

Life Sciences in Virginia

Presentation to:

BioIT Coalition

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Summary

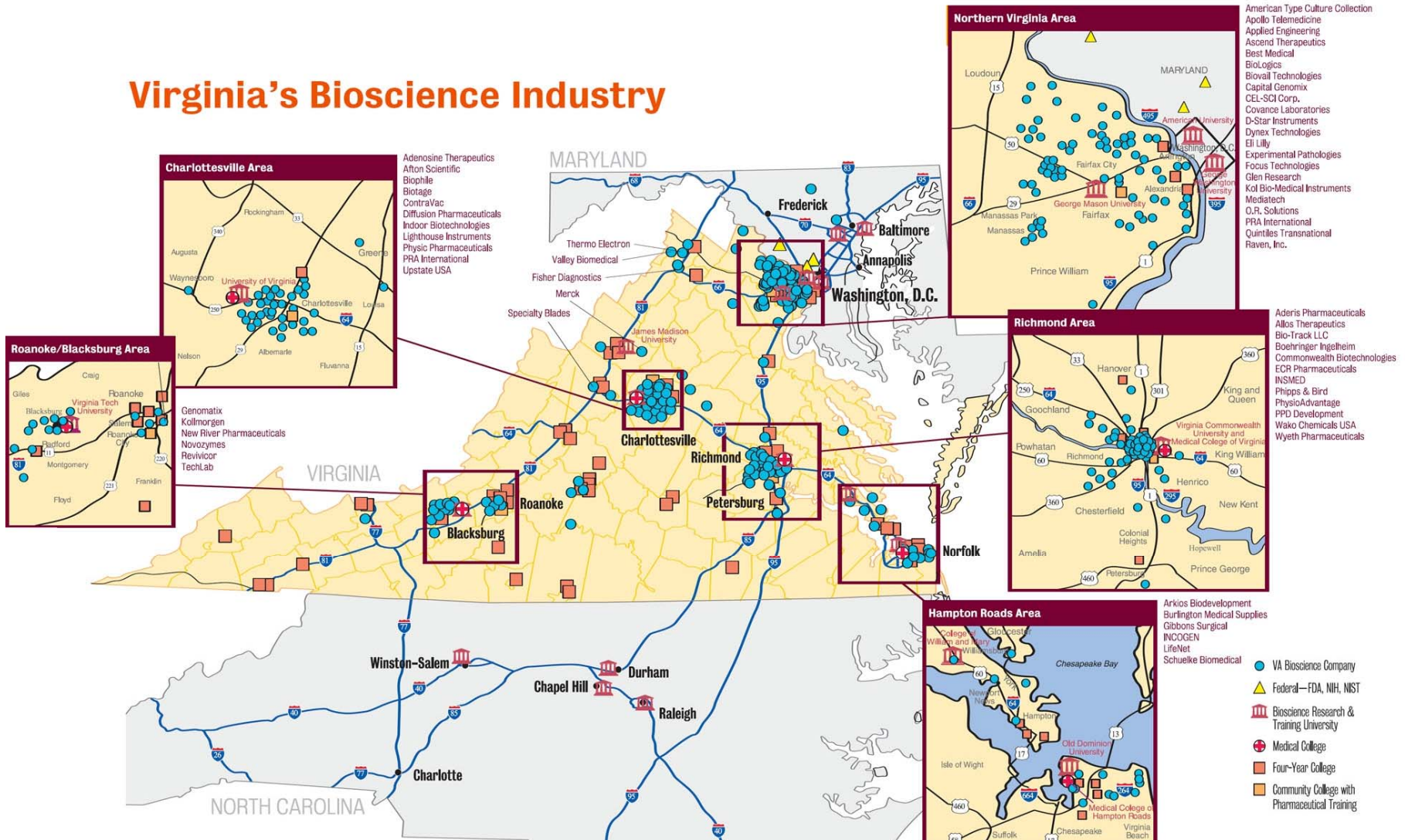
- Virginia Life Sciences Overview
- Virginia Life Sciences Industry
- Virginia LS Research Assets
- Virginia LS Support Activities
- Competitive Position
- SmartBio™ focus
- CIT's GAP BioLife Fund

Overview: Virginia Life Sciences

- Strong and diverse life sciences sector
- Expanding R&D Infrastructure (federal, research parks, non-profit R&D institutes)
- Strong Education/Workforce Development
- State Commitment/Support for biosciences
- Focus on SmartBio™
- Telemedicine efforts to remote areas

