

State of the Corridor



November 1, 2019

AGENDA

Welcome

Jill Loope

Economic Development Director

Overview of Fralin Biomedical Research Institute

Michael J. Friedlander, Ph.D.

Executive Director Fralin Biomedical
Research Center at VTC

Carilion Children's at Tanglewood Mall

Dr. Kimberly Dunsmore

Chair of Pediatrics Carilion Clinic

419 Town Center Plan

Philip Thompson

Deputy Director of Planning

Closing Remarks

Jill Loope

State of the corridor: the impacts of the Virginia Tech Carilion Academic Health Center in Roanoke



Michael J. Friedlander, Ph.D.

Virginia Tech Vice President for Health Sciences and Technology
Executive Director, Fralin Biomedical Research Institute at VTC
Senior Dean for Research, VTC School of Medicine



- **280 undergraduate and graduate degree programs; #5 in U.S. in # of STEM degrees awarded**

33,000 students; 13,000 employees; 1,520 faculty

Over \$525 million in annual research expenditures (top 5% in U.S.) - #1 in Virginia

\$1.5 billion annual budget; \$1.9 billion in assets and managed funds

9 colleges including Engineering, Science, Medicine, Veterinary Medicine

7 research institutes: Biomedical, Bio-complexity, Critical Technologies & Applied Sciences

240,000 alumni - CEO of KPMG, former CEOs of Exxon, Georgia Pacific, & Siemens USA

Academic Health Center in Roanoke – public private partnership with Carilion Clinic including research intensive medical school

Virginia Tech Innovation Campus Washington, DC area

Virginia Tech To Build A New Campus Helped Seal Amazon's Virginia Headquarters Deal

Virginia Tech announced today that it will build a \$1 billion campus in northern Virginia played a role in Amazon's decision to locate one of its two new corporate outposts in Arlington's Crystal City development. The state, county and city governments worked with Amazon for more than a year on the proposal.

November 13, 2018, [Forbes Magazine](#)





- Nationally ranked integrated healthcare delivery system
- \$1.7 billion in annual revenue
- Headquartered in Roanoke, Virginia
- 13,000 employees, 1,000 employed providers
- 7 hospitals (48,000+ discharges)
- Level 1 Trauma Center
- 226 practices (1.5 million+ encounters)
- Children's Hospital
- VTC School of Medicine and Fralin Biomedical Research Institute at VT
- Urgent care, home health agencies, retail pharmacies, wellness centers
- Next Generation ACO Model



Carilion Clinic has major plans for growth



**Carilion announces
\$300M expansion in Roanoke**



**Carilion plans to create center for
children's care at Tanglewood**

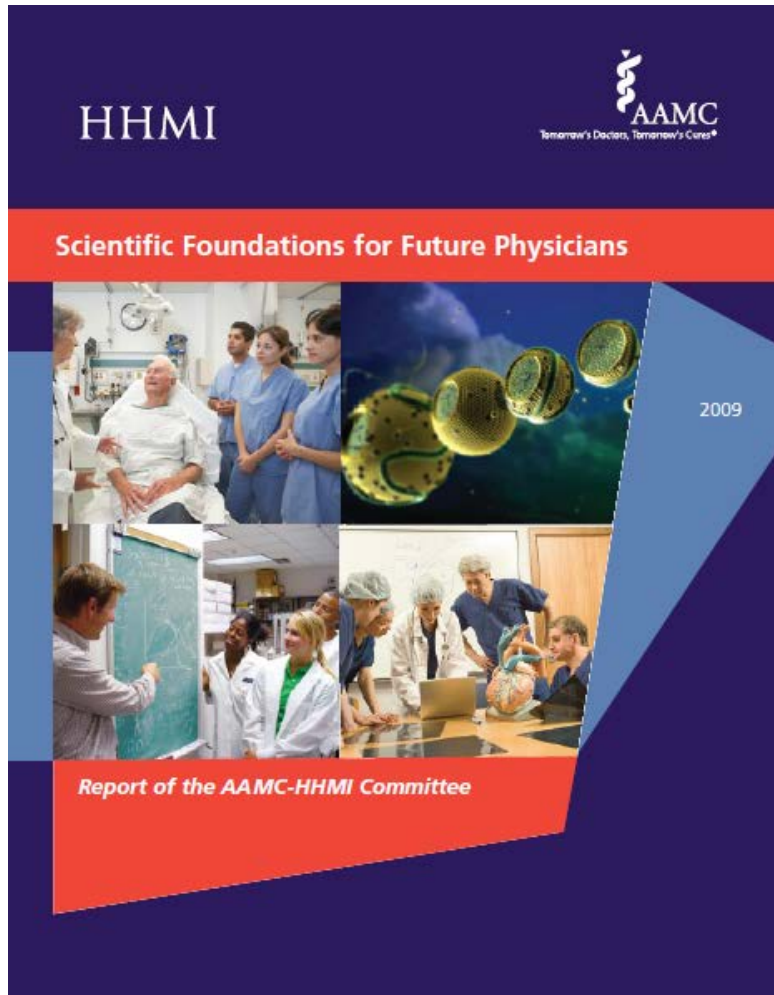
Growing the VTC Research Enterprise in Roanoke: New Fralin Biomedical Research Institute Addition

**opens June, 2020; 150,000 SF new research space;
25 new research teams; 450 additional researchers 2020-2027**



AAMC-HHMI

Scientific foundations for future physicians



VTC School of Medicine

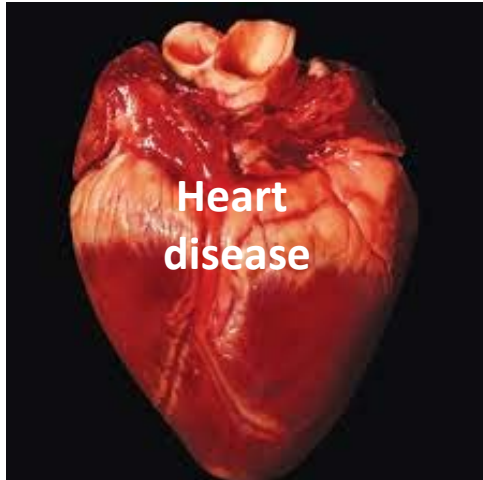
2019 eight year LCME accreditation
6 classes graduated
141 publications
340 presentations
31 awards/fellowships



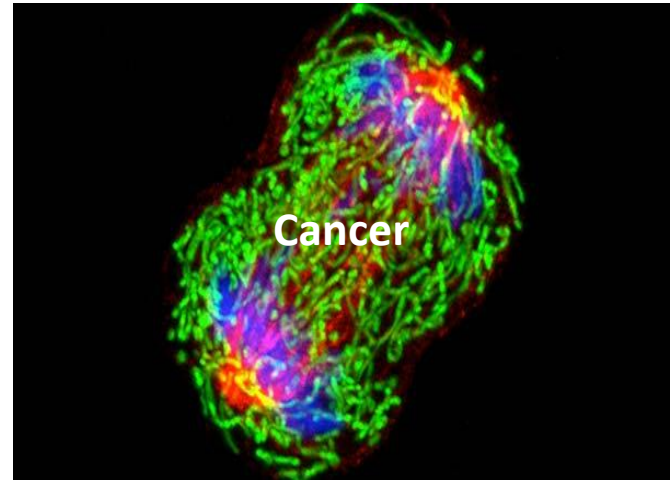
Friedlander, MJ, Commentary: Learning by Doing Biomedical Research: Value Added for Medical Education? Medical Educator, October 1, 2019

The Fralin Biomedical Research Institute at Virginia Tech Carilion:

Focus on:



Over 800,000 deaths
annually in US;
Cost over \$200B



Over 600,000 deaths
annually in US;
Cost over \$135B



75 million directly
affected in US;
Cost = \$1.5T

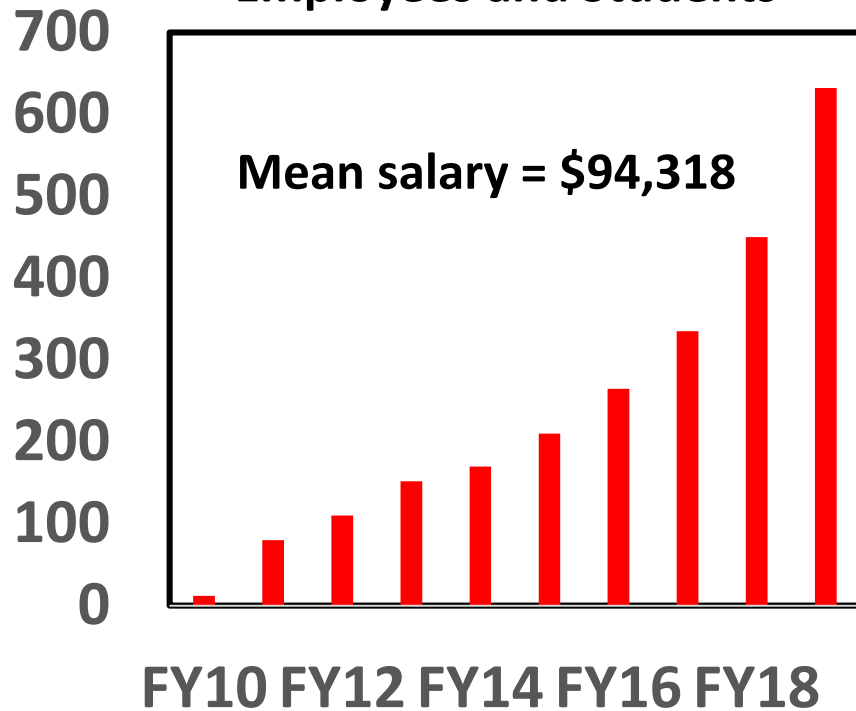


100 million (40%) of adults are obese
5 million (19%) of kids are obese
Cost = \$190B per year

