

# 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

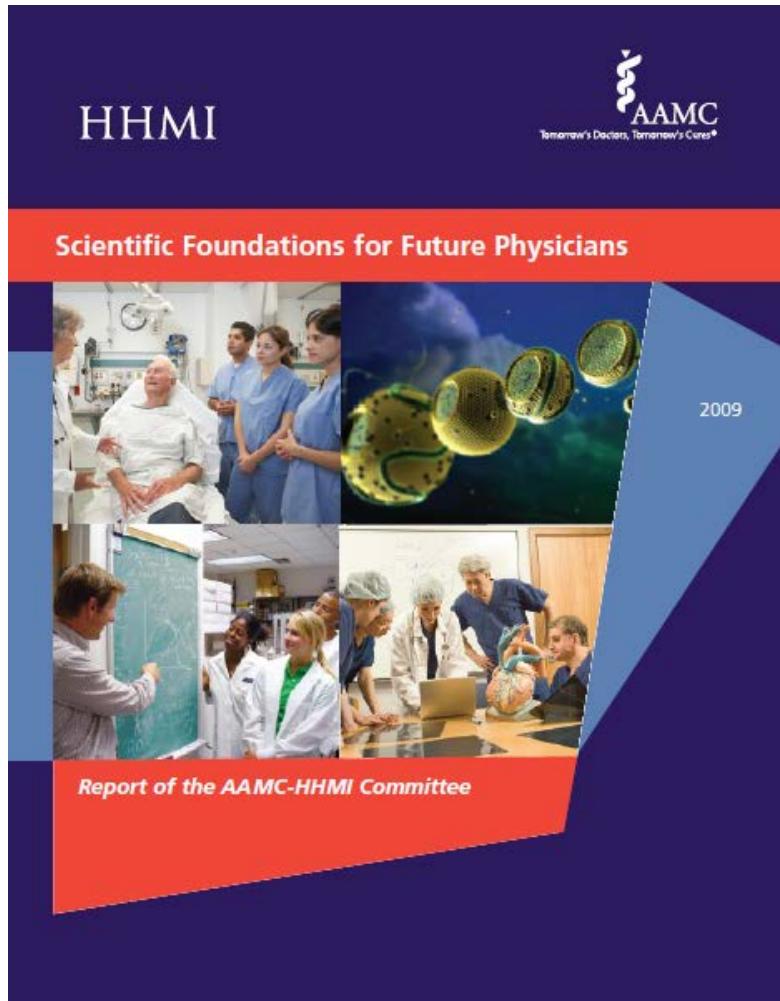
# Growing the VTC Research Enterprise in Roanoke: New Fralin Biomedical Research Institute Addition

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

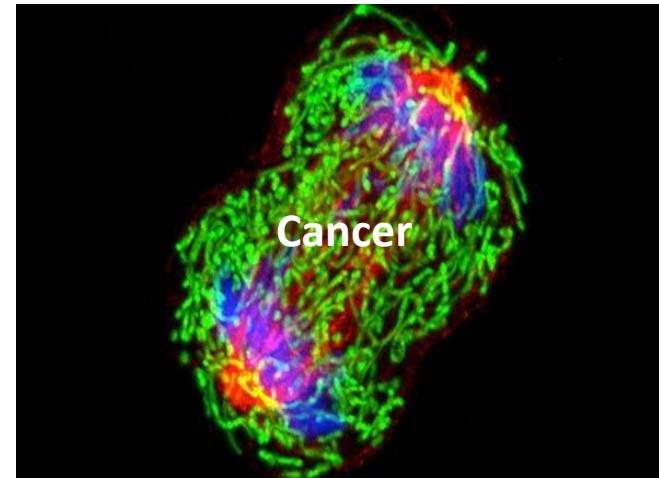


Friedlander, MJ, Commentary: Learning by Doing Biomedical Research: Value  
Added for Medical Education? *Medical Educator*, October 1, 2019

# The Fralin Biomedical Research Institute at Virginia Tech Carilion: Focus on:



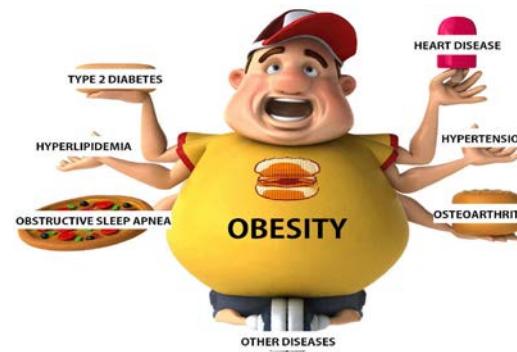
Over 800,000 deaths  
annually in US;  
Cost over \$200B