Virginia's Bioscience Industry (from VEDDP)

Virginia's Bioscience Industry



Sample Bioscience Firms/Institutes

- Abbott (Ross Products)
- American Type Culture Collection
- Barr Laboratories
- Biotage AB
- Biovail Technologies
- Boehringer-Ingelheim
- Commonwealth Biotechnologies
- Covance Laboratories, Inc.
- EPL, Inc.
- Fisher Scientific
- Genetics and IVF Institute
- Incogen, Inc.
- INSMED, Inc.
- LifeNet
- Mediatech, Inc.
- Merck & Co., Inc.
- New River Pharmaceuticals
- Novozymes Biologicals, Inc.
- Philip Morris USA
- PRA International
- Quintiles Transnational
- Revivicor, Inc.
- Wako Chemicals USA, Inc.
- Wyeth Consumer Healthcare
- Wyeth Pharmaceuticals

Major Bioscience Investments 1995-2007

Company	Location	Investment (\$M)
Boehringer Ingelheim	Petersburg	\$332
Eli Lilly & Company	Prince William County	\$425
Howard Hughes Medical Institute	Loudoun County	\$500
Abbott Labs/Ross Products	Campbell County	\$29
Fisher Scientific	Frederick County	\$30
Novozymes Biologicals	Roanoke County	\$12
Wyeth Consumer Healthcare	Richmond	\$80
BioVail Technologies	Fairfax & Loudoun County	\$14
Barr Laboratories	Bedford County	\$27
Merck & Company	Elkton	\$220
MediaTech Inc.	Prince William County	\$10
Philip Morris USA	Richmond	\$300
SRI International	Rockingham County	>\$30

Recent Large R&D Investments

**Howard Hughes Medical Institute
Janelia Farms Campus, Loudoun**
\$500M Opened 2006, 300 scientists



**Philip Morris USA Research &
Technology Center, Richmond**
\$300M. Open 2007, 500 R&D jobs



SRI International, Shenandoah Valley/Harrisonburg
December 2006 announced new SRI Center for Advanced
Drug Research. New facility by 2009. 140 jobs, over 100
R&D positions by 2012.

Virginia's Bioscience Research Universities

- **University of Virginia, Charlottesville**
 - Biomedical Engineering/Coulter Translational Research Partnership
 - Medical Automation Research Center
 - Regenerative Medicine, Healthy Aging initiatives
- **Virginia Tech, Blacksburg**
 - Virginia Bioinformatics Institute
 - Fralin Biotechnology Center
 - Virginia-Maryland Regional College of Veterinary Medicine
- **Virginia Commonwealth University, Richmond**
 - Medical College of Virginia
 - VCU Life Sciences cross-disciplinary initiative
 - Massey Cancer Center
 - School of Pharmacy/Institute for Structural Biology and Drug Discovery
- **Eastern Virginia Medical School, Norfolk**
 - The Jones Institute for Reproductive Medicine
 - Strelitz Diabetes Institutes
 - Center for Collaboration in Medical Modeling and Simulation (w/ODU)

Virginia's Bioscience Research Universities

- **George Mason University, Fairfax & Manassas**
 - National Center for Biodefense and Infectious Disease
 - Center for Biomedical Genomics
 - Center for Applied Proteomics and Molecular Medicine
 - Krasnow Institute for Advanced Study
- **Old Dominion University, Norfolk**
 - Center for Biotechnology
 - Frank Reidy Research Center for Bioelectrics
- **College of William and Mary, Williamsburg**
 - School of Marine Sciences/Virginia Institute of Marine Science
- **James Madison University, Harrisonburg**
 - Biomanufacturing Laboratory and Training Facility
 - Collaborations w/USAMRIID, SRI CADRE

Bioscience R&D/Incubator Facilities

- Virginia Biotechnology Research Park/Virginia Biosciences Development Center, Richmond
- UVA Research Parks, Charlottesville
- VT Corporate Research Center, Blacksburg
- Carilion Biomedical Institute/Riverside Center, Roanoke
- INNOVATION@Prince William Technology Park
- BioAccelerator, Fairfax
- Riverstone Technology Park, Halifax County
- Innovation Research Park@ODU, Norfolk

