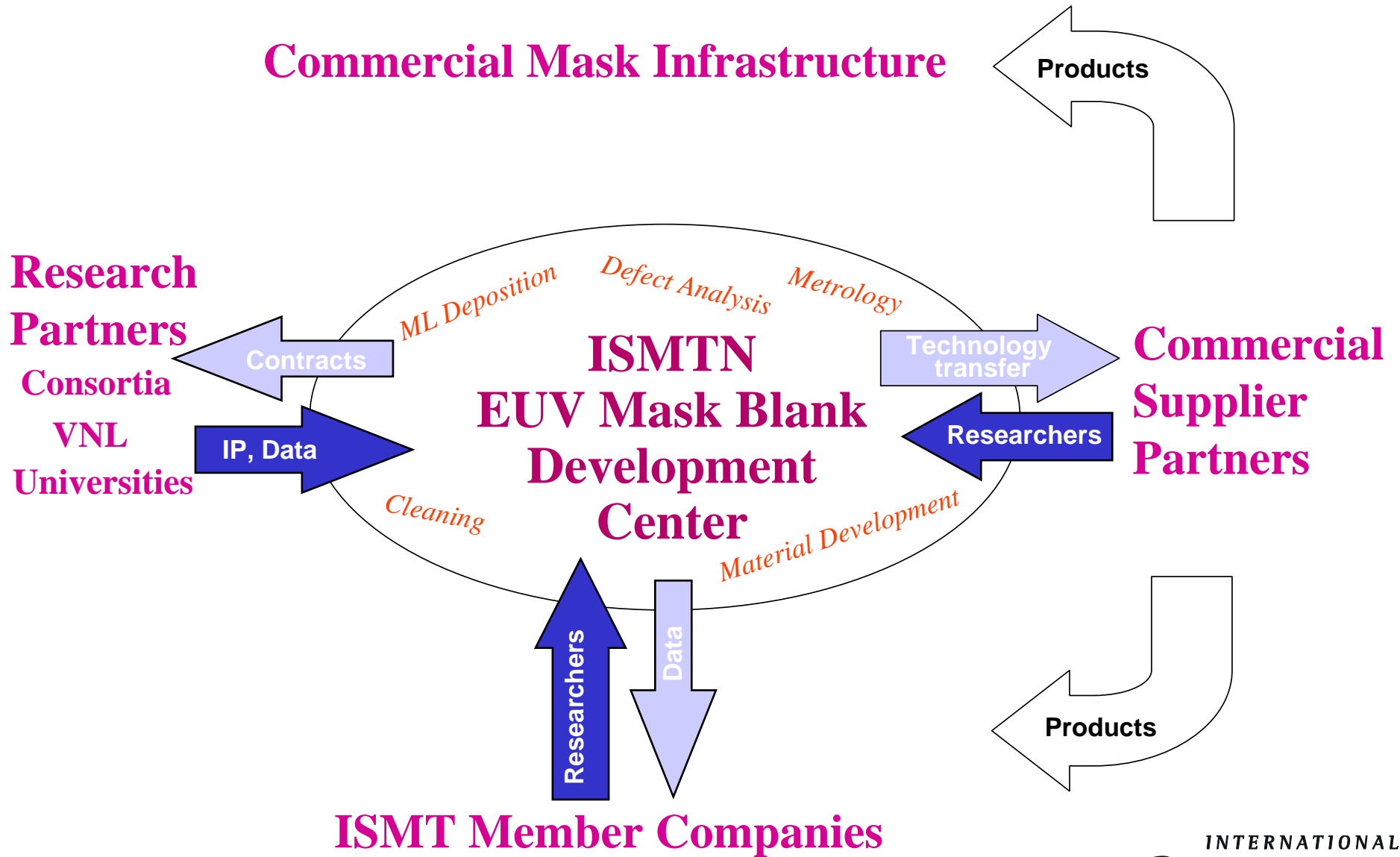
- Clean room, office, classroom space.
- Location for EUV Mask Blank Development project.



- Class 1000 Clean Room.
- Mask blank program will occupy 9,720 ft².
- 1st tool delivery 2/17/03.

