VCU

VIRGINIA COMMONWEALTH UNIVERSITY

School of Engineering

GO VIRGINIA

Barbara D. Boyan, PhD

Dean and Alice T. and William H. Goodwin Chair

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Engineering and Economic Development

- **Engineering bridges scientific advances into technical capabilities and workforce development that are essential to drive sustainable economic growth.**
- **US capacity and capability to maintain globally-competitive standing is constantly challenged.**

We are building processes to accelerate innovation and improve commercialization success

while

Educating students and attracting leaders to the region.

Partnerships are Essential

- **Support Basic Research**

  Need effective Government – Academic – Industry collaboration.

- **Affect Translational Research Success**

  Must increase level of industry- sponsored research for effective commercialization.

- **Build Competitive Infrastructure**

  Share across all sectors.

Workforce education & development required across society.

Case Study: Pharmaceutical Engineering

- Healthcare is 18% of US GDP; pharmaceuticals are an ever increasing proportion.
- U.S. leads in clinical development, but has outsourced most value-added manufacturing.
- Opportunities exist to radically change how drugs are manufactured, distributed and used.

REDUCE COST, IMPROVE ACCESS, IMPROVE EFFECTIVENESS

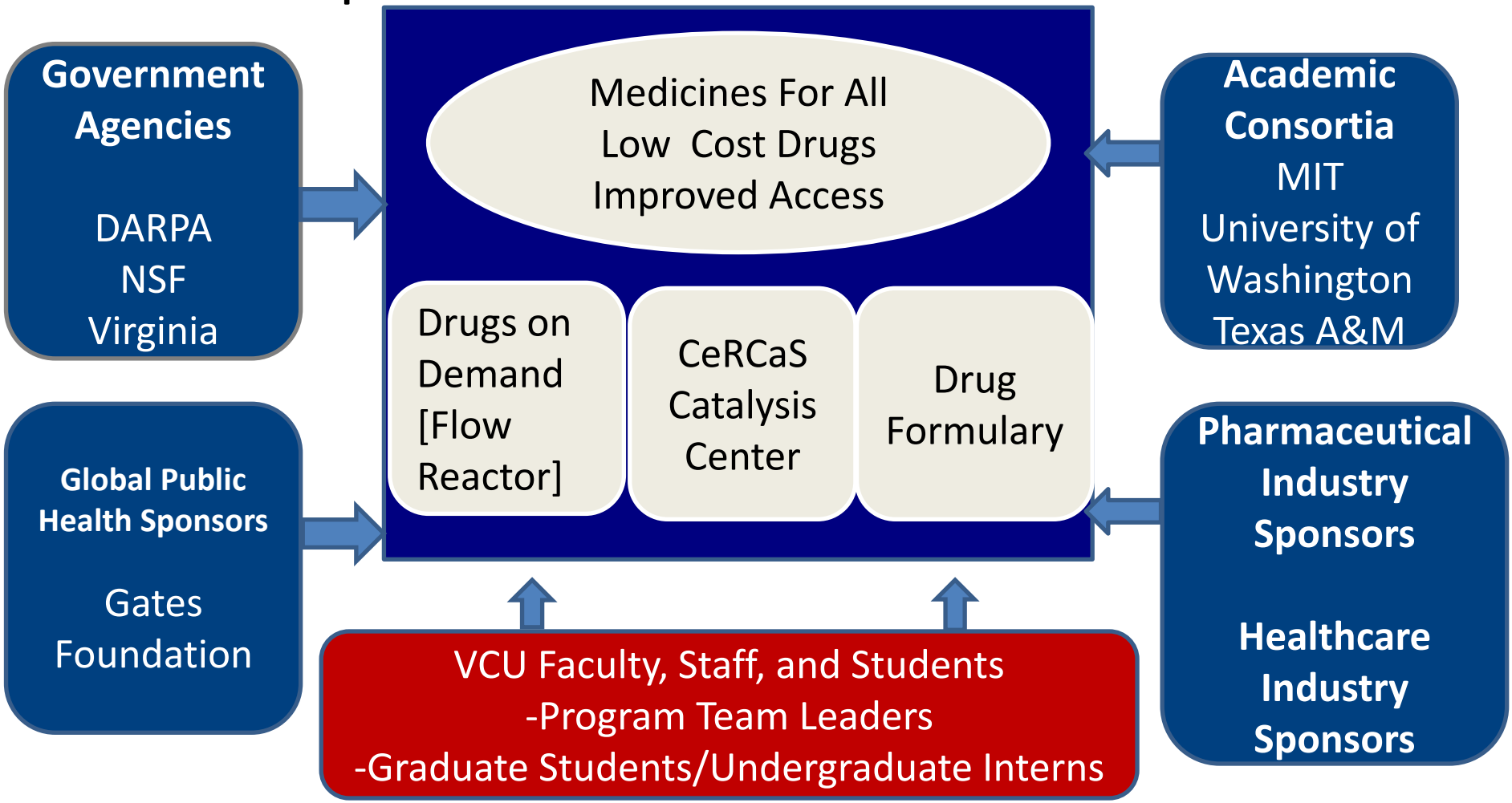
Pharmaceutical Engineering Driving Economic Growth