Representative Life Science Start-Ups

- Adenosine Therapeutics, Charlottesville, VA
- Diffusion Pharmaceuticals, Charlottesville, VA
- EyeRx, Norfolk, VA
- Global Cell Solutions, Charlottesville, VA
- Incogen, Williamsburg, VA
- Intelliject – Richmond, VA
- Living MicroSystems – Richmond, VA
- Shire (New River Pharmaceuticals) – Roanoke
- Tau Therapeutics – Charlottesville, VA

Education/Workforce

- **Universities & Colleges** – 14th in US higher ed degrees in life sciences
- **Community Colleges** – 2004 biotech strategic plan with industry. Region-specific emphases (e.g. NVCC –NoVaHealthFORCE)
- **K-12 Outreach** –
 - Virginia Tech’s Fralin Biotech Center sponsors “Biotech-in-a-Box” equipment/materials to high schools, professional development for high-school/college educators
 - HHMI \$1M for Loudoun biotech magnet program, scholarships, summer science academy
- **Virginia Council on Advanced Technology Skills**
 - Dec 2006 \$1.5M DOL grant
 - Industry/ed. partnership co-led by VaBIO, Va. Manufacturing Assn
 - design/validation of training/certification of advanced tech workers

Supporting Organizations

- **Virginia Biotechnology Association (VaBIO)** – over 220 members, trade association, public policy, finances, workforce
- **Center for Innovative Technology (CIT)** – technology development, commercialization, early stage funding, identification and assimilation
- **Virginia Economic Development Partnership** – recruiting key bioscience investments
- **Virginia Department of Business Assistance**
- **Virginia Community College system**

Virginia's Competitive Position in US

Growing the Nation's Bioscience Sector: State Bioscience Initiatives 2006

Prepared for:
BIO—Biotechnology Industry Organization

Prepared by:
**Battelle Technology Partnership Practice
and SSTI**

April 2006

BIO
SCIENCE
06



State Trends in Life Sciences

- All states targeting biosciences, often specific niches, including agricultural, industrial and environmental in addition to health
- Addressing elements key to growth for all technology sectors: technology/talent, education/workforce, and financial capital
- Biosciences are changing traditional economic development approaches:
 - Attracting research anchors (e.g. Scripps, HHMI)
 - Engaging regional philanthropic leadership
 - Focusing discretionary funding (21 states used 2.3% of tobacco settlement dollars for health research in 2003)
- Key challenges for all states:
 - Skilled, well-educated workers
 - Translation of research from “bench-to-bedside”

Source: Batelle/BIO/SSTI reports, 2004, 2006

Virginia's Rankings in U.S.

- Total R&D Expenditures (FY2005): 14th (\$914M)
- Life Sciences R&D Expenditures (FY2005): 17th (\$474M)
- US Patent Applications (FY2005): 9th (374)
- Technology Licenses/Options Executed (FY2005) 16th (116)

- BioScience Industry
 - 200+ life science companies (2004) 23rd

- LS Higher Education Degrees (AY2004): 14th (2444)
- BioScience occupations in workforce (2004): 20th (11,060)