March 28, 2003

EUV Mask Blank Development: Strategy



March 28, 2003

INTERNATIONAL
SEMATECH

Summary

- EUV Lithography will be used to make Integrated Circuits that are much smaller and much faster than what we can do today.
- International SEMATECH has a comprehensive program to address the key components for the EUV lithography infrastructure.
 - **The ISMTN program at Albany is a major part of this.**
- The ISMTN facility is nearing completion; our researchers will start installing equipment in mid-February.
- Together with our Research and Commercial Supplier Partners, the ISMTN program will deliver the EUV mask blank and photoresist technology required by the worldwide semiconductor industry.

The Tokyo Electron home page

www.tel.co.jp

TOKYO ELECTRON

会社案内

製品紹介

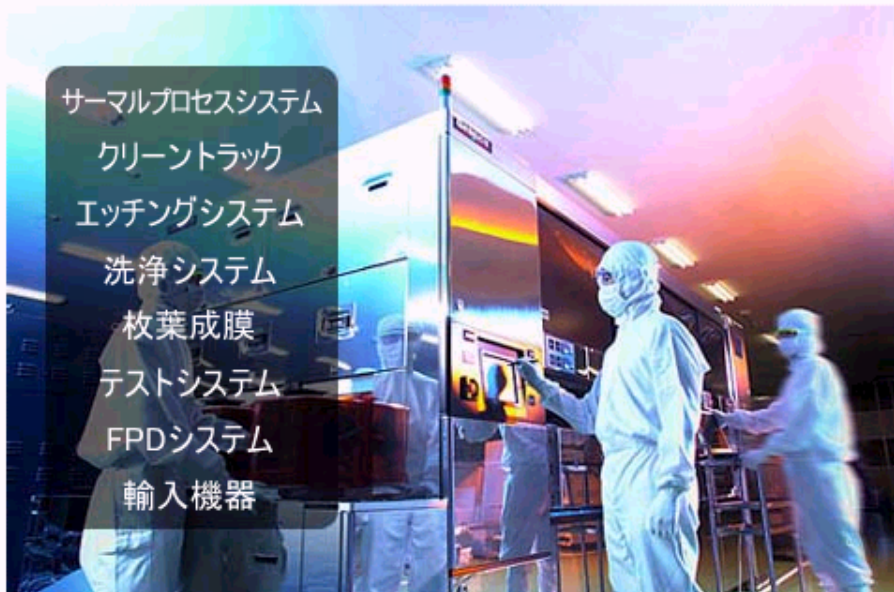
ニュースルーム

投資家の皆様へ

環境・健康・安全



半導体・FPD製造装置



[半導体・FPD製造装置 \(PDFバージョン\)](#)

半導体・FPD製造装置のサービス・サポートについては [こちら](#) をご覧下さい

Take-away messages from Austin

Sematech & TEL are small, but represent huge potential

We have a strong economy & an excellent quality of life

We have excellent education opportunities

Challenges: Coordination; consistency; cooperation

Nearly half of living UT grads live in Austin area; we want to keep our kids, too

Reach kids by Middle School; teach them not just science and math, but creativity, confidence, leadership

Tech Valley is real



Key elements for educating in Tech Valley

1. Collaborations

Industry; Education; Government

2. Curricular Development - connections

3. Research Experience

4. Cultural Awareness

5. Creativity and Entrepreneurship



Converging Technologies

Designing the Future
Converging
Technologies
@UNION

Quick Navigation



ADMISSIONS ALUMNI ACADEMICS CAMPUS LIFE RESOURCES NEWS & SPORTS SEARCH HOME

Nanotechnology

Nanotechnology
in the classroom

Projects

Related Links

Back to Main Menu

Nanotechnology Projects

Click here for the Projects Archive

The Effect of Water, Catalyst and Solvent Content on Silica-Aerogel Density, Conductivity and Porosity
Designing a Fly Rod

The Effect of Water, Catalyst and Solvent Content on Silica-Aerogel Density, Conductivity and Porosity: Smitesh Bakrania

Aerogels are a class of ceramic materials fabricated from a sol-gel by carefully evacuating the solvent to leave a fragile polymer network which is 90-99% air by volume. Due to its structural and material properties, aerogels exhibit some remarkable properties. Silica aerogels have been fabricated with bulk densities in the range of 0.003-0.35 g/cm³, index of refractions from 1.0-1.05, thermal conductivities from 0.008-0.017 W/mK, and tensile strengths of 16 kPa or higher. They are one of the most insulating and least dense materials.