The 30 Research Team Leaders Recruited to the FBRI in Roanoke (so far) to Lead the Programs on Heart Disease, Brain Disorders, Cancer and Obesity



Number of FBRI Employees and Students



FBRI Workforce - FY19	
FBRI Employee Category	
Primary Faculty	30
Research Faculty	65
Administrative Support	46
Research Support	53
High School Students	35
Undergraduate Students	201
Graduate Students	103
Medical Students	69
Collaborators	30
Total	632

FBRI Faculty Research Output

719 publications

54,000 citations

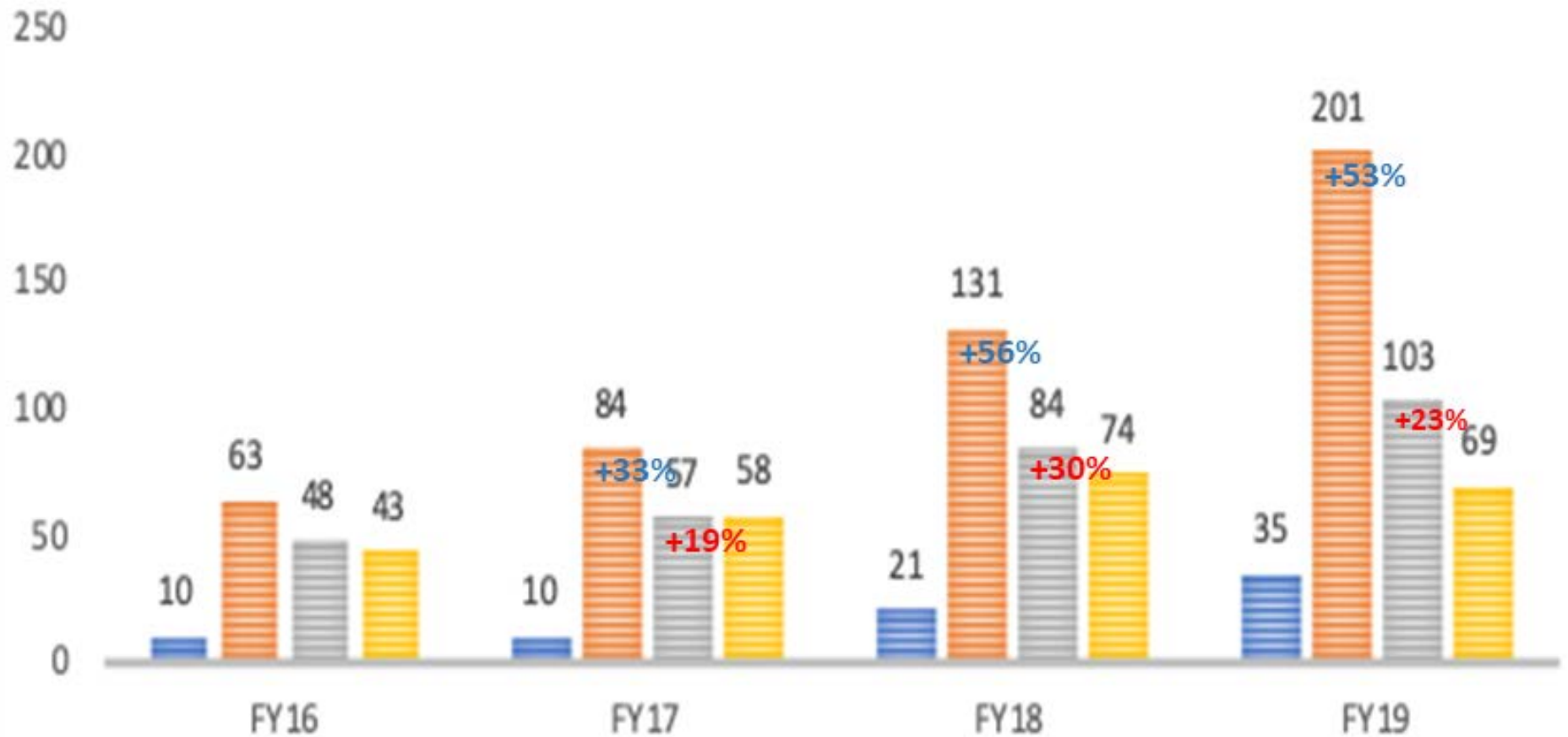
35 patents

5 companies launched

\$184M in cumulative grants awarded

STUDENTS @ FBRI

■ High School Students ■ Undergraduate Students ■ Graduate Students ■ Medical Students



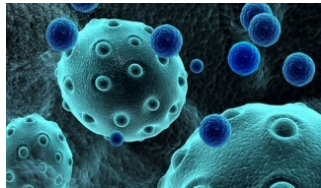
**New pilot undergraduate pre-health sciences program
on the Roanoke Health Sciences and Technology Campus in Roanoke
begins fall, 2020
(Initially 25-50 additional students per year; scale to 500 over 10 years)**



Some start up companies spun off from FBRI Research programs so far



FirstString Research Inc.



Tiny Cargo Company

Protecting and delivering heart therapies on target



BEAM Diagnostics, Inc.

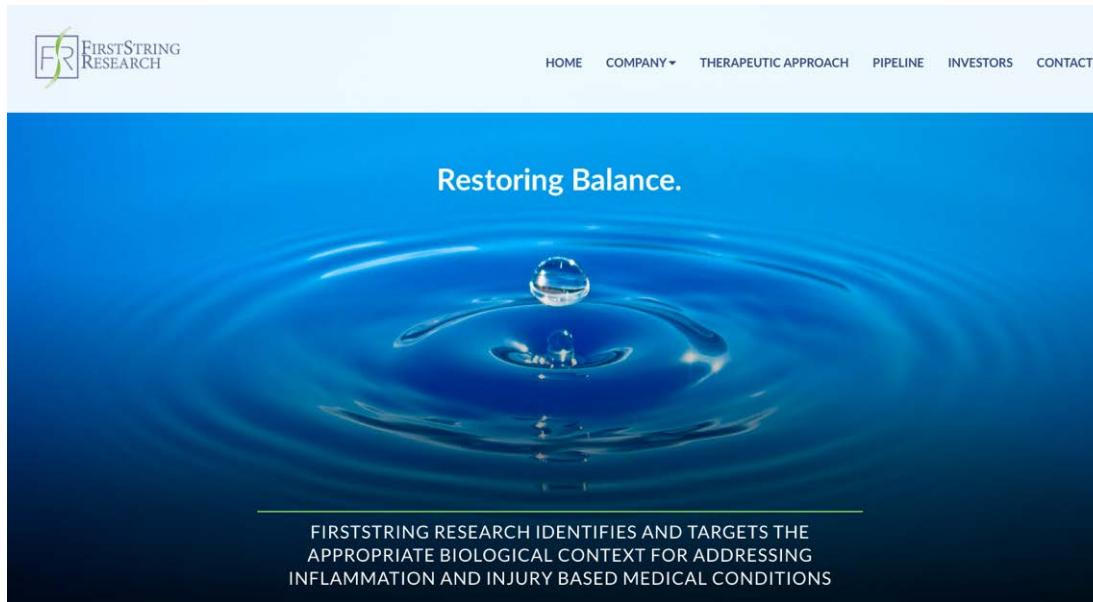
Behavioral Economics as Advanced
Methodological Diagnostics

Shining light on the future of precision medicine



ACOMHAL RESEARCH
FIGHTING CANCER AT ITS SOURCE

FirstString Research Inc: α CT1 peptide drug

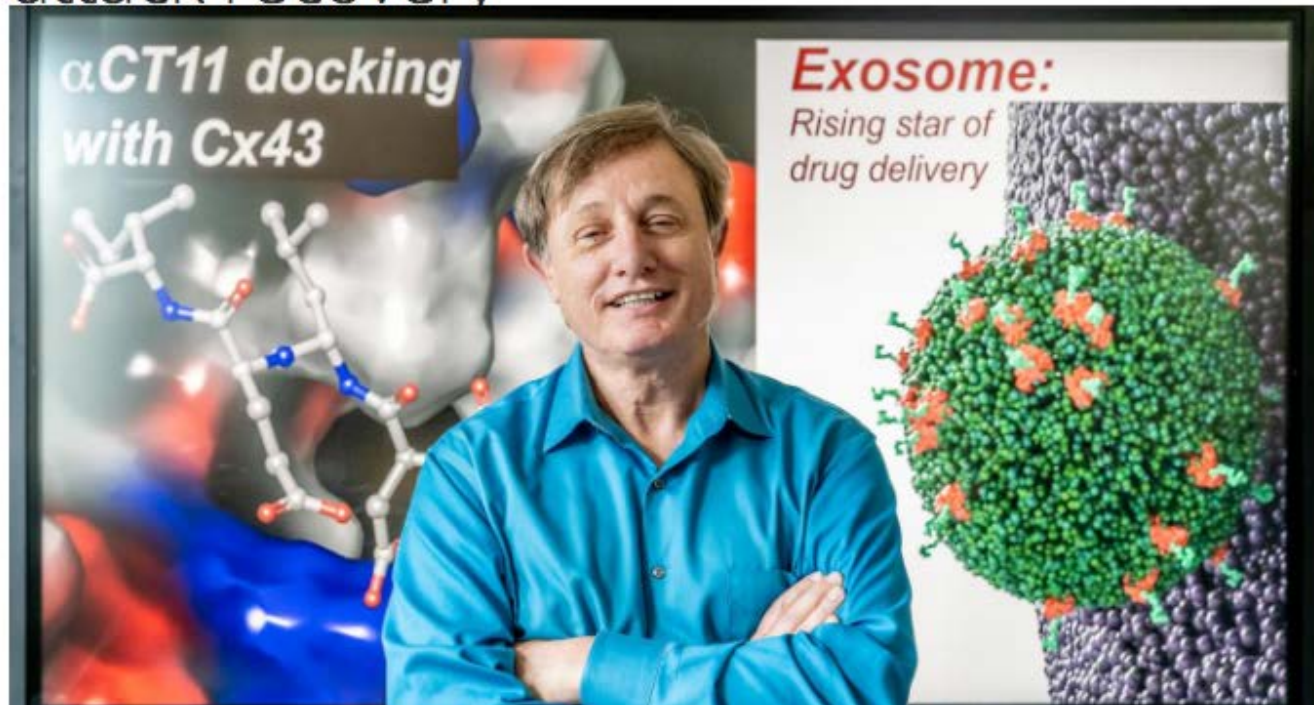


FirstString receives the Tibbetts Award. Maria Contreras-Sweet, Administrator of the U.S. SBA (left), Christina Grek, Director of Translational Research (FirstString Research; center), Mark Walsh, Assoc. Administrator (SBA; right)

- ❖ Raised >\$75m in investment
- ❖ >\$10m in Federal small business grants
- ❖ Recipient of the Tibbet's Small Business Prize, awarded at the White House
- ❖ Completed for 4 Clinical Trials – **Pivotal Phase III underway**
- ❖ 2018/19 closed on a series B and C funding – Sophos Capital, Jim Carruthers Jr.