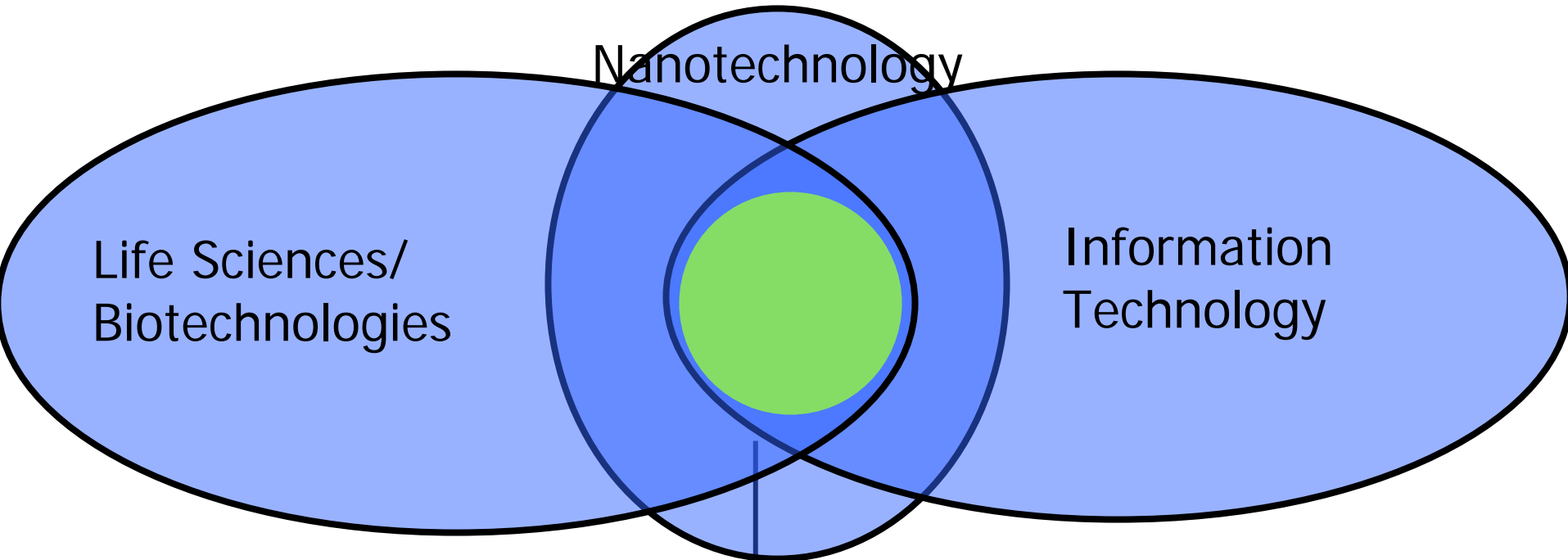
- IT Industry
 - number of IT workers (2005) 5th (261,000)
 - Rate of tech job growth (2004-5) 2nd (3.0%)

(Sources: NSF; Batelle/BIO, 2006; SSTI/AUTM 2007; VaBIO; AeA “CyberStates 2007”)

CIT's Mission:

*Accelerate Next Generation of
Technologies and
Technology Companies*

SmartBio™



SmartBio™ = Research + Commercialization

- Better understand complex living systems
- Develop "Smart" practical applications

Why a VA Focus on SmartBio™?

“The 21st Century has embarked upon a scientific and technology revolution in the life sciences that could match the transportation, mass manufacturing, electronics and computer revolutions of the previous century.”

International Data Corp, March 2002

- Applications and markets in “4P healthcare”, food production, public safety and environmental stewardship
- Growing Industry: Revenues, Jobs, Investment
- Growing private and public R&D investment
- Significant strengths/investments in Virginia



The “Plain People”

The Clinic for Special Children



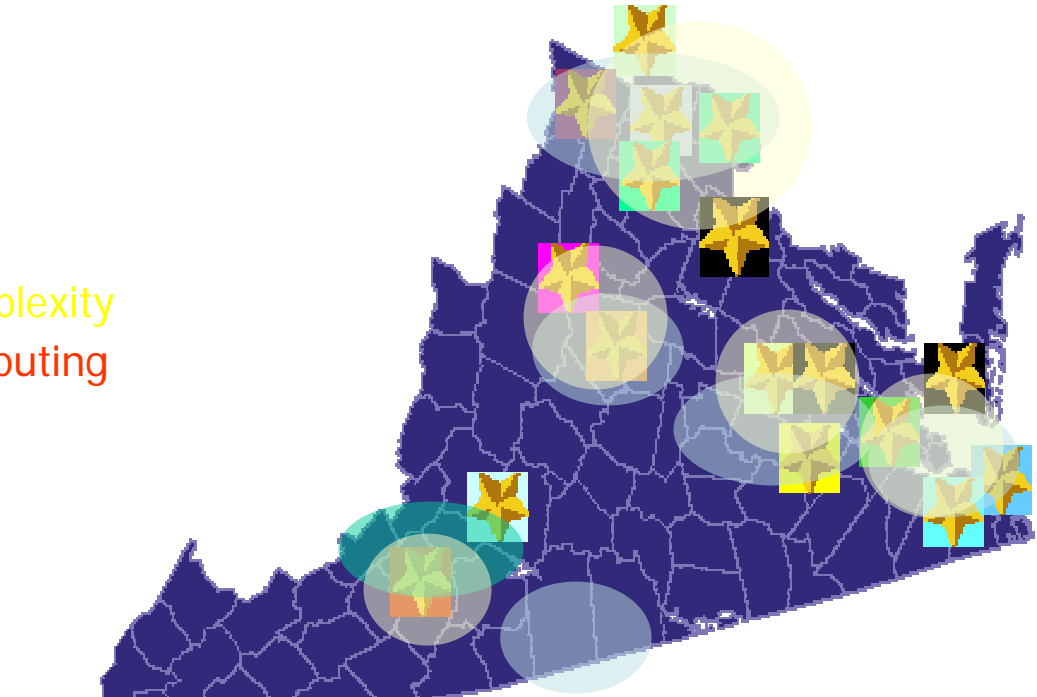
Virginia Strengths = SmartBio™ Requirements