- **Opportunity to be the best, not just first**
- **Rapid, demonstrated success**
  - Great partnerships
  - Great Infrastructure
- **Projects underway**
  - Bill and Melinda Gates Foundation “Optimization Programs”
  - DARPA: Drugs on Demand
  - NSF IUCRC on Catalysis
  - Industry Projects
  - Additive Manufacturing Opportunities
  - New Enabling Technologies (Catalysts, Sensors)

This Program Did Not Exist Three Years Ago

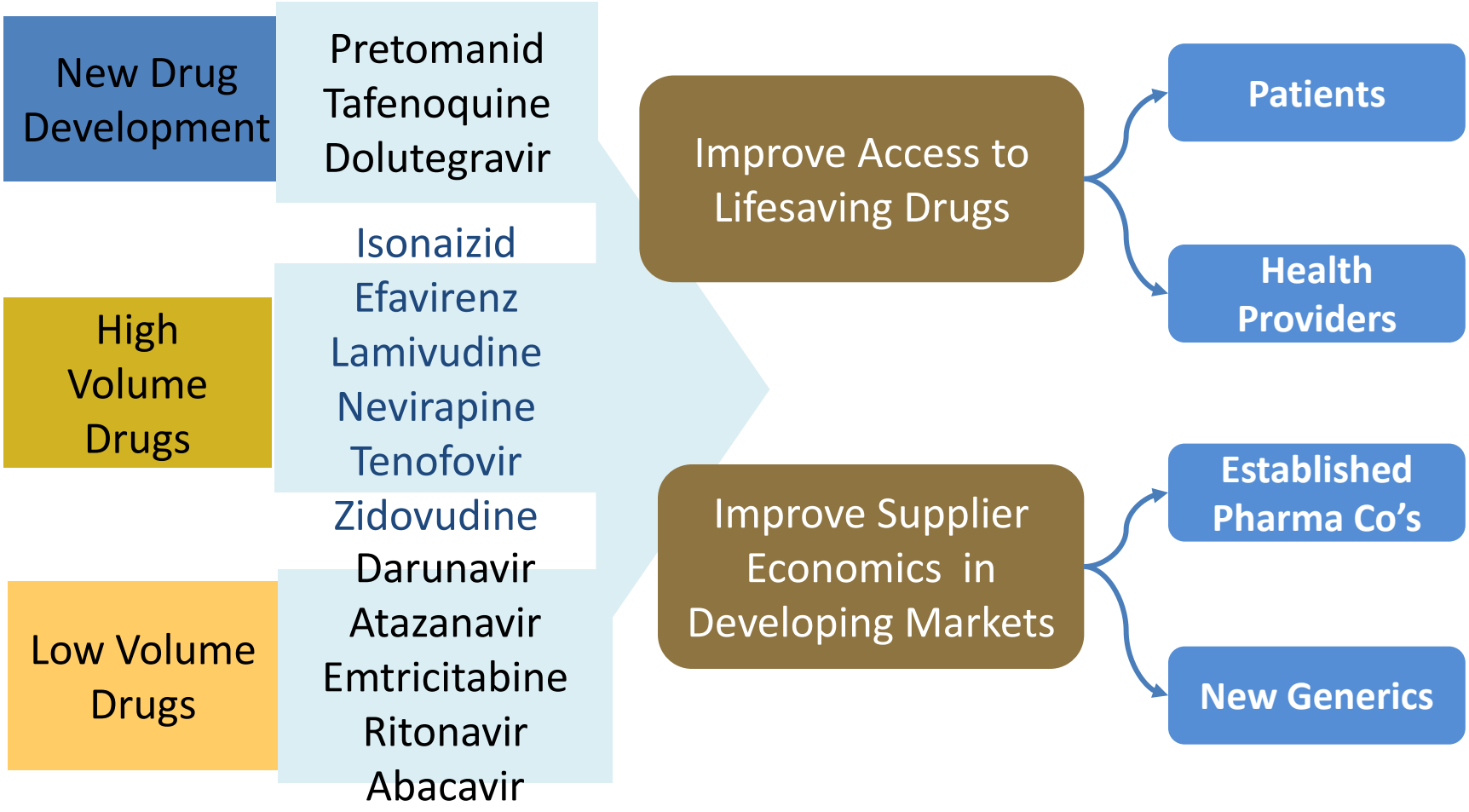
VCU Pharmaceutical Engineering

Chairman and Founder: Dr. Frank Gupton
Director: Dr. Tom Roper



Gates Foundation Program

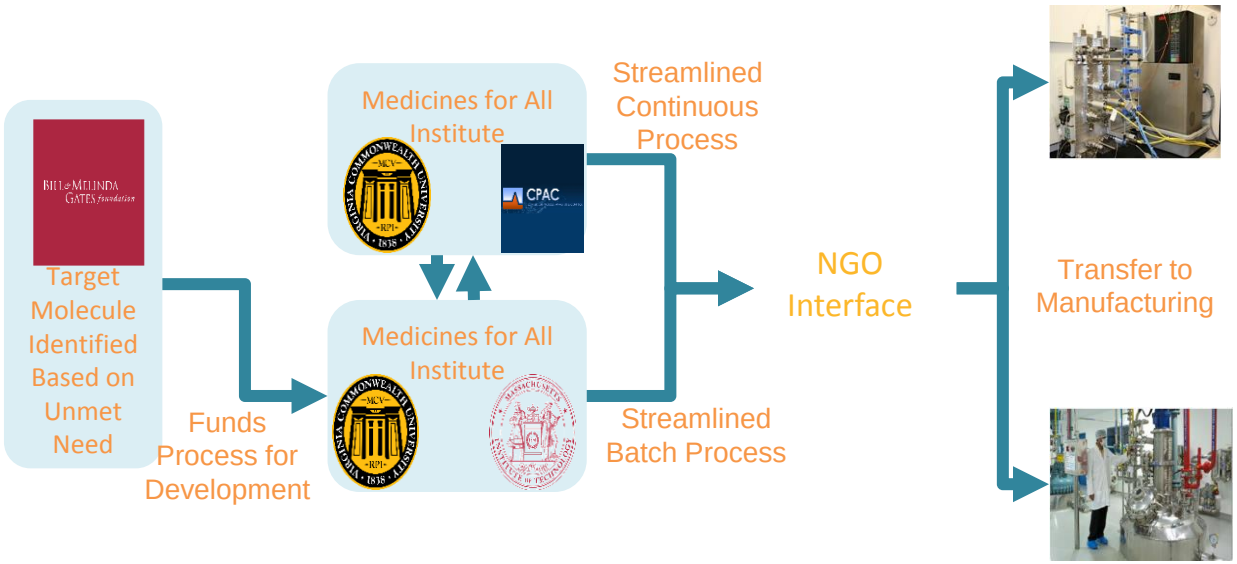
Specific High-Value Deliverables: Optimize Manufacturing Processes to Improve Patient Access; Provide Value for Multiple Stakeholders.