NEWS RELEASE 19-AUG-2019

New molecule could help improve heart attack recovery



<https://www.sciencedaily.com/releases/2019/08/190819082442.htm>

Rob Gourdie

Meet the exosome



- ❖ Exosomes are tiny resealable “zip-lock” bags for drug delivery
- ❖ Protects peptides in blood
- ❖ Protects body from immune reaction to peptide
- ❖ Cross tissue boundaries –e.g., into brain, skin, gut

...And a new co. – **The Tiny Cargo Company**

Milk source of industrial quantities of exosomes



- ❖ Homestead creamery Inc
- ❖ Milk exosomes cross the gut and target heart



New medical app to help doctors identify &
treat substance abuse. #healthcare
#digitalhealth



BEAM Diagnostics, Inc.

Behavioral Economics as Advanced
Methodological Diagnostics

Shining light on the future of precision medicine

BEAM Team



Sarah E. Snider, Ph.D.
CEO



Warren K. Bickel, Ph.D.
Senior Scientific Advisor



James MacKillop, Ph.D.
Senior Scientific Advisor



Anita Kablinger, MD, CPI
Carilion PI; Collaborator



Cynthia Lawrence
Business Mentor



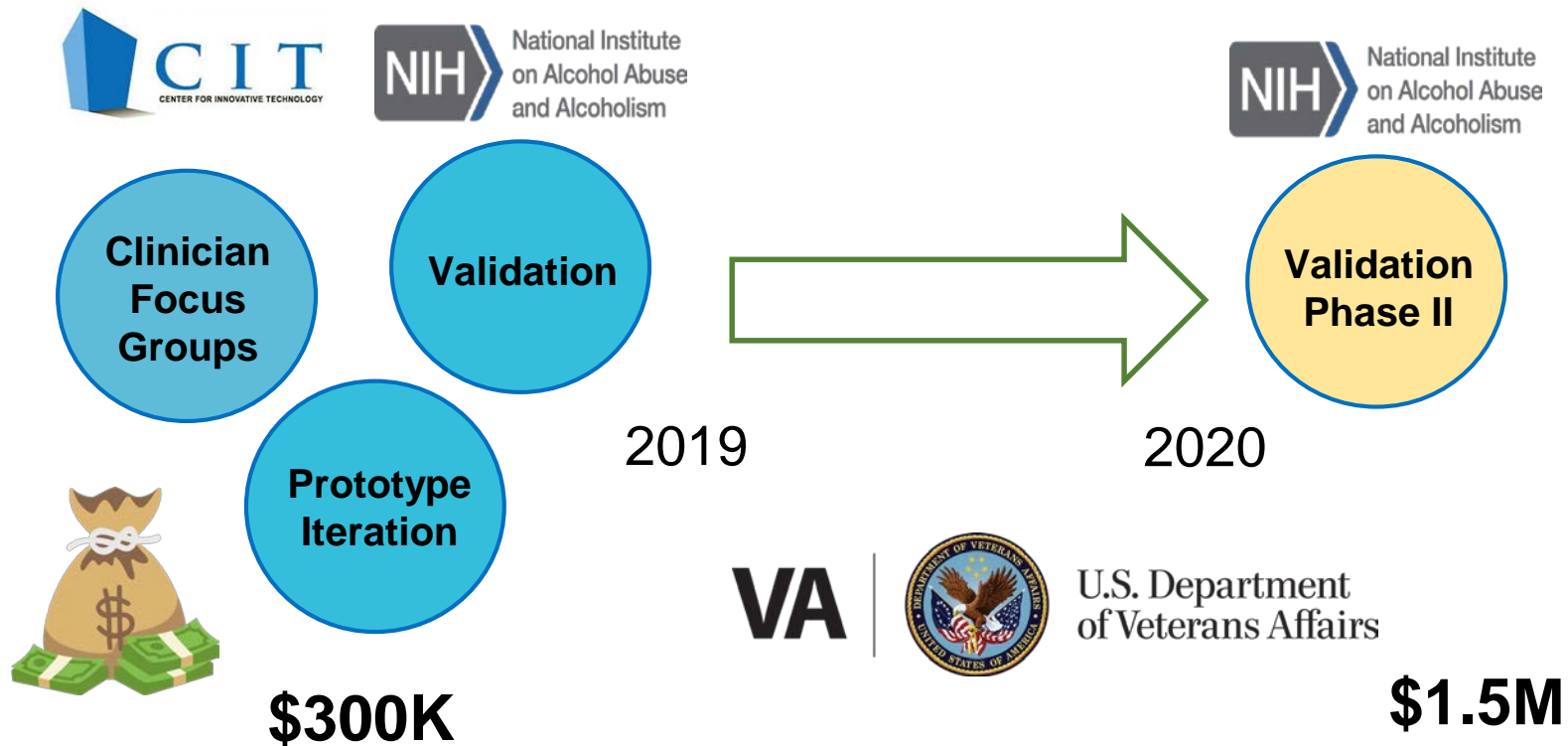
Elaine Bradford, MS
Research Coordinator



Andrew Lindberg

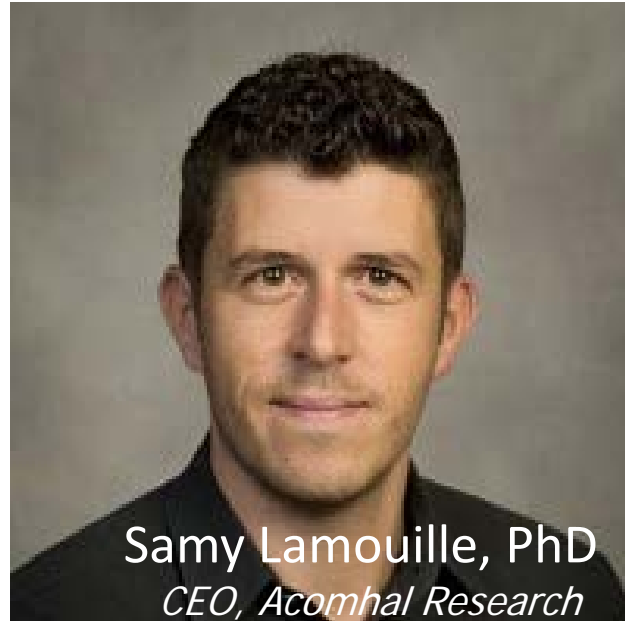
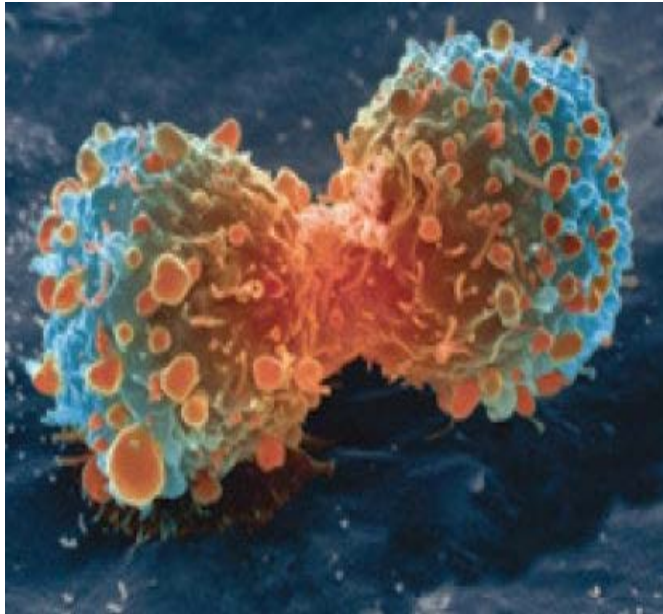


Where are they now?