ACADEMIC:

EVMS Biomedical Proteomics
GMU Biodefense; Bioinformatics
JMU Information Security
ODU Modeling and Simulation
SU/GWU Pharmacogenomics
UVA Computational Biology
VCU Life Sciences, Biological Complexity
VT Bioinformatics, Terascale Computing
W&M Computational Biology

NON-PROFIT/GOVERNMENT:

American Type Culture Collection
Carilion Biomedical Institute
FBI Labs Quantico
Howard Hughes Medical Inst. Janelia Farm
Thomas Jefferson National Lab
UNOS
VA Consolidated Labs, Forensic Science



INDUSTRY CONCENTRATIONS:

Biotech/HealthCare

Information Technology

VA SmartBio™

Workforce/Education

“One of the major limitations to the future expansion of bioinformatics... a lack of trained personnel in this interdisciplinary field”

- GMU – MS, PhD Bioinformatics, Computational Bio
- JMU – Biotechnology, Information Security
- NVCC– Health Informatics Training
- SU/GWU – Pharmacogenomics
- UVA – PhD Computational Biology
- VCU - BS, MS, PSM Bioinformatics, PhD Integrative Life Sciences
- VT – PhD Genetics, Bioinformatics, & Computational Biology

Actions

- Support Ongoing SmartBio-related Assets and Activities
 - Research in Universities
 - Commercialization Support Activities
 - Business Environment for Innovation-Based Industry
 - Education/Workforce Initiatives in Universities, Community Colleges, and K-12
- Heed Recommendations of Biotechnology Commission
- Use Info Resources (e.g. CIT, VRTAC, VaBIO, BioIT Coalition)
- Like “Plain People”, think “out of the box”
 - Use existing skills/assets to generate funds
 - Use existing/new collaborations to maximize impact of current funds, and maximize leverage for new funding
- Seize the opportunity to lead in SmartBio!