[Click here for more details](#)

[Visit Smitesh's Site](#)

[-top](#)

Designing a Fly Rod: Justin Maleszwski

‘Converging Technologies’ is about enabling students to study at the intersection of traditional disciplines, learning to think creatively and see connections.

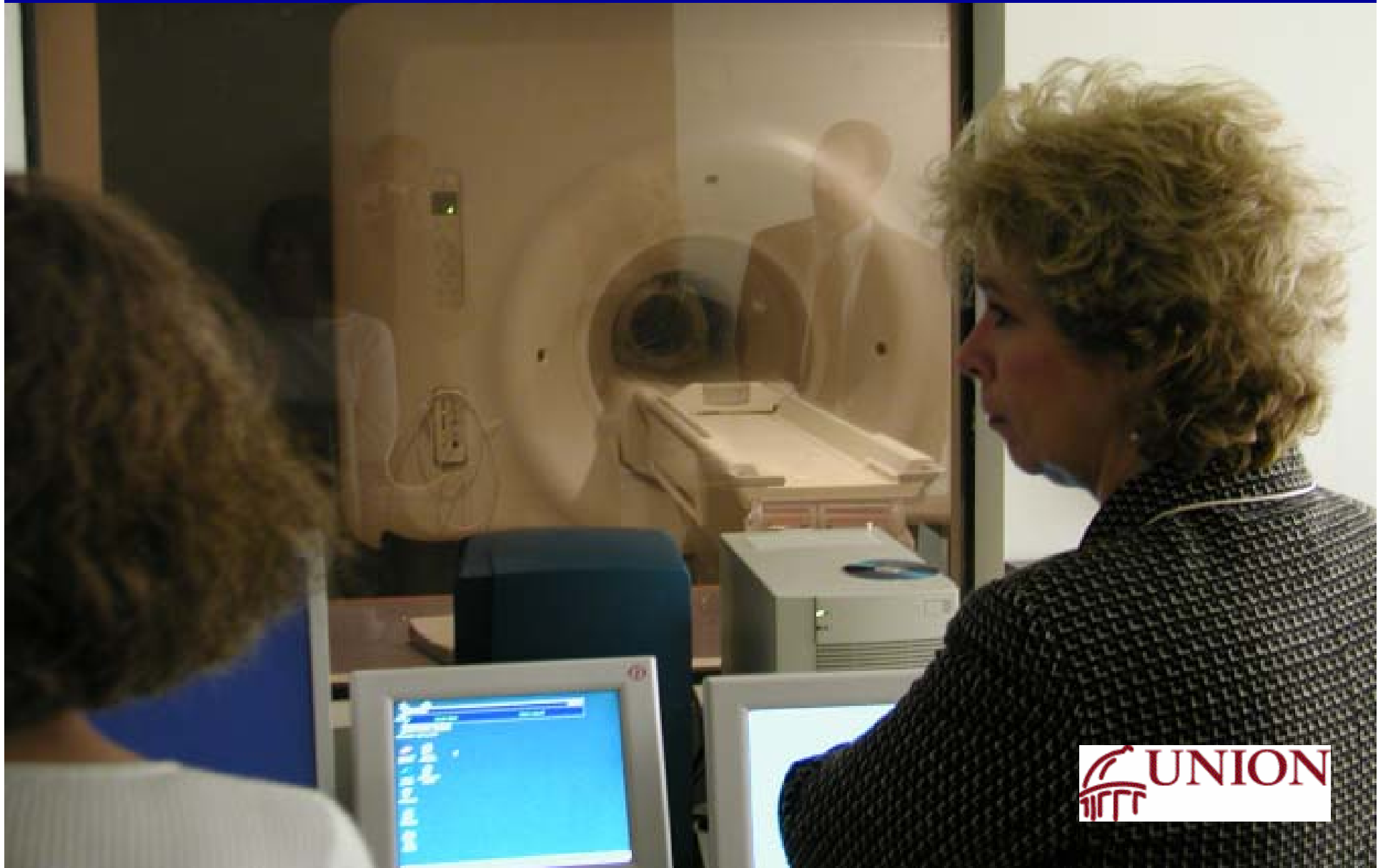
Studying in the context of the Liberal Arts, they also understand science and technology in a social and cultural context.