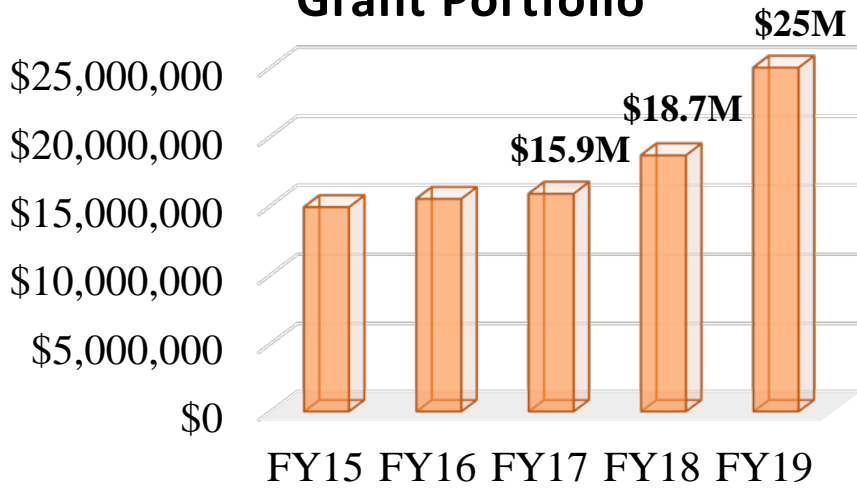
Acomhal Research Inc:

JM2 peptide drug

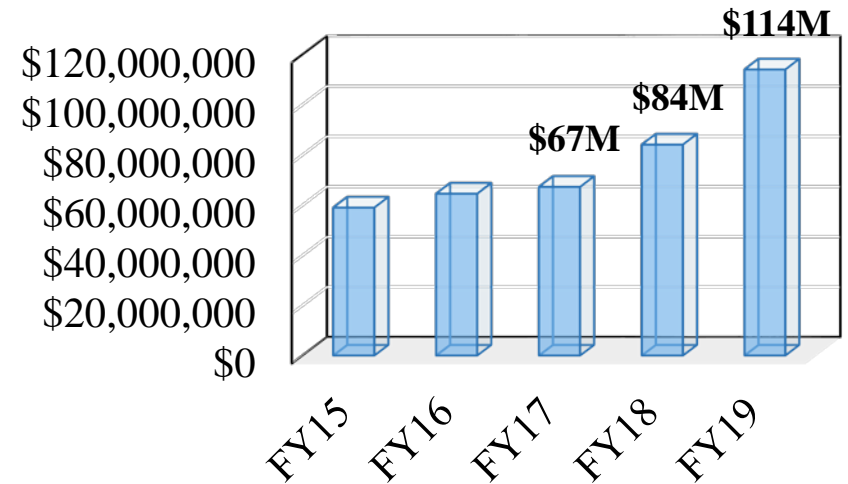


- ❖ Cancer stem cells seed new tumors – glioblastoma, breast and colon cancers
- ❖ Awarded an NIH SBIR/STTR Phase I grant
- ❖ Closing on its first venture round

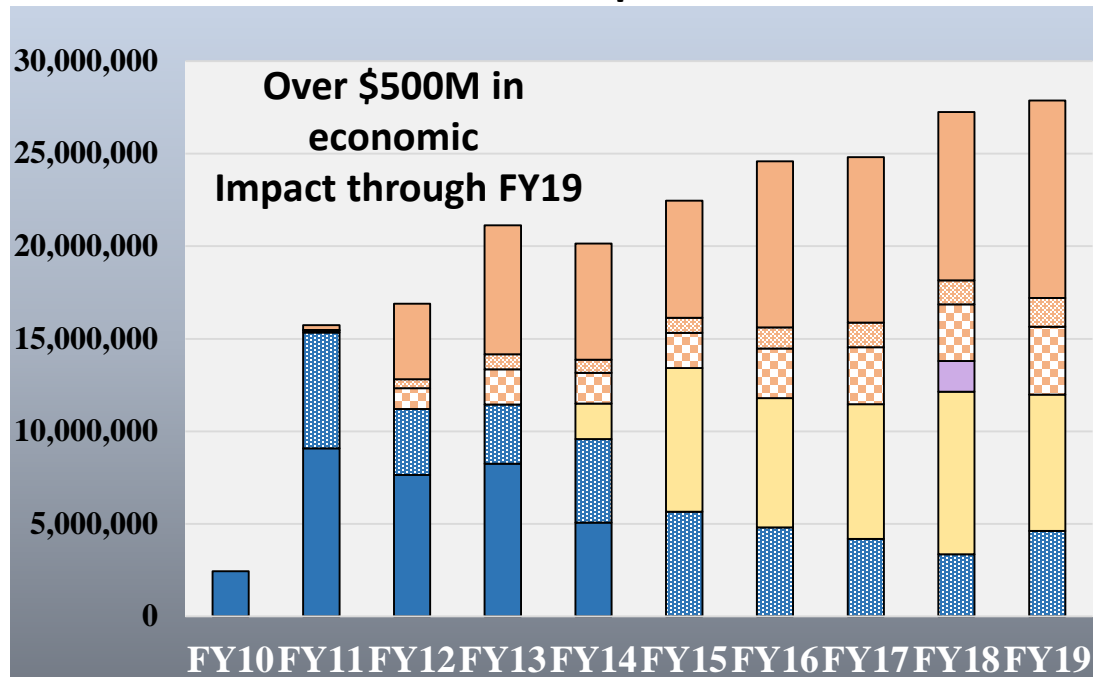
FBRI Annual Value of FBRI Grant Portfolio



Total Value of FBRI Grant Portfolio



Annual FBRI Expenditures



Sample of funding sources for FBRI research



Major industry partnerships at FBRI



FDA deems molecular test for concussions 'breakthrough device'



Stephen LaConte
FBRI @ VTC

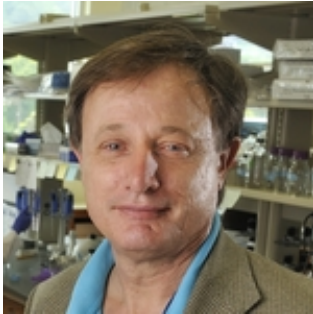


Damon Kuehl
VTCsOM/CC

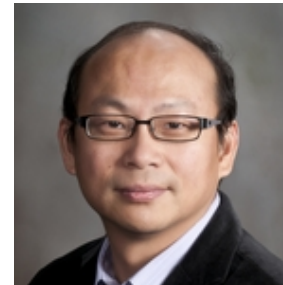
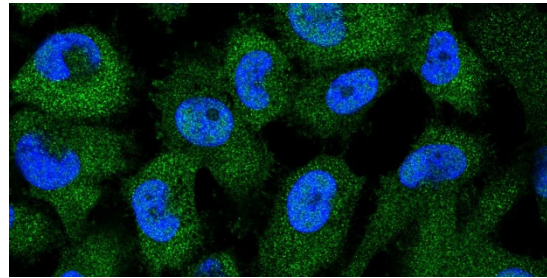


Fralin Biomed teams re-sensitize brain cancer to temozolomide

Fralin Biomed team discovers new therapeutic target for brain cancer -
Casein Kinase 1 Epsilon
Science Reports
2018



Rob Gourdie



Zhi Sheng



LINAC
\$3.5M



Samy Lamouille



John Rossmeisl, VT CVM



Health decision-making failures: a trans disease process

FBRI Center for Transformative Research on Health Behaviors

- Addiction (alcohol, cigarettes, cocaine, methamphetamine, opioids, sedatives)
- Problem Gambling
- Obesity
- Risky Sexual and Injection Practices
- Health Behaviors (BP-checks, cholesterol testing, dental visits, eating breakfast, exercise, follow physician advice, flu shot, mammograms, pap smear, prostate exam, seat belt, or medically compliant)
- Debt
- At the other Extreme: Anorexia, OCD



Warren Bickel



Virginia Tech Carilion Research Institute

CTRHB

Center for Transformative Research
on Health Behaviors



Sharon
Ramey



Stephanie
DeLuca

Fralin BRI Neuromotor Research Clinic:
Innovative treatment for children with cerebral palsy
NIH (NICHD) StrokeNet awarded February, 2019
First national multi-site pediatric stroke clinical trial

FBRI at VTC –Roanoke
Nationwide Children's-Ohio State,

Stanford, U. Cincinnati Children's, MUSC,

U. Michigan, Emory, John Hopkins, Tufts, U.
Illinois; MUSC, Texas Children's, Yale, U.
Penn., UC San Diego





**Bringing the state's institutions together in a
working research partnership:**

NIH (NCATS) Clinical and Translational Science Award (CTSA)

\$23M integrative Translational Health Research Institute of Virginia





**New medical app from
Roanoke Group to help
identify & treat substance abuse**



**Trauma Management
Therapy for PTSD in Roanoke**



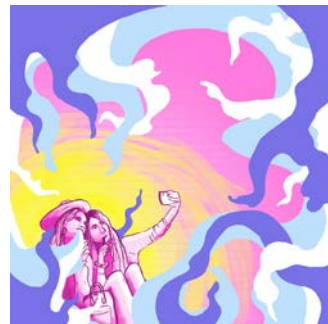
**FDA deems molecular test
for concussions
‘breakthrough device’**



**Roanoke: New molecule
from FBRI team could
help improve heart
attack recovery**

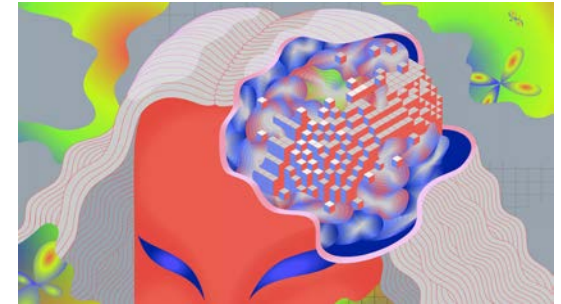


**Pioneering neuro-geneticist
to join Fralin Biomedical
Research Institute**



The Cancer Letter

**Virginia Tech announces
cancer research initiative**



THE VERGE

**MEET THE SCIENTISTS WHO ARE
TRAINING AI TO DIAGNOSE MENTAL
ILLNESS IN ROANOKE, USA**

By [B David Zarley](#)