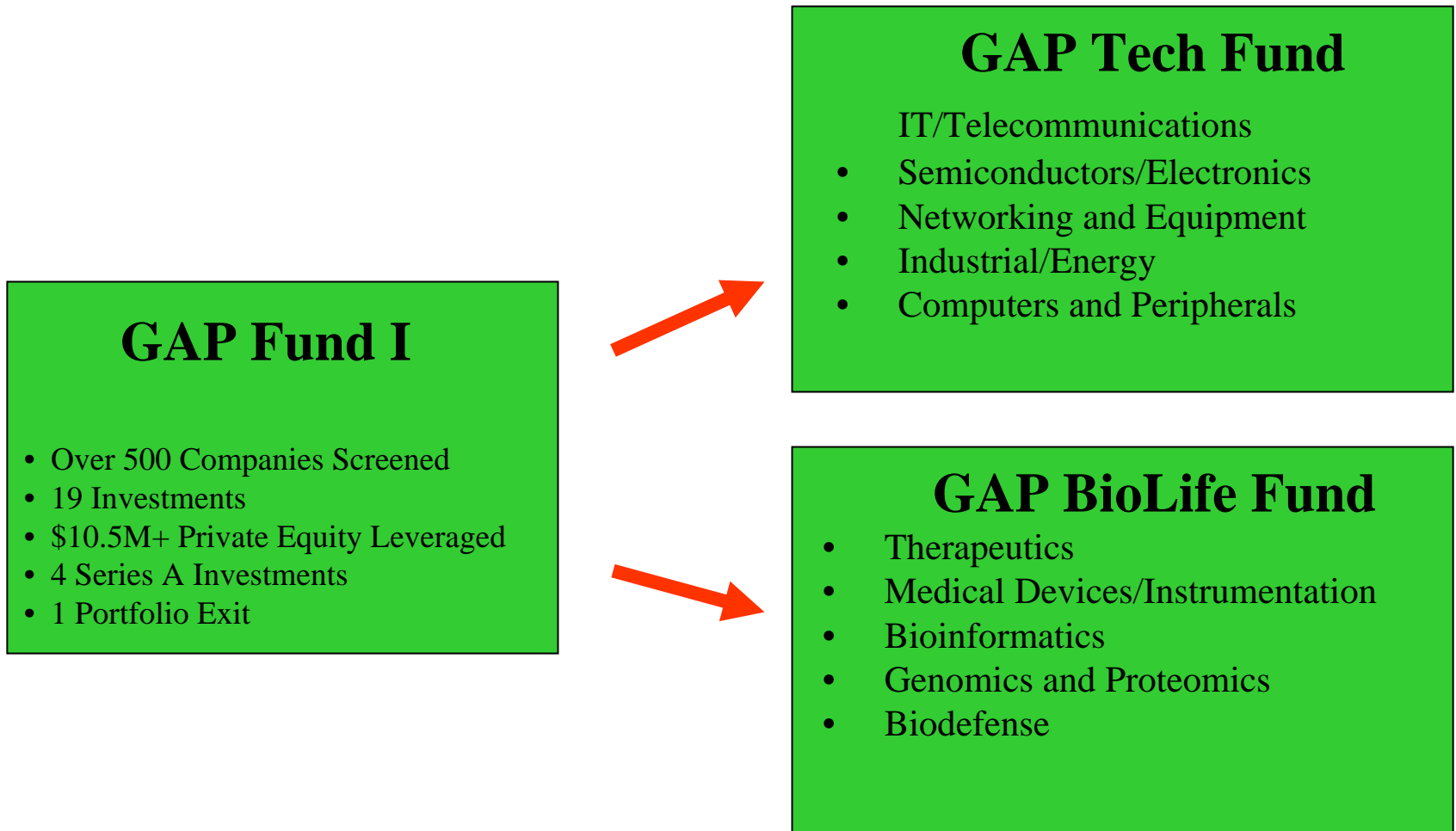
Early-Stage Investment in Virginia

- NIH SBIR/STTR Funding, 2001 - 2004
 - \$67.8M awarded
 - 277 Awards
 - 77 Companies
- Venture Funding, 2001 – 2005
 - \$216.3M +
 - 45 Deals
 - 23 Companies
 - Selected VCs: Rho Ventures, Kline Hawkes & Co., Grotech Capital Group, Novartis Venture Fund, Essex Woodlands Health Ventures, Johnson & Johnson Development, New Enterprise Associates, Venrock Associates, Intersouth Partners, Mayfair Capital Partners, Boston Millennia Partners

GAP Fund Mission

Address the Commonwealth's funding gap for very early stage technology companies by providing critical pre-seed and seed level capital necessary to move Virginia's most promising and high-potential technologies from the proof-of-concept stage to the marketplace.

CIT GAP FUNDS EVOLUTION

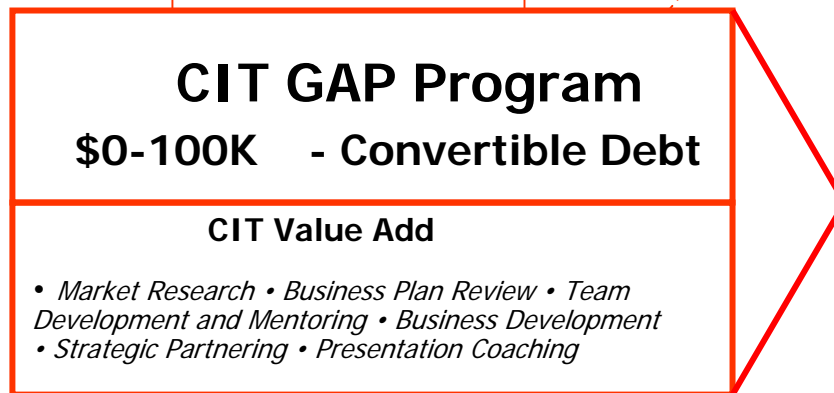
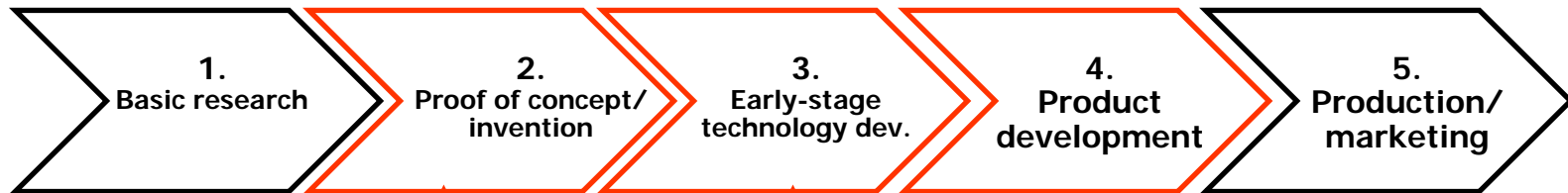