www.ct.union.edu

1. Collaborations with Business: Atomic Force Microscope (AFM); gift to Union from IBM



1. Collaborations with other Institutions: AMC Neurosciences Advanced Imaging Research Center -- Union Psychology Prof. Steve Romero has joint research appointment with AMC.



2. Curriculum development: New interdisciplinary courses & programs.

<http://idol.union.edu/~malekis/ESC24/ESC24MainPage/NanoMainPage.htm>

ESC 24/ CHM 24

Frontiers of Nanotechnology

Winter 2003 - Union College

Course Content

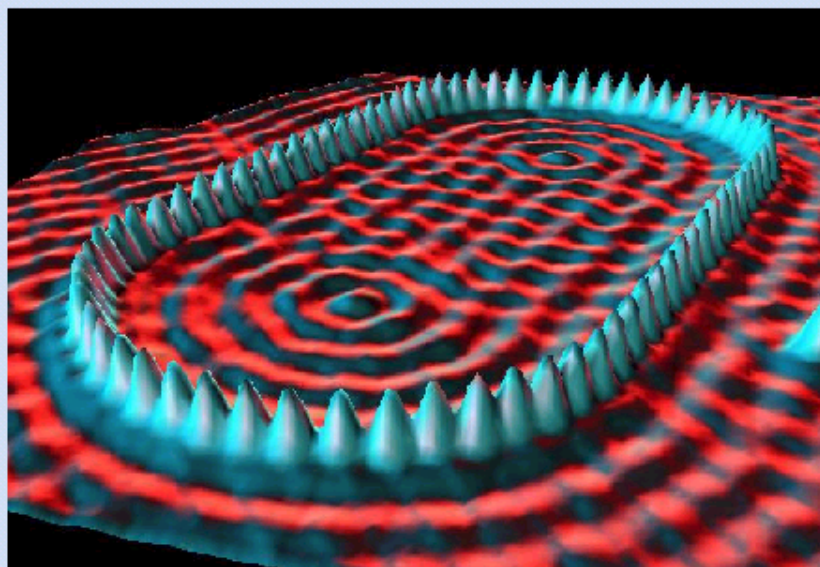
Instructors

Nanotracts

Presentations

Syllabus

Exams



IBM Corral



Done

Start

ESC24...

boces.ppt

Microsoft...

Eudora b...

Paint Sh...

P918003...