Jan 28, 2019

米国製薬業界週報

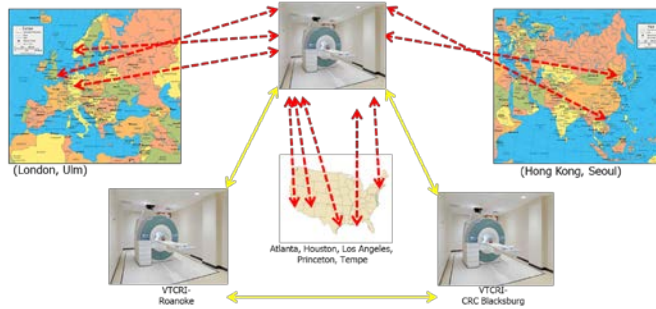
**Roanoke, Virginia, USA
research team identifies
a new strategy in the
fight against brain cancer**

Roanoke as an International Destination Site for Biomedical Research Technology Innovation

Optically pumped magnetometry



Interactive worldwide real time human functional brain imaging network hub



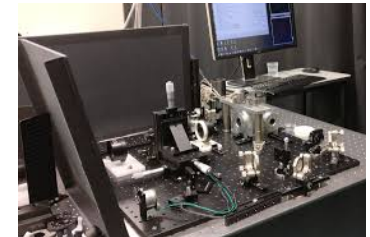
Focused ultrasound



Flourescence activated cell sorter



Super resolution light sheet microscope



LINAC



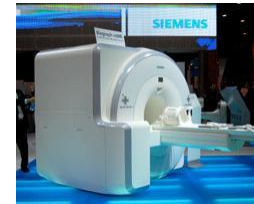
small animal MR - PET



SBFEM



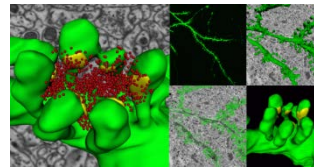
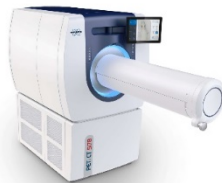
Large animal MR-PET



Human high field MRI



Transcranial magnetic stimulation





Outreach to the Community: 2019-20 Fralin Biomedical Research Institute Maury Strauss Distinguished Public Lecture Series



Julie Pulerwitz
Program Director
HIV/AIDS Programs
The Population Council

*“Transforming evidence
into HIV policies &
practice: Lessons from global
Implementation Science”*



Susan Hockfield
Former president of MIT

*“The technology revolution:
living machines”*



Michael Young
Rockefeller University
Nobel Prize
in Physiology or Medicine

*“Genes Regulating Sleep and
Circadian Rhythms”*



Vicki Arroyo
Georgetown University
Director: Georgetown
Climate Center

*“Climate Change: policy,
People and place”*



Ayanna Howard
Profesor/Director
College of Computing
Georgia Tech

*“Pediatric Robotics:
a journey from the lab
to a child’s home”*



Biomedical Research Incubator
School of Climate Health
School of Pharmacy
Veterinary Medicine One Health
Public Health Program
Entrepreneurs in Residence Program
Biomedical Industry Park
National Center for Brain Technology Development

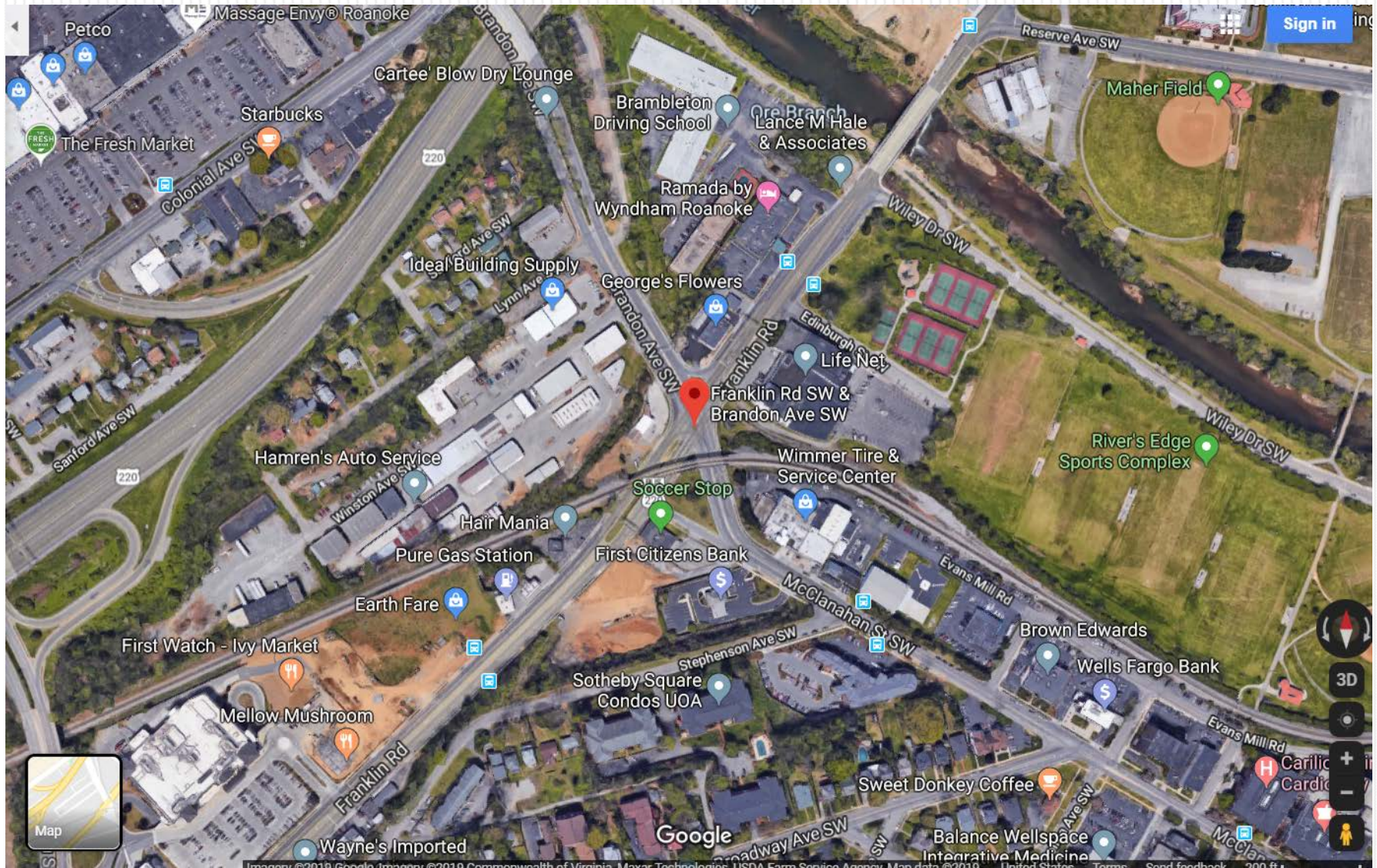
New Franklin Road Bridge adjacent to VTC



Diverging-diamond interchange planned for Tanglewood exit in 2028



Connecting the growing VTC enterprise to the 419 corridor (safety, bikes, sidewalks, covered bus stops, streetscapes, healthy lifestyle retail choices)



Economist says Tech, Carilion Roanoke campus will contribute at least \$465 million to economy within 8 years