“Medicines For All” Inter-relationships

Leverages organizational competencies to ensure benefits are realized through the supply chain and distribution to patients.

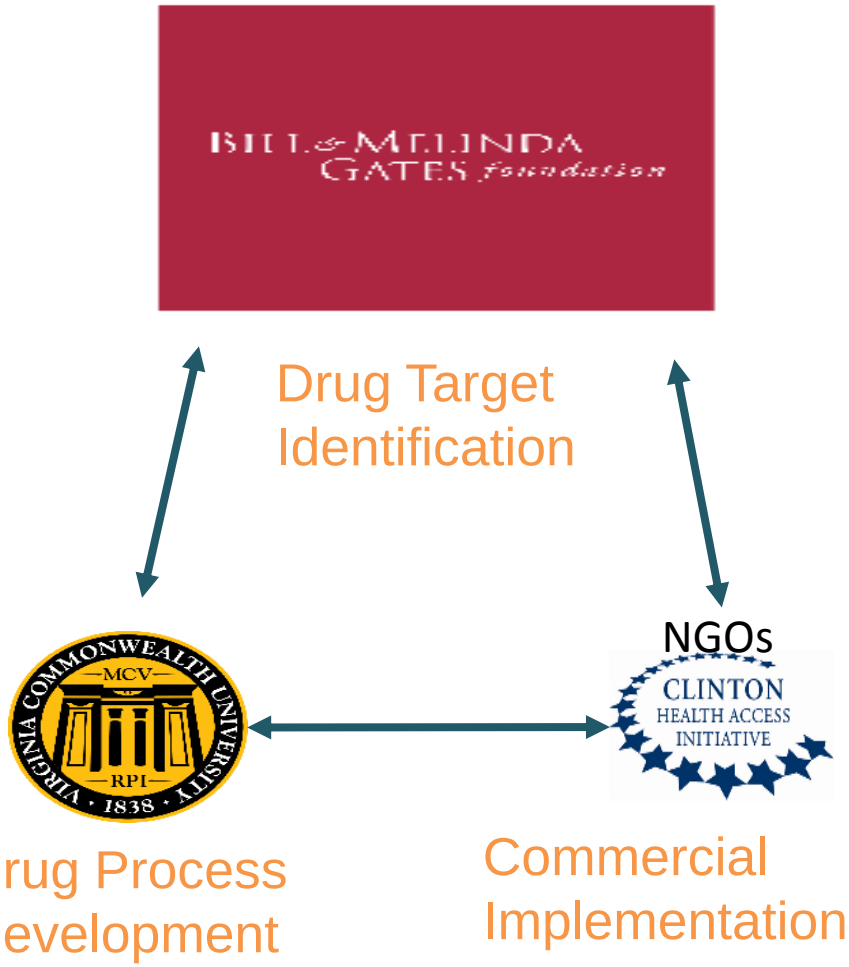
- **Drug Target Identification**
  Priorities established by Sponsors.
- **Drug Transformation**
  VCU research unlocks the economic potential.
- **Manufacturing & Market Distribution**
  VCU collaborates with NGOs & manufacturers to facilitate rapid commercialization.



VCU now expanding to US – based Sponsors and Manufacturers.

Conclusion

- ***Proven, scalable model*** to bring improvements to global healthcare.
- ***Sponsor support*** (Gates Foundation) provides capital and market interface and leverage.
- ***Organizational infrastructure*** creates a permanent, *sustainable networking model* and *provides an educational vehicle for future engineers*.



Using Existing Competencies to Drive New Economic Opportunity

- Industry Partnerships: Develop Pharmaceutical Manufacturing Technology Cluster
- NewCo (Tech Spin-Outs): New Pharma Co's
- Enabling Technology Opportunity
  - Continuous Flow Manufacture, Sensors

Create New Linkages and New Clusters

- Additive Manufacture of Pharmaceuticals (with CCAM)
- Regulatory Optimization Opportunities
- Re-Invent Distribution and Logistics for the Pharmaceutical Industry (with CCALS)

Economic Development Infrastructure: Engineering Research Building at VCU

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