

Micron Technology, Inc.
Manassas, Virginia



Presentation to:

HJR 25 Study Commission

Science, Math, and Technology Education
in the Commonwealth at the elementary, secondary, and
undergraduate levels

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Rev. A, 05/05



Presentation

- Introduction to Micron Technology
- Why is STEM Education Critical
- Micron's STEM Education Strategy
- Observations and Recommendations

Global Presence



Idaho



Utah



Virginia



Puerto Rico



Scotland



Italy



Singapore



Japan

Micron Products Enable the Digital World

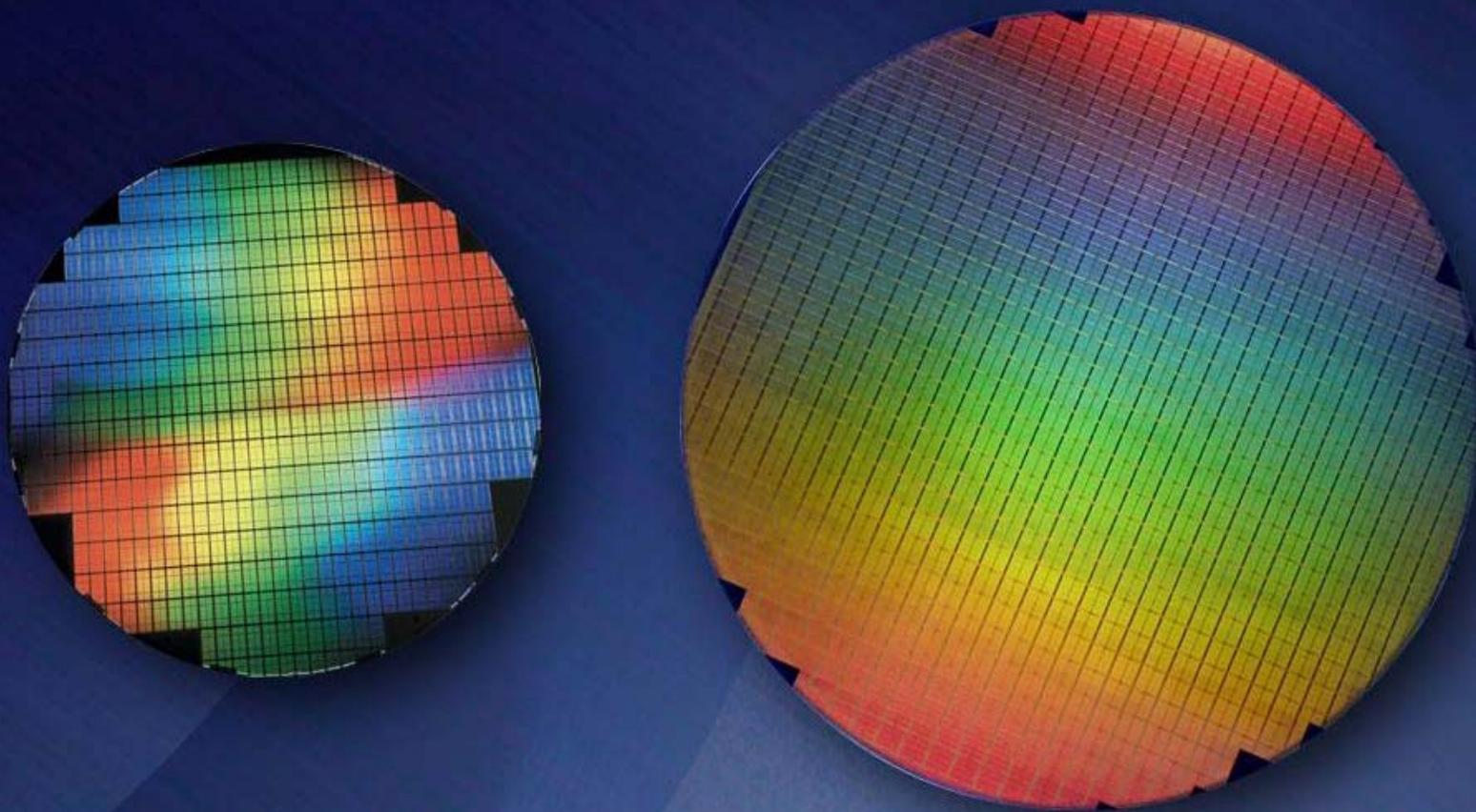


Manassas Operations



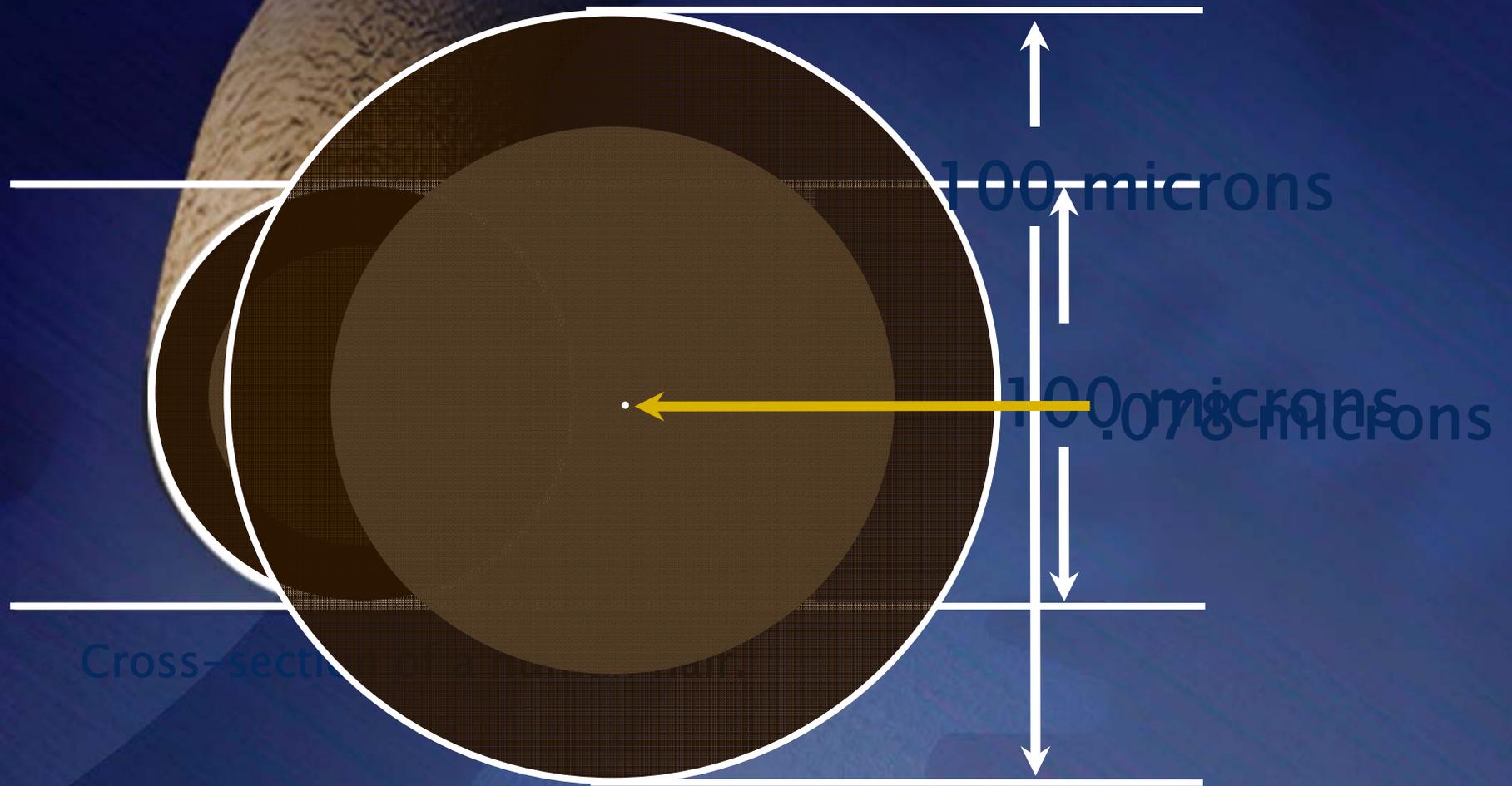
**Micron's Premiere 300mm Facility
Micron–Intel Joint Venture
R&D Efforts**