The Roanoke Innovation Corridor

UAB Academic Health Center

\$7 billion annual economic impact



**Birmingham's Highlands Bar and Grill
selected one of 10 best restaurants in
America**

Carilion Children's at Tanglewood

Dr. Kimberly Dunsmore
Chair of Pediatrics, Carilion Children's
Nov. 1, 2019









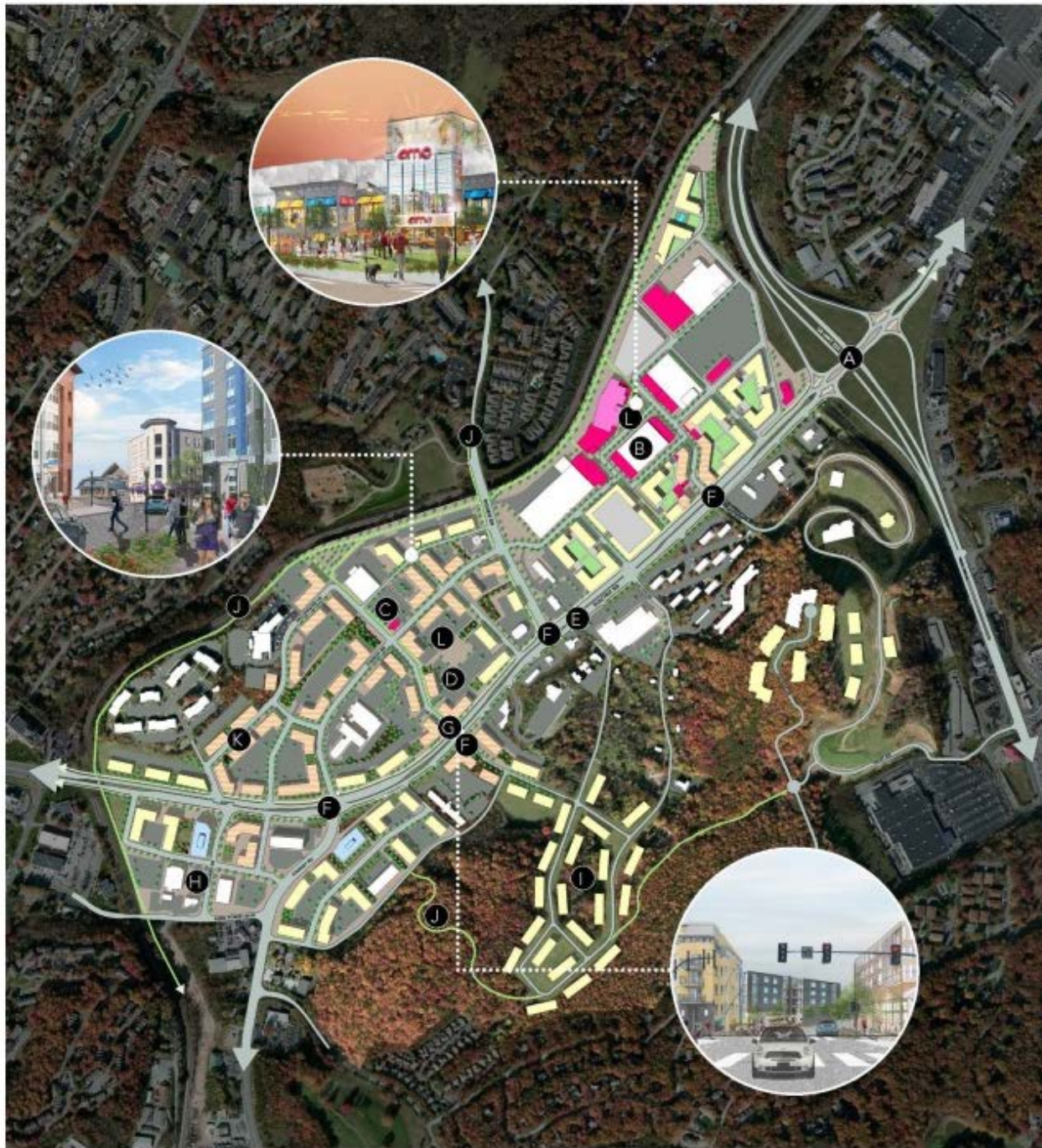


419 Town Center Plan

State of the Corridor Meeting

November 1, 2019

419 Town Center Vision



- A. Interchange Improvements
- B. Tanglewood Mall Redevelopment
- C. Old Country Plaza Redevelopment
- D. Madison Square Redevelopment
- E. Electric Road Improvements
- F. Walkable and Accessible Intersections
- G. New Traffic Signal – Fallowater Lane Ext.
- H. Signature Office Development Sites
- I. Multifamily Development
- J. Network of Trails
- K. Main Street Retail
- L. Community Green Space

Plan Implementation

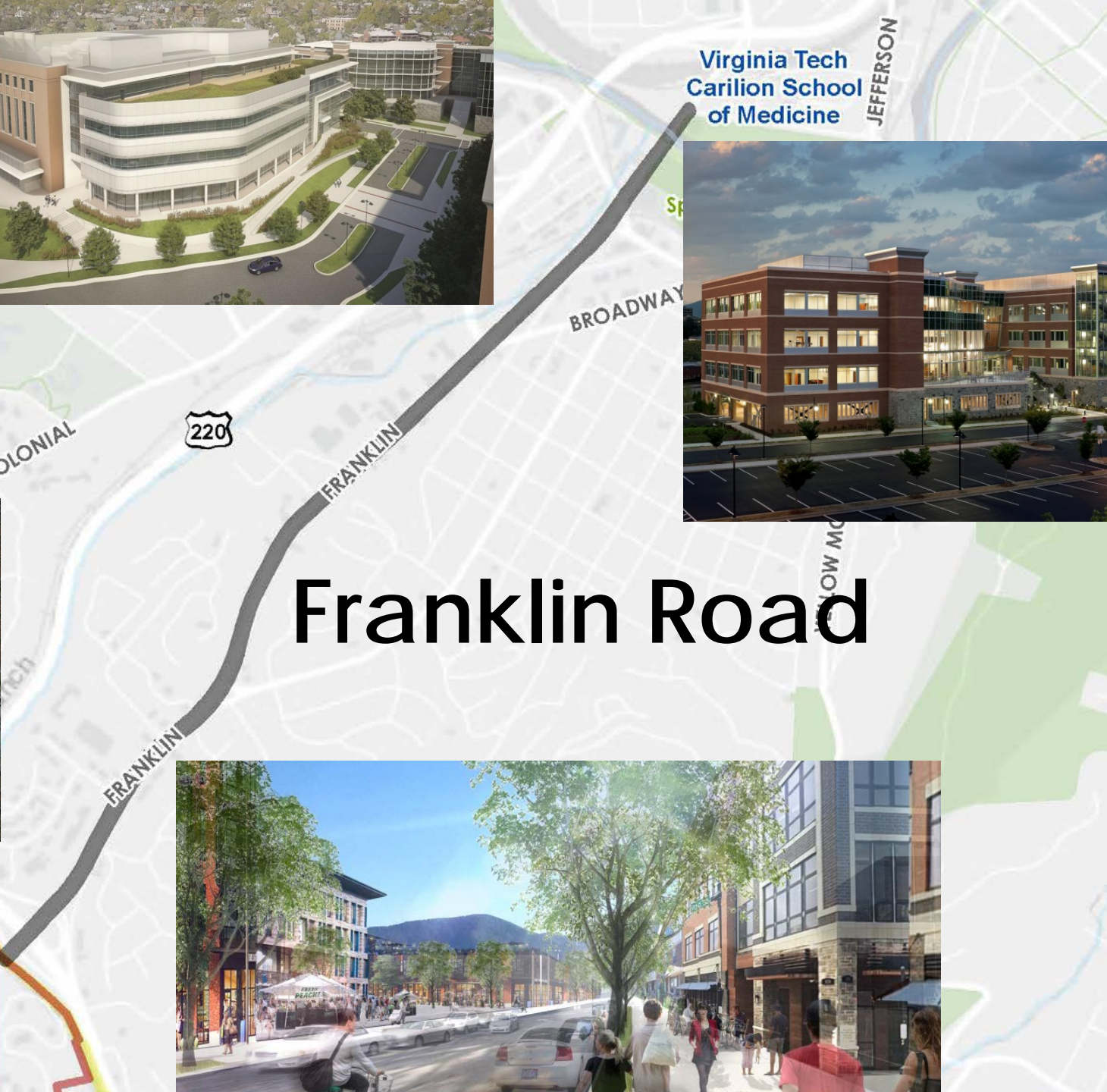
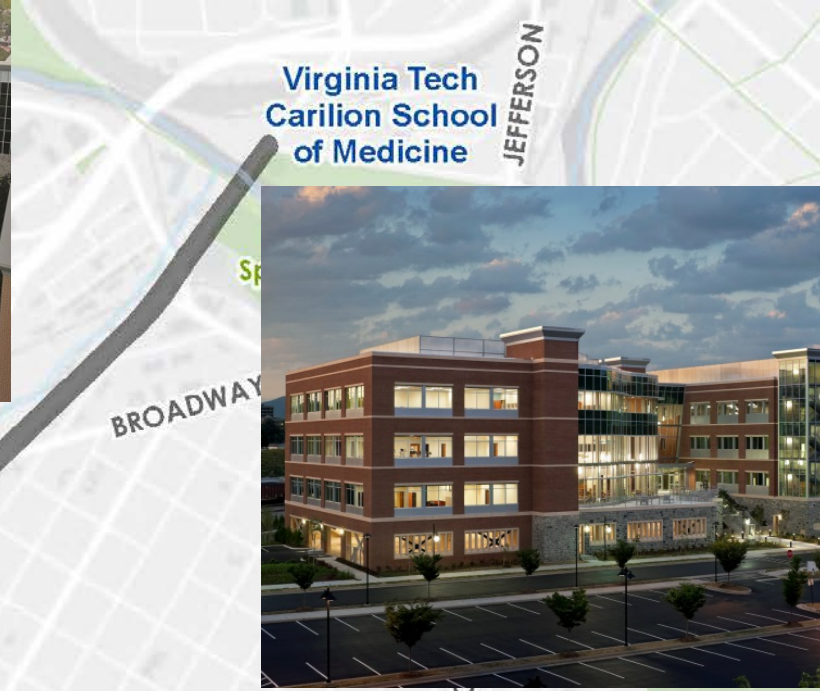
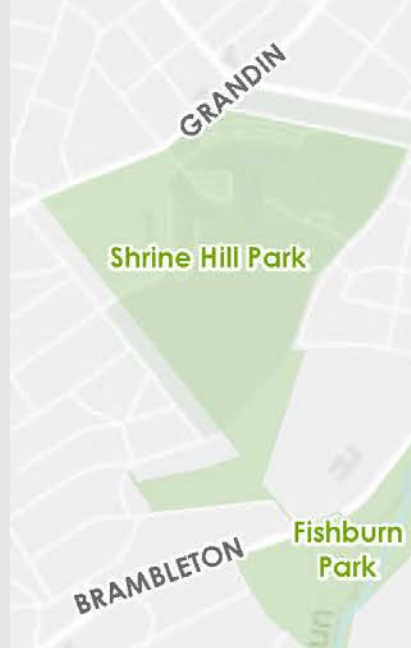
- Planning/Zoning (Regulatory)
- Community Engagement
- Infrastructure Investments



Plan Implementation

- Planning/Zoning
 - Plan Approval – BOS – July 23, 2019
 - Zoning & Design Guidelines
 - Density/Uses/Form
 - Site Design/Building Location
 - Building Architecture
 - Sidewalk & Streetscape Elements
 - Open Space Requirements
 - Parking Regulations
 - Future Plans & Plan Review