Vintage 2004: Fully-Deployed

2Q07

CIT GAP Program

Stages of development



Angel or
Series "A"
Financing

INVESTMENT CRITERIA

Management Team / Founder

- ✓ Full-Time Commitment
- ✓ Integrity
- ✓ Passion
- ✓ Coach-ability
- ✓ Creativity
- ✓ Record of High Achievement

Investment Stage

- ✓ Exclusive Seed Stage Focus
- ✓ 12-36 Months Prior to Series-A
- ✓ Pre-prototype – Pre-Launch Technologies

Investment Range

- ✓ ≤ \$100K Alone; <\$500K Syndication
- ✓ ≤ \$500K Previous Financing
- ✓ Follow-On Investment Option

Proprietary Advantage

- ✓ Unique Technology
- ✓ Defensible IP Position
- ✓ Difficult-to-Replicate Business Model

Scalability

- ✓ Markets with Big Buying Power
- ✓ Potential for Dominant Market Position
- ✓ Large-Scale Production and Delivery Economies

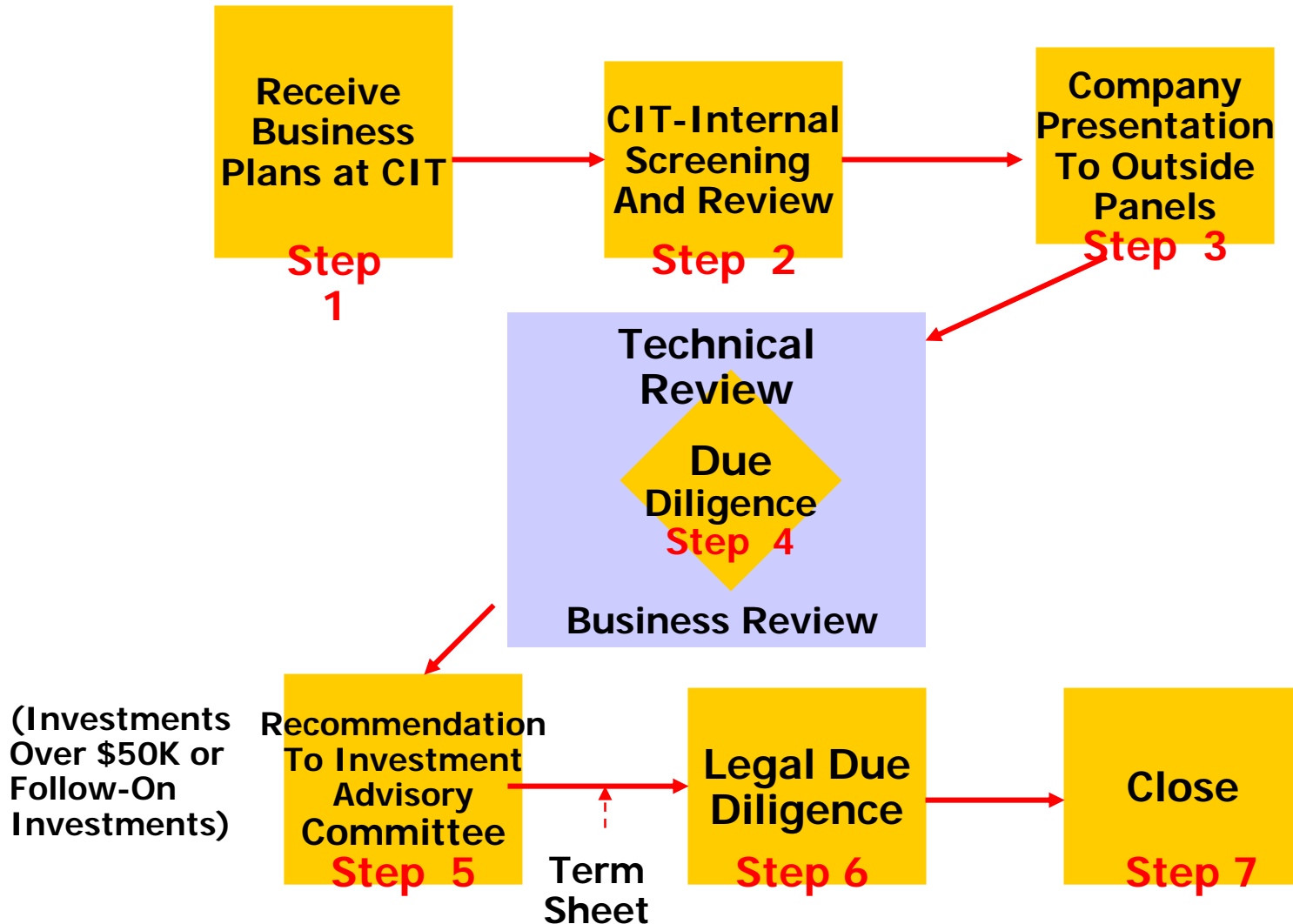
Industries

- ✓ Technology
- ✓ BioLife

Geographic Focus

- ✓ Virginia-Only

CIT Investment Process



INVESTMENT TEAM

Tom Weithman – Managing Director, CIT GAP Funds

- 25+ Years Experience in IT and Software Company Operations and Venture Investing
- Track Record: IBM, Hughes Electronics, Consultant to Numerous Start-Ups

Bill Watson – Investment Director, GAP Tech Fund

- 15+ Operations and Product Development Experience in Electronics, Software, and Materials Sectors
- Track Record: Orbital Sciences, BF Goodrich Aerospace, Allied Signal

Melissa Bradley – Investment Director, GAP Tech Fund

- 15+ Years Experience as Entrepreneur, Angel Investor, and Fund Manager
- Track Record: UBS, New Capitalist

Erika Smith – Venture Advisor, GAP BioLife Fund

- 15+ Years Management and Technical Experience in Life Science Sectors
- Track Record: Palatine Consulting, Boston Scientific, Pittsburgh Greenhouse
-