200mm (8") Wafer vs. 300mm (12") Wafer



Nanotechnology in Production

Shrinking Transistors – A Real World Comparison



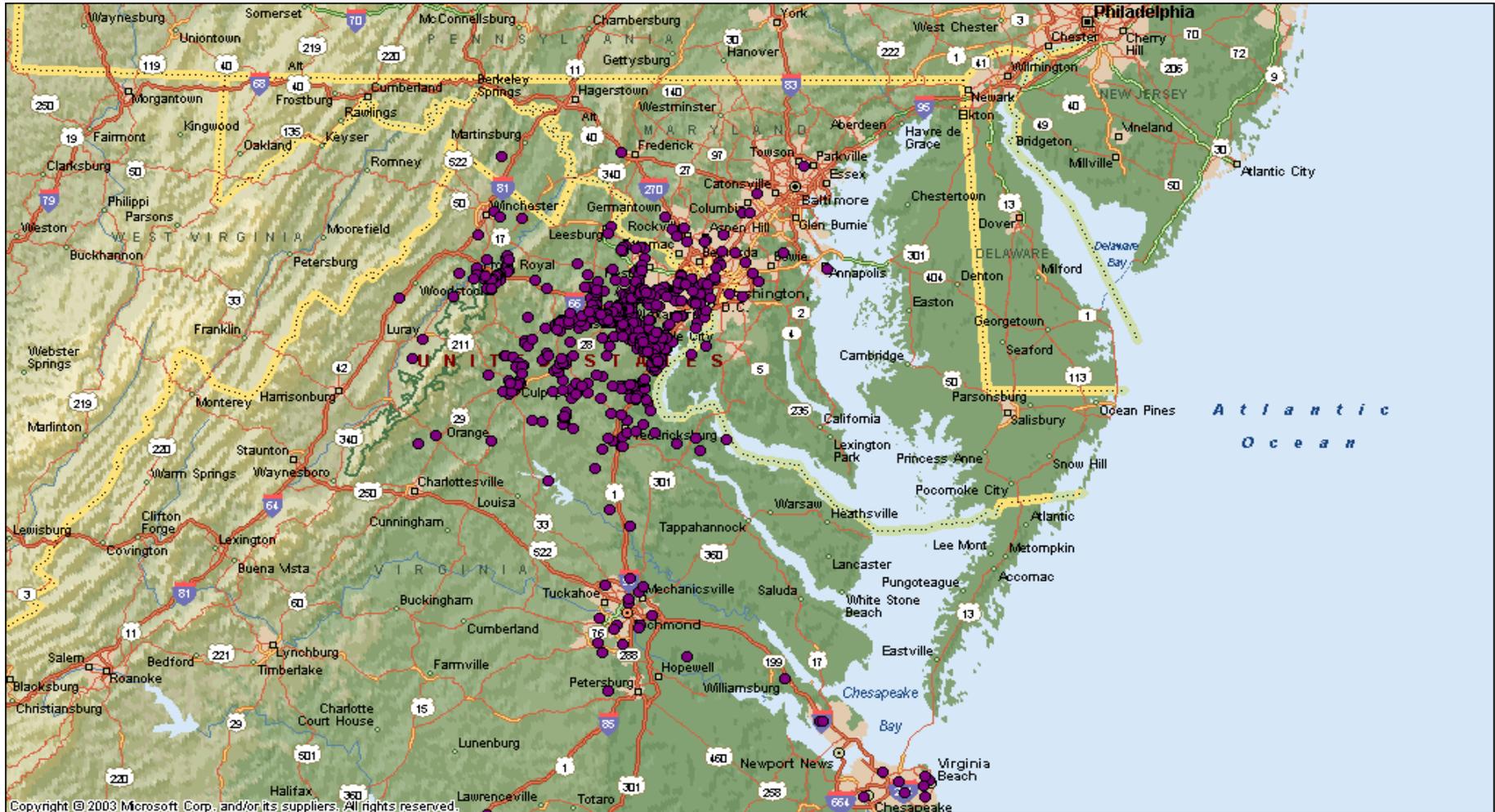
Cross-section of a human hair.