Internet

11:58 PM

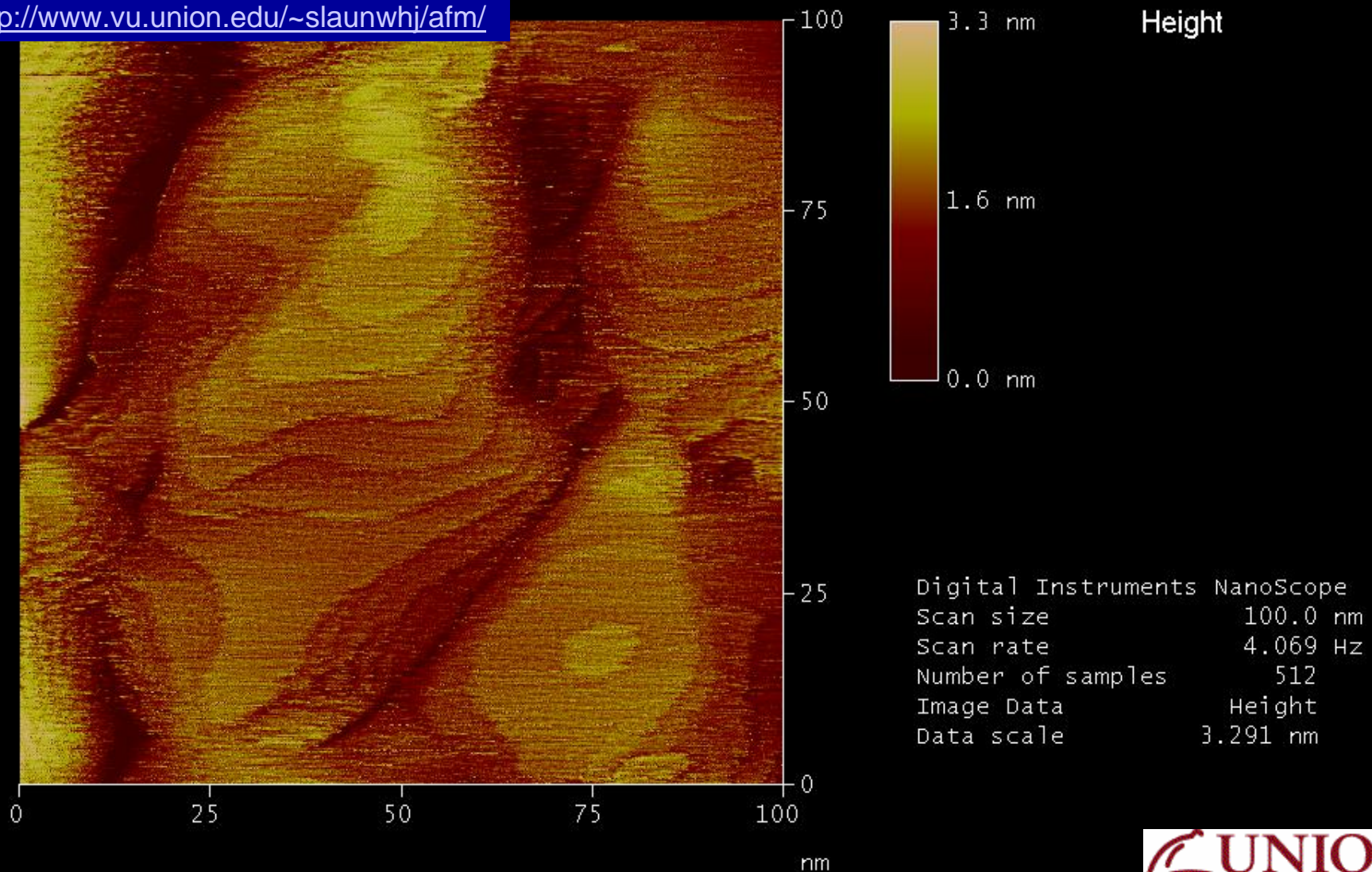
3. Undergraduate Research; Lindsey Pacuska, '03, ME; using mechanical engineering tools to measure human neural disorders.

<http://www.vu.union.edu/~pacuskal/SeniorWebPage/>



4. International collaborations: Jason Sloanwaite, '04; spent Fall 2002 in a Swedish nanotech lab.

<http://www.vu.union.edu/~slaunwhj/afm/>



4. International Collaboration: John Thompson, '03, CS Nakauvadra HS; Rakiraki, Fiji <http://fiji.union.edu/nakauvadra/>

Nakauvadra High School

[Home](#)
[Location](#)
[History](#)
[Management](#)
[Mission Statement](#)
[Staff](#)
[Department Reports](#)
[Classes](#)
[Facilities](#)
[Extra-Curricular Activities](#)



Standing: 1.Mr. Sailasa 2. Attache Teacher 3. Mr.Nilesh 4. Mr. Siraz 5. Mr. Marika 6. Mr. Rosa **Middle:** 1.Mr. Sairusi 2.Mr.Ashwin 3.Mrs.Maata 4.Miss Mere 5. Mr. Kiti 6.Mrs. Merelita 7.Mrs.Ratu 8. Mr.Nasoni
Sitting: 1.Miss. Reapi Cokanasiga (School Chaplain) 2.Mr. Bola 3.Mr.Sanjesh 4.Mr.Joeli (Vice Principal) 5.Mr.S Doge (Principal) 6.Mr.Gounder (Asst.Principal) 7.Mr.Emosi 8.Mrs.Siteri 9.Mrs.Nisha

Staff Profiles:

Principal: [Sairusi Doge](#)
V/P: [Joeli Dakuidreketi](#)
A/P: [Muneshwar Gounder](#)

[Solomoni Bolanitabua](#)

[Merewalesi Kalou](#)

[Sanjesh Kumar](#)

[Maata Vanavana Nakalevu](#)

[Merelita Bula](#)

[Emosi Kuli](#)

[Siraz Rasheed Mohammed](#)

[Marika Nakauta](#)

Project to connect Niskayuna High School students with students at Nakauvadra High School in Fiji.