Marco Rubin – Venture Advisor, CIT GAP Funds

- 25+ Years in Technology Consulting, Venture Capital, and Corporate Venture
- Track Record: Exoventure, Monumental Venture Partners, MCI New Ventures, Booz Allen

Jennifer O’Daniel – Investment Analyst

- 7+ Years Experience in Business Planning and Investment Analysis
- Track Record: Virginia Tech Business Technology Center, SVIT Holding Co.

INVESTMENT COMMITTEE

- New Enterprise Associates
- Intersouth Partners
- HIG Ventures
- Johnson & Johnson
- Tall Oaks Capital
- Carilion Biomedical Institute
- Valhalla Venture Partners
- New Vantage Associates
- Cashed-Out Entrepreneurs

GAP Fund Takeaways

- Feeder Fund with Exceptional Deal Flow
- Unique Sources of Company Creation
- Professional, Rigorous Diligence Process
- Creative Approach to Start-Up Funding
- Viewed as a Desired Partner by Entrepreneurs
- Solid Commitment to Investment Community

Sample of Funding and Life Science Supporting Organizations

- VaBio (<http://www.vabio.org/>)
- Mid-Atlantic Venture Association (Mava.org)
- BioIT Coalition (<http://www.bioitcoalition.org>)
- Business Alliance Grubstake (<http://www.businessalliance.org>)
- Loudoun County Science and Technology Cabinet
- Northern Virginia Technology Council (NVTC)
<http://www.nvtc.org/index.php>
- Healthtechnet.org
- Early Stage East (www.earlystageeast.org)
- Southeastern BIO Investor Forum
(<http://www.sebio.org/investorforum/2007/index.asp>)
- AdvaMed (<http://www.advamed2007.com/>)
- Virginia Venture Calendar (in packet)

For Participation in the GAP BioLife Fund:

Please contact:

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Also, visit the website at:

www.citgapfund.org

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