Manassas Operations

- Micron's 1st 300mm Facility
- Leading Edge Technology
- Micron Investment in MTV > \$3B (2002 – present)
- Key Site for Micron Intel Joint Venture
- Over 1,700 Employees + large number of Vendors & Contractors
 - ▶ Diversified Workforce:
 - ▶ 441 Engineers
 - ▶ 391 Technicians
 - ▶ 439 Operators
 - ▶ 326 Support positions
 - ▶ >50 Different Countries of Origin

Micron Employees Across Virginia



The New Economy in Virginia

Richmond Times-Dispatch

RICHMOND, VIRGINIA

VIRGINIA'S NEWS LEADER
A LEGAL GENERAL NEWSPAPER

SATURDAY, MARCH 25, 2006

FINAL

www.TimesDispatch.com

VIRGINIA'S CHANGING ECONOMIC LANDSCAPE

From Marlboros . . . to microchips



1997 exports

Computer chips

Cigarettes

Computer memory chips have supplanted cigarettes as state's No. 1 manufactured export

BY JEFFREY KELLEY
AND JOHN REID BLACKWELL
Times-Dispatch Staff Writers

morphi into a variety of consumer-electronics products such as portable music players, videogame consoles and mobile phones.

"This is an incredible shift," said Pat Otte, site director at Micron Technology Inc.'s semiconductor plant in Manassas. "That's 400 years of history that's changing."

Virginia sent \$643.6 million worth of chips

Chips — also known as integrated circuits or semiconductors — are the state's top manufactured export behind coal, the top export overall. Lead tobacco and aircraft parts round out the top five.

While chips have risen, the decline of coal has forced to fill a major gap left by the loss of coal's



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2005 Top 10 U.S. Patents Issued

The Story Behind the Story

Rank	Employees		Patents		Patents per 1K employees	
1	Hitachi	347,424	IBM	2,941	 82.1	
2	IBM	329,061	Canon	1,828	Matsushita	38.7
3	Fujitsu	187,000	HP	1,797	Intel	18.2
4	Toshiba	161,000	Matsushita	1,688	Canon	16.9
5	HP	151,000	Samsung	1,641	Samsung	13.3
6	Samsung	123,000	 1,561		HP	11.9
7	Canon	108,000	Intel	1,549	IBM	8.9
8	Intel	85,000	Hitachi	1,271	Toshiba	7.8
9	Matsushita	50,062	Toshiba	1,258	Fujitsu	6.1
10	 20,900		Fujitsu	1,154	Hitachi	3.6