Franklin Road







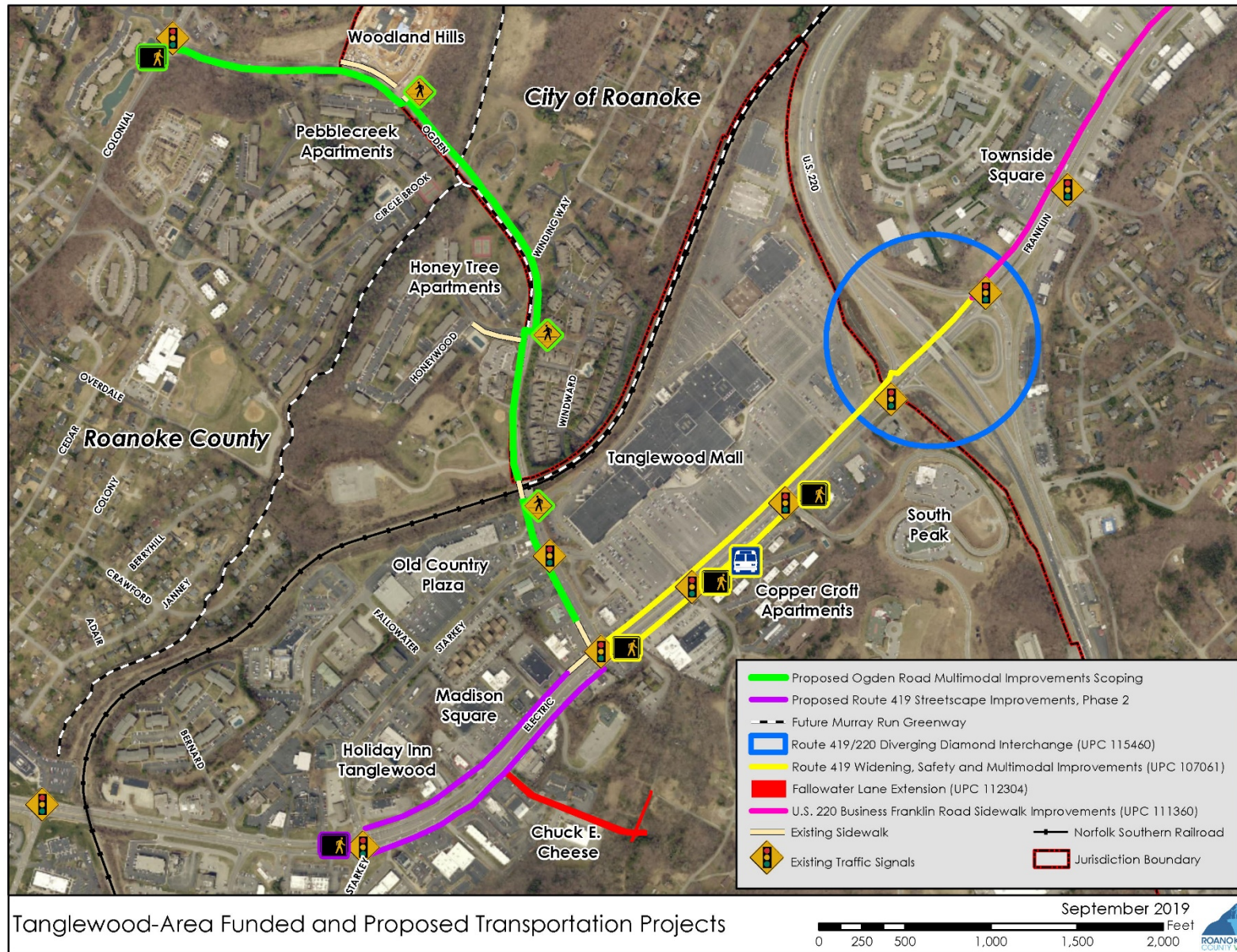
Community Engagement

- Marketing/Branding
- Land owner and business engagement
- Developer attraction – multi-use projects
- Public – private proposals



Plan Implementation

- Infrastructure Investments
 - Transportation Improvements/Funding
 - Increase Capacity/Reduce Congestion
 - Increase Accessibility
 - Add Pedestrian & Bicycle Accommodations
 - Improve Interconnectivity / Access Management
 - Incorporate Streetscape Improvements
 - Structured Parking
 - Transit Expansion & Integration



Tanglewood-Area Transportation Projects

Funded Projects

Funded: Route 419 Streetscape Improvements (Ogden to Rt. 220)

- Constructing third lane to Route 220 South ramp, sidewalks, bicycle lanes, pedestrian signals/crosswalks, bus shelter
- Construction Advertisement: March 2020
- Construction Duration: Summer 2020 to Fall 2022

[illegible]

Funded: Route 419/Route 220 Diverging Diamond Interchange

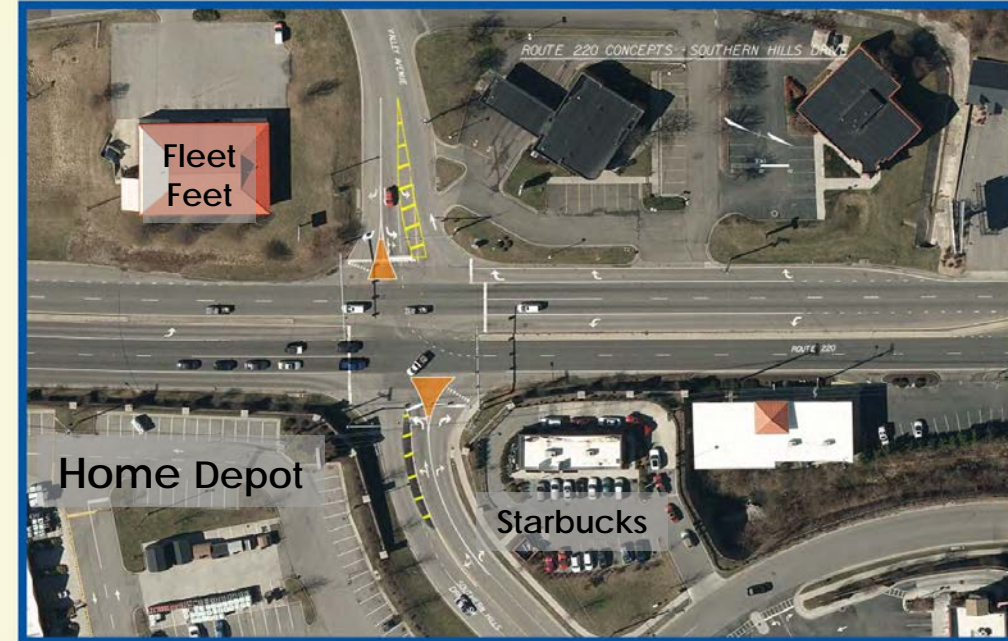
- Reconfiguring travel lanes, ramps, bicycle and pedestrian accommodations through the interchange; reducing traffic signal phases
- Preliminary Engineering: underway | Right-of-Way: 2023 | Construction: 2024



Study: Route 220 Signalization Improvements

- VDOT is proposing to reduce traffic signal phases at the following intersections:
 - Valley Avenue/Southern Hills Drive
 - Crossbow Circle/Pheasant Ridge Road
 - Buck Mountain Road/Stable Road
 - Indian Grave Road/Clearbrook Village Lane
- **Community Meeting scheduled for:**
Thursday, November 7th
Clearbrook Elementary School
4:30 p.m. to 6:30 p.m. Open House
5:00 p.m. Presentation

Valley Avenue / Southern Hills Drive SW



Pheasant Ridge Road / Crossbow Circle



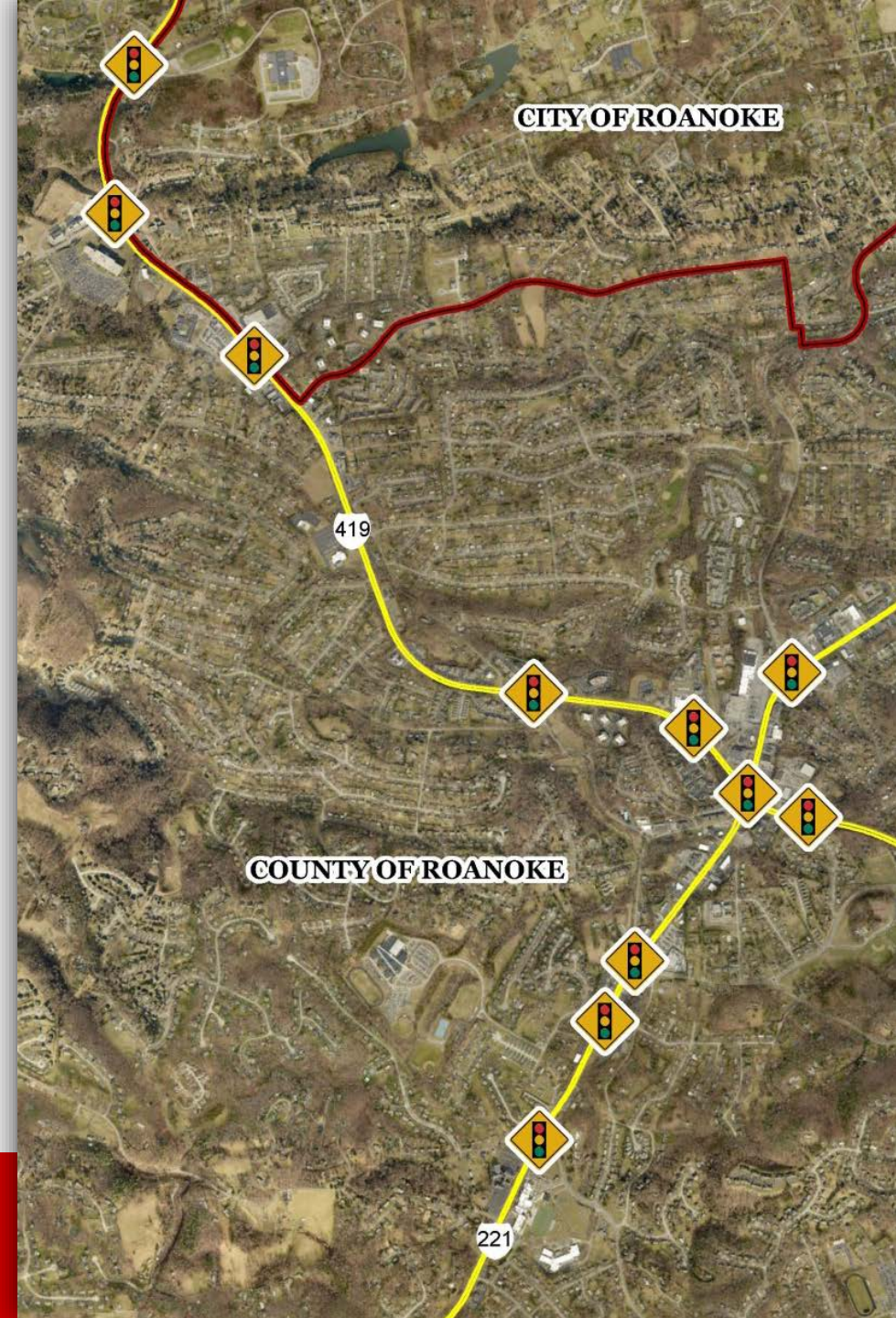
Partially Funded: Fallowwater Lane Extension