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



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

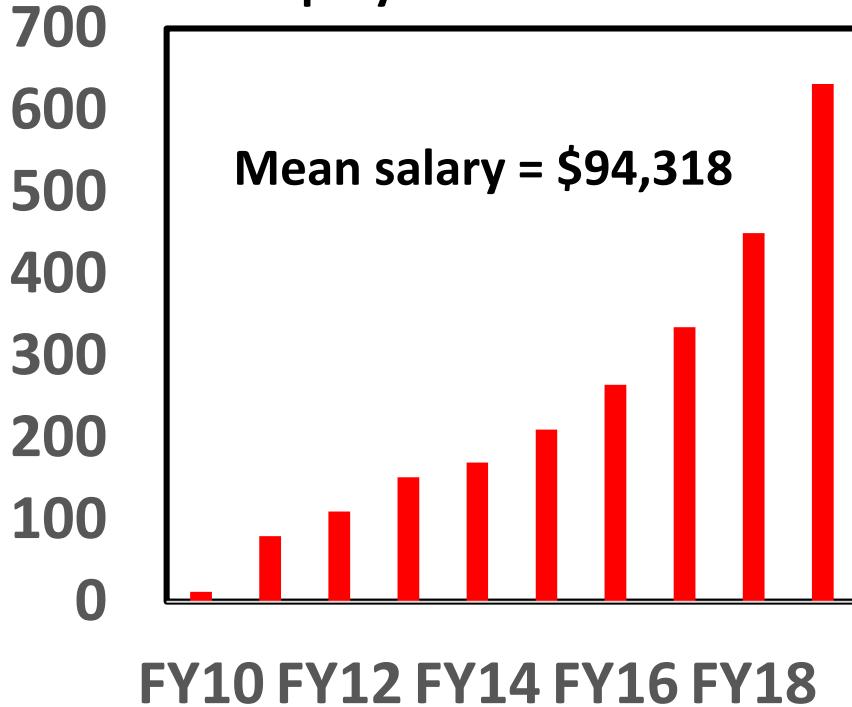


100 million (40%) of adults are obese  
5 million (19%) of kids are obese  
Cost = \$190B per year