Source: United States Patent and Trademark Office

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Patents Strength



Micron's 2005 Patent Portfolio rated the world's most valuable

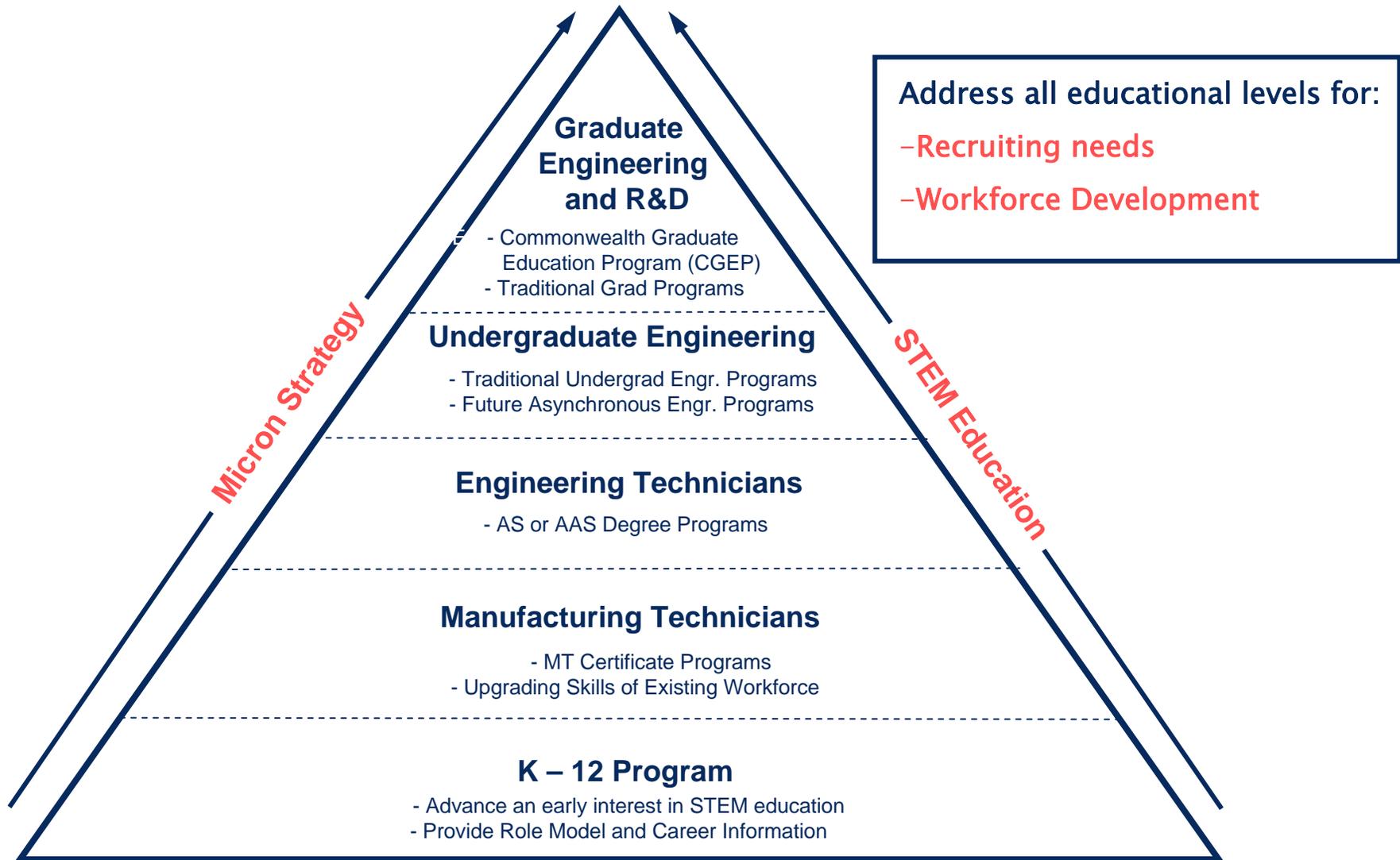
“...Micron beat out thousands of organizations, including numerical patent champ IBM, to stake a claim to having the world's most powerful patent pipeline...”

Source: IEEE Spectrum, November 2006

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Micron STEM Education Strategy



K-12 Program

- Deliver SOL based Lesson Plans to Elementary School

- ▶ Units and Measures

- K-1st grades

- ▶ Simple Machines

- 3rd grade

- ▶ Matter –

- 3rd-4th grades

- ▶ Electricity –

- 4th – 5th grade



K-12 Program

- Judge Academic/Science Competitions
- Site Visits
- Clean-the-Stream Program
- Sophomore Interview Day
- Job Fairs



K-12 Program

- **FIRST Robotics**

- ▶ Provide Engineering mentors to assist students in preparing for the FIRST competition.
- ▶ \$10,000 commitment to the high school team



K-12 Program



- Other Partnering Projects

- ▶ Donating computers to IT Specialty High School
- ▶ Science in a Box – Donated \$9,000 to PWC School system for creating 54 electricity lessons
- ▶ National Young Readers Day – read to 543 K-5 students
- ▶ Teacher Appreciation Day – 42 teachers and principals