- Project will upgrade the existing private road to public road standards and will connect to Chevy Road
- This connection will provide appropriate access to future multifamily development identified as The Ridges in the 419 Town Center Plan



Funded: Route 419 and Route 221 Adaptive Signal Control

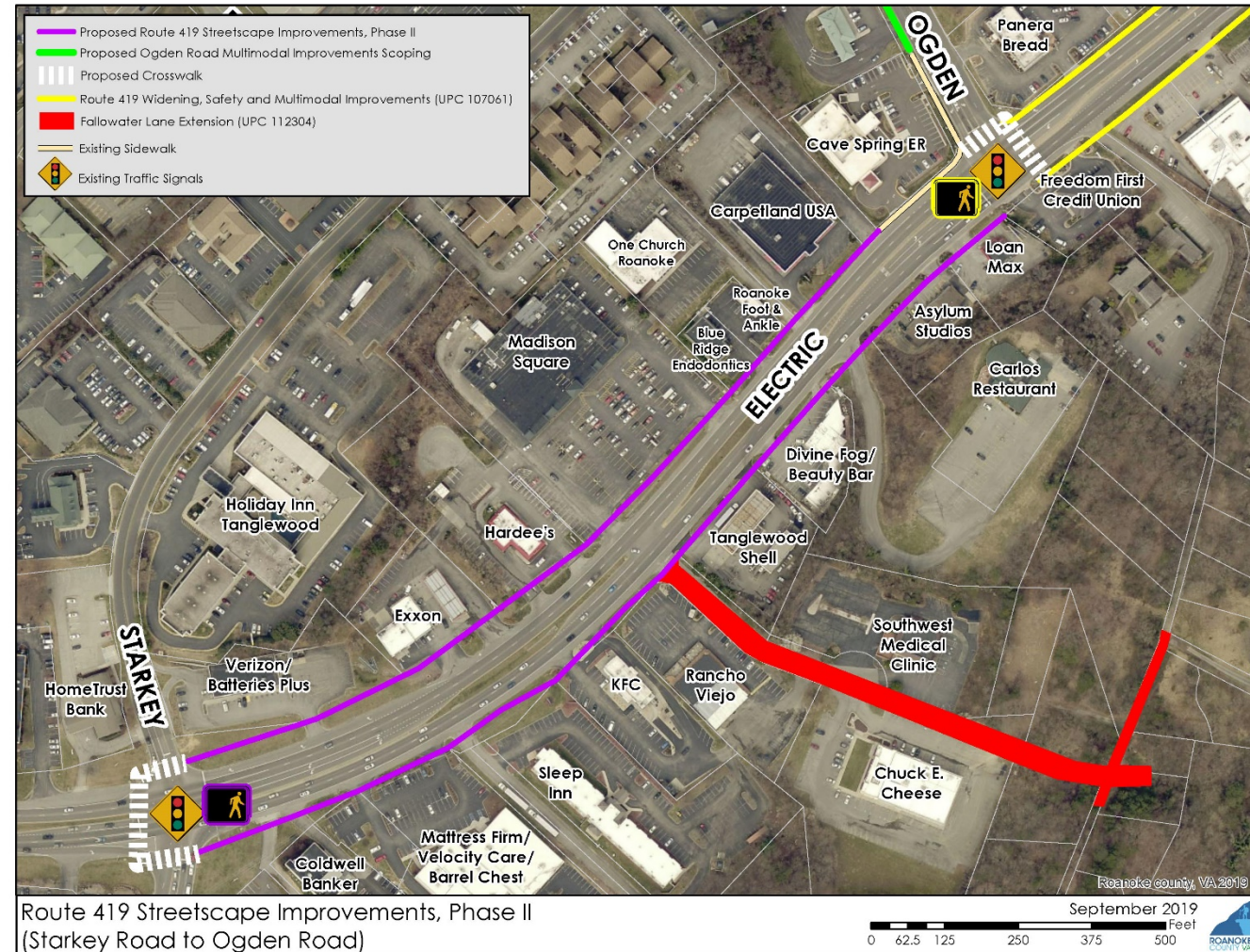
- VDOT is coordinating signals:
 - Route 419 from Colonial Avenue to Valley Drive
 - Route 221 from Garst Mill Road to Ranchcrest Drive
- Infrastructure is in place and systems will be activated in late 2019/early 2020



Proposed Projects

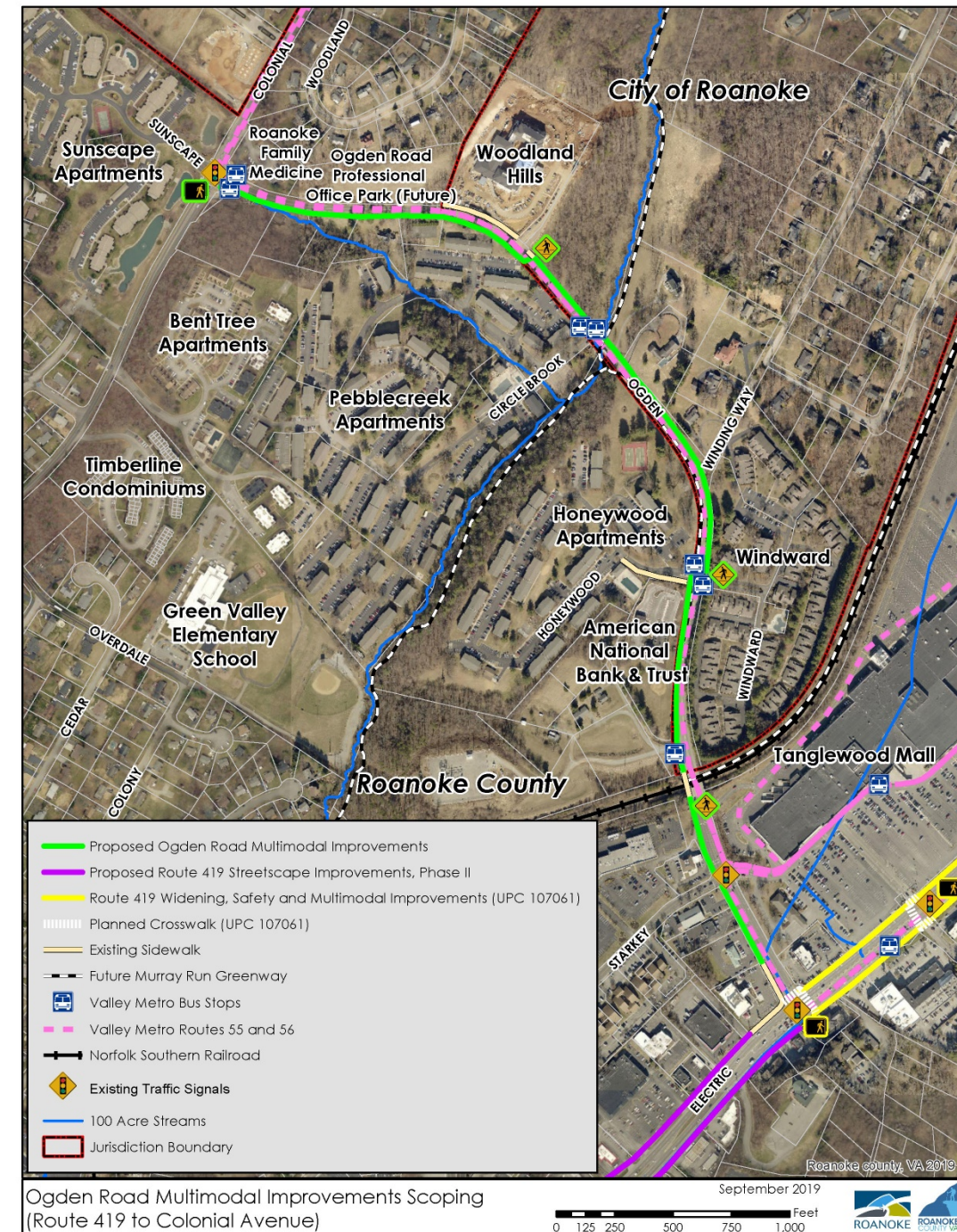
Unfunded: Route 419 Streetscape Improvements, Phase II (Starkey to Ogden)

- Applied for initial funding in September 2019 and will apply for additional funding in 2020
- VDOT has conceptually designed:
 - Road widening
 - Bicycle lanes
 - Sidewalks
 - Pedestrian signals/crosswalks at Starkey Road



Unfunded: Ogden Road Multimodal Improvements Scoping (Route 419 to Colonial Avenue)

- Applied for funding to conceptually design:
 - Sidewalks and crosswalks
 - Bus stop improvements
 - Murray Run Greenway connection
 - Possible bicycle accommodations
- Collaborating with VDOT and the City of Roanoke



Thank You