# 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	
FRBI 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

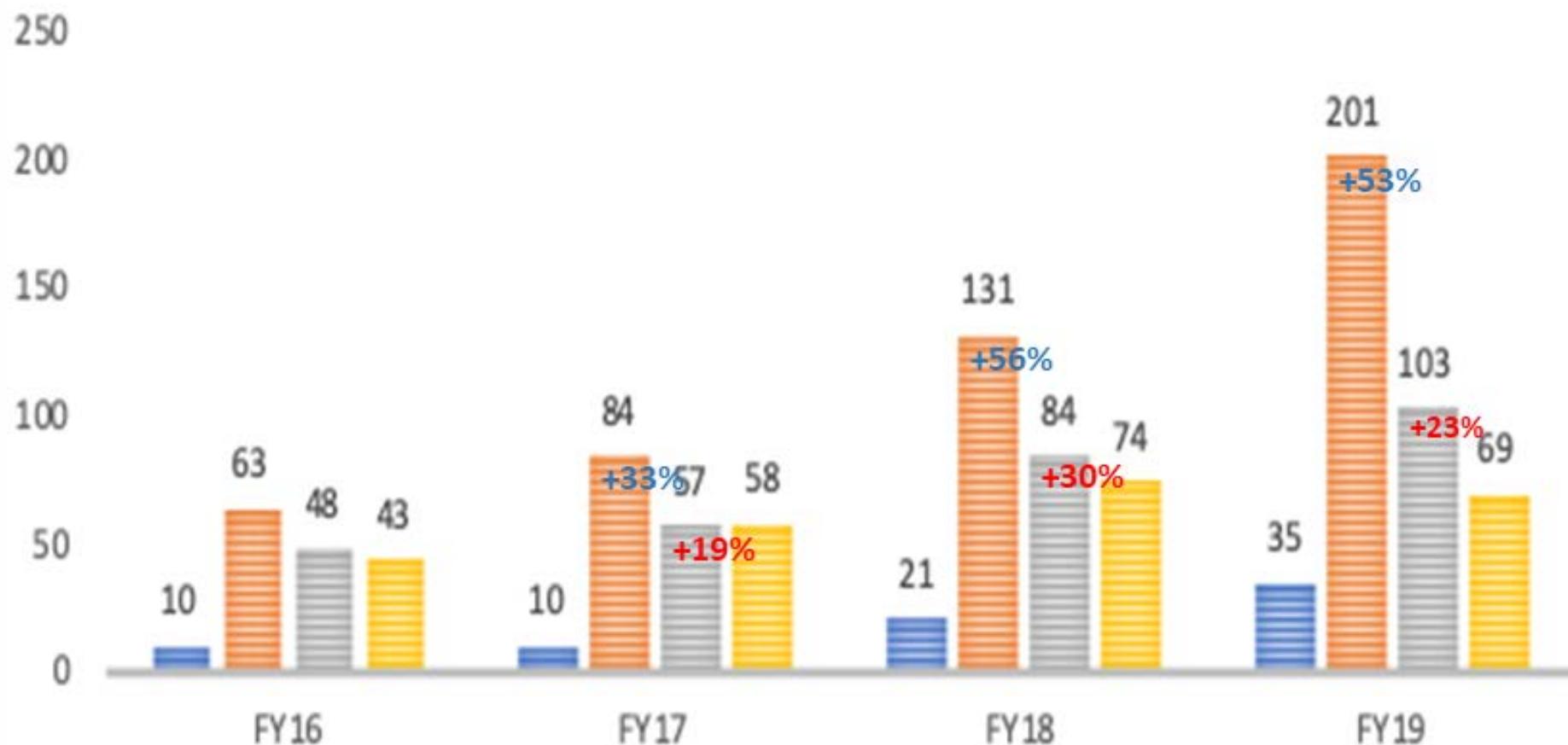
35 patents

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**

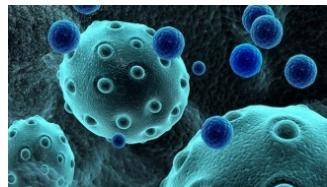
**(Initially 25-50 additional students per year; scale to 500 over 10 years)**



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



FirstString Research Inc.



*Tiny Cargo Company*

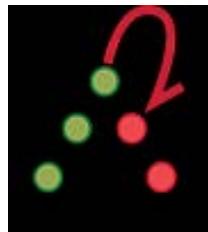
*Protecting and delivering heart therapies on target*



**BEAM Diagnostics, Inc.**

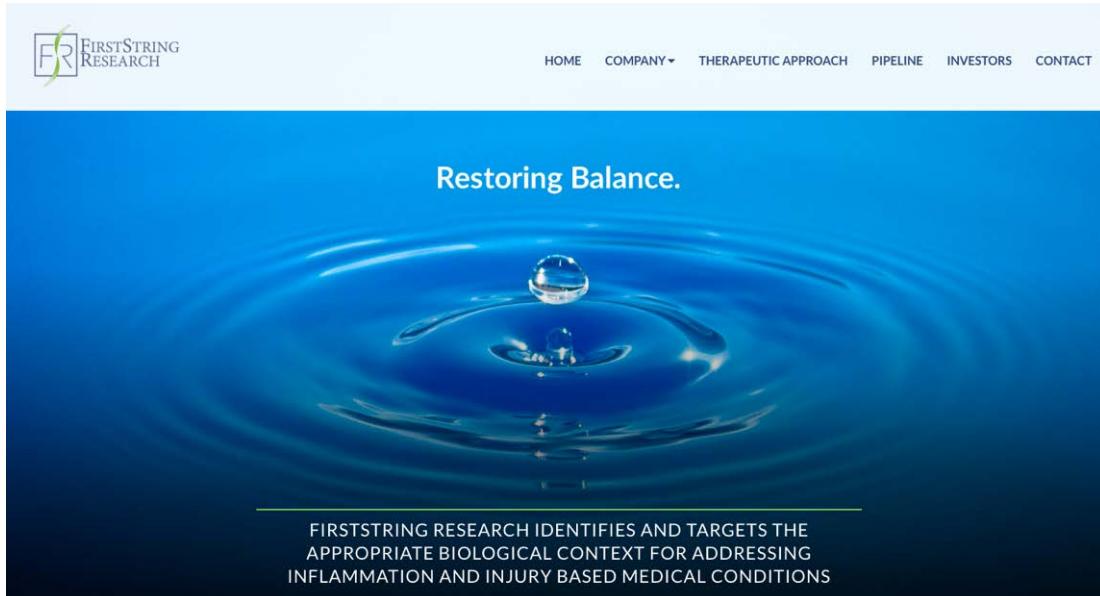
Behavioral Economics as Advanced  
Methodological Diagnostics

*Shining light on the future of precision medicine*



**ACOMHAL RESEARCH**  
FIGHTING CANCER AT ITS SOURCE

# FirstString Research Inc: αCT1 peptide drug



The image shows the homepage of FirstString Research Inc. The header features the company logo 'FR' in a green square, followed by 'FIRSTSTRING RESEARCH' in a sans-serif font. The main visual is a large blue background image of a water droplet hitting a surface, creating concentric ripples. Overlaid on this image is the text 'Restoring Balance.' in a white, sans-serif font. Below the image, a horizontal line leads to a text block: 'FIRSTSTRING RESEARCH IDENTIFIES AND TARGETS THE APPROPRIATE BIOLOGICAL CONTEXT FOR ADDRESSING INFLAMMATION AND INJURY BASED MEDICAL CONDITIONS'. The navigation bar at the top includes links for HOME, COMPANY, THERAPEUTIC APPROACH, PIPELINE, INVESTORS, and CONTACT.