Micron Technology Virginia K-12 Outreach

2005 – Present

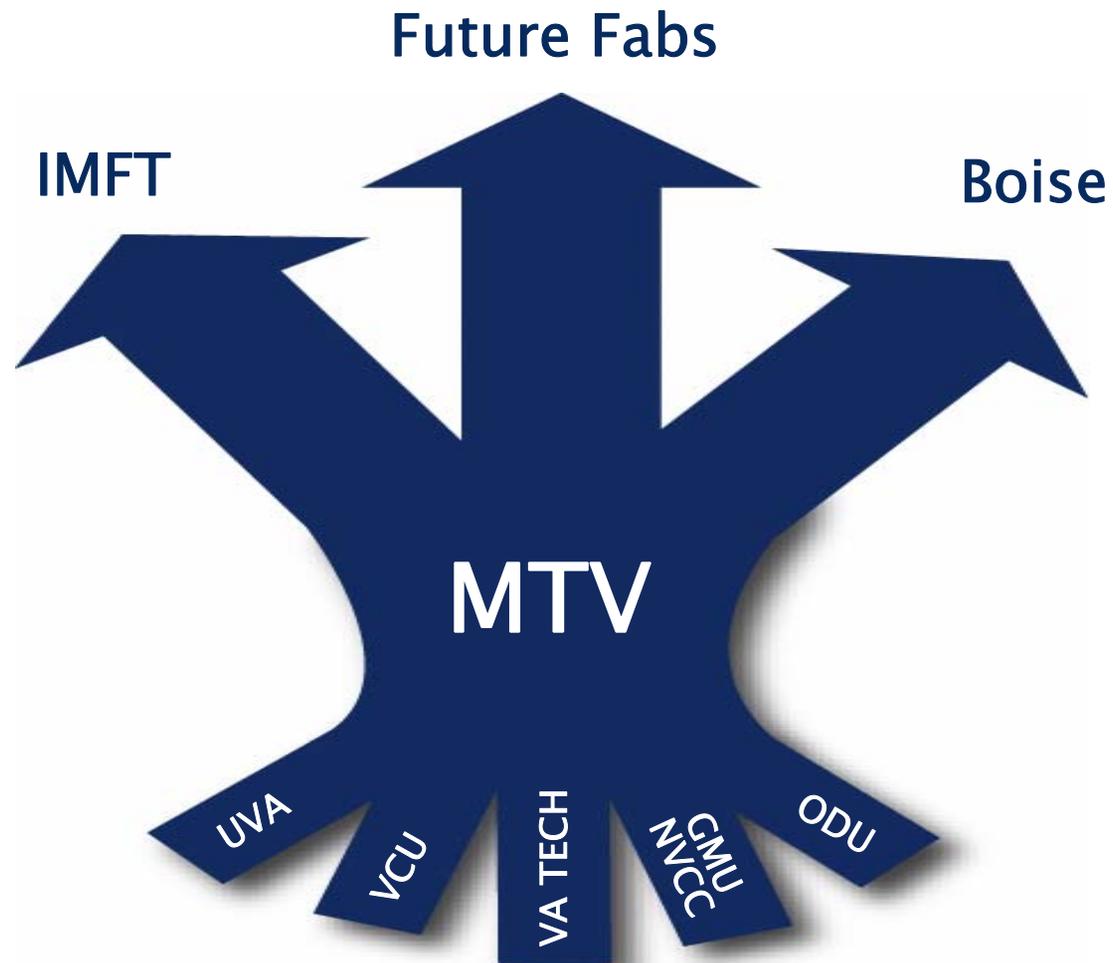
• <i>Site Visits</i>	<i>8</i>
• <i>Competitions</i>	<i>5</i>
• <i>HS Internships</i>	<i>2</i>
• <i>Career Fairs</i>	<i>10</i>
• <i>School Presentations</i>	<i>48</i>
• <i>Team Members Volunteers</i>	<i>301</i>
• <i>Students/Teachers Reached</i>	<i>4,173</i>
• <i>Schools</i>	<i>29</i>

Program Initiated November 2005 at MTV

The Micron Science and Technology Scholars Program

- Each year the Micron Foundation awards up to 13 scholarships to high school seniors pursuing a degree in a math, science, or engineering field.
- 12 **\$16,500** scholarships
- One grand prize scholarship valued at **\$55,000**.
- **Virginia** students are guaranteed **at least two scholarships**, with three additional Micron scholarships available among all eligible states (VA, ID, UT, CO, TX).
- In 2006, three Science and Technology Scholars, including the **Grand Prize winner**, were from **Virginia**.