5. Alumni creativity and entrepreneurship:

John Corey '79 - www.qdrive.com

Goal: Encourage area alumni to stay and start businesses here.

QDRIVE RESONANT POWER SYSTEMS

WELCOME ABOUT QDRIVE PRODUCTS APPLICATIONS TECHNOLOGY RESOURCE

What is Thermoacoustics?
Pressure Wave Generators
Coldheads
How does it all work?
Links

Welcome to Qdrive, a world leader in acoustic cryogenic... drive is a part of the Clever
Fellows Innovation Consortium (CFIC), Inc in Troy, NY.

The heart of a Qdrive product is the CFIC patented STAR™ resonant linear motor. Our TwinSTAR™ pressure wave generators (PWG) and compressors use two STAR™ motors, and are available in capacities from a 160 Watts to 15,000 Watts - the widest range in the industry. Our Qdrive™ acoustic cryocoolers combine TwinSTARs™ with thermoacoustic coldheads (Stirling-cycle pulse-tube type) for service in the 50-150 Kelvin range at capacities of 7 Watts to 1000 Watts.

Qdrive products operate wear-free for long-life and low-maintenance. All are low-vibration, low-noise, 100% environmentally safe machines. They can be configured for a wide range of cooling applications, so browse our site and contact us to learn more about us, our products, and how we can meet your cooling needs.

Pressure Wave Generator-Model 2S241W Cryocooler-Model 2S114K

UNION

Done Start boces.ppt Microsoft... Eudora b... ACDS... Paint Sh... 11:49 PM

Review of Key elements

1. Collaborations

Industry; Education; Government

2. Curricular Development

3. Research Experience

4. Cultural Awareness

5. Creativity and Entrepreneurship

The Pennsylvania training model -- www.nanofab.psu.edu

PENNSTATE



Nanofabrication Facility

[ATE Center](#)

[ATE Home](#)

[About Us](#)

[Edu. Programs](#)

[Nanotech](#)

[Careers](#)

[Monthly](#)

[Bulletin](#)

[Events](#)

[Student Info.](#)

[Nanofab Home](#)

The Pennsylvania Nanofabrication Manufacturing Technology Partnership

An NSF Advanced Technology Education (ATE) Regional Center for Nanofabrication Manufacturing Education



What is nanotechnology?

The prefix Nano in the words Nanofabrication and Nanotechnology comes from the word nanometer (nm), which is the term for one billionth of a meter. Hence these words refer to making and using "things" which are of this nanometer size range. In its broadest usage, the term nanotechnology covers making structures in the range of 1 nm to 10,000 nm. These are truly small sizes as can be realized by noting that something one nanometer in length is only about five atoms long. Nanofabrication and nanotechnology are engineering at the atomic length scale - a size range which until recently was only available to nature. Being able to engineer such small things opens the door to a multitude of new opportunities. These include making extremely fine diameter but incredibly strong fibers atom by atom, making extremely small

Selected References (in folder)

- Tech Valley Chamber news; Texans plot...
- Education and Training of the Nanotech Workforce
Fonash, Stephen J., "Education and Training of the Nanotechnology Workforce", *Journal of Nanoparticle Research*, (2001, Vol. 3, pp. 79-82).
- Mind the Gap: Science and Ethics
http://www.utoronto.ca/jcb/pdf/nanotechnology_paper.pdf
- Roundtable on Women in Science and Technology
- List of New York Capital Region Schools
- Converging Technologies at Union College
<http://www.ct.union.edu/>
- The MIT Technology Review
www.technologyreview.com