A Pipeline of Talent to Micron

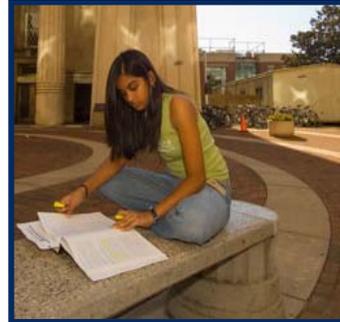


University Relationships



UNIVERSITY of VIRGINIA

- CGEP/VMEC
- Undergrad MicroE Education
- 10% desire for Masters and PhD's
- Joint R&D
- Business case Studies



VCU

- CGEP / VMEC
- Volume Hiring
- Semiconductor savvy Eng Dept
- Undergrad Education



Old Dominion UNIVERSITY

- CGEP/VMEC
- Location near to military
- MS Management



VirginiaTech

- CGEP/VMEC
- Volume Hiring
- Undergrad MicroE Education
- Internships and Co-ops
- Professorships
- Joint R&D



GEORGE MASON UNIVERSITY NVCC

- GMU/NVCC
- CGEP/VMEC
- Undergrad Education
- "Manufacturing Tech" transition
- POM Program

Funding Higher Education

- Governor Opportunity Fund (\$2M) to Micron:
 - ▶ Funding Modernization of Semiconductor Lab at VA Tech
 - ▶ Funding Technician Training Program at NVCC in partnership with GMU



Higher Education Partners

- Virginia Micro Electronics Consortium (VMEC)
- Commonwealth Graduate Engineering Program (CGEP)
- Virginia Tech
 - ▶ Ten Micron Scholars Awarded Each Year to study micro-electronics (2 years/\$10,000)
 - ▶ Funding Semiconductor Lab Modernization
 - ▶ Funding Course Development

Observations

- Micron faces significant workforce recruiting issues
 - ▶ Hiring large numbers of foreign born engineers
 - ▶ Restrictions on H1B visas
 - ▶ Entry level worker skills insufficient to meet job requirements
- Micron and other companies are performing significant K-12 outreach efforts
- Universities are also pursuing K-12 outreach programs
- K-12 outreach efforts are largely independent

United States Falling Behind

- U.S. Balance of Trade in high technology manufactured goods

1990	+ \$54B
2001	- \$50B

- Undergraduate degrees awarded in natural science or engineering by country (2004)

South Korea	38%
France	47%
China	50%
Singapore	67%
U.S.	15%

- 56% of PhDs in engineering awarded in the US are to foreign born students (2004)

- American Physical Society, Physical Review's percentage of U.S. publications

1983	61%
2004	29%

- Only four American companies ranked among top 10 corporate recipients of patents granted by the *United States* Patent and Trademark Office (2005)

Source: "Rising Above the Gathering Storm", by the National Academies Committee on Science, Engineering and Public Policy, Oct. 2005

How to fix?

- National Academies Committee on Science, Engineering and Public Policy report to Congress, October 2005:
 - ▶ **Four Recommendations with 20 specific actions:**
 - 1) 10,000 Teachers, 10 Million Minds
 - Recruit 10,000 science & math teachers yearly
 - 2) Sowing the Seeds
 - Increase federal investment in basic research 10% yearly
 - 3) Best and Brightest
 - Provide 25,000 new undergrad scholarships yearly to increase BS degrees in sciences, engineering and math
 - 4) Incentives for Innovation
 - Enhance IP protection for the global economy

Source: “Rising Above the Gathering Storm”, by the National Academies Committee on Science, Engineering and Public Policy, Oct. 2005 – report can be reviewed at www.nationalacademies.org/cosepup

Recommendations

- Companies and Universities cannot solve this problem alone
 - ▶ Recommend a Commonwealth-wide workshop with key stakeholders to:
 - Define Best Practices
 - Explore collaborative efforts
 - ▶ The JCOTS Nanotechnology Advisory Committees have recommended the same action to the JCOTS Commission
- The Commonwealth of Virginia cannot solve this problem alone
 - ▶ Recommend that the HJR25 Study Commission create Commonwealth actions that dovetail with the National Academies' recommendations established in the Rising Above the Gathering Storm report

The background of the slide features a complex, repeating pattern of microscopic structures, likely biological cells or fibers, rendered in a light blue color against a darker blue background. This pattern is most prominent in the central horizontal band.

Micron[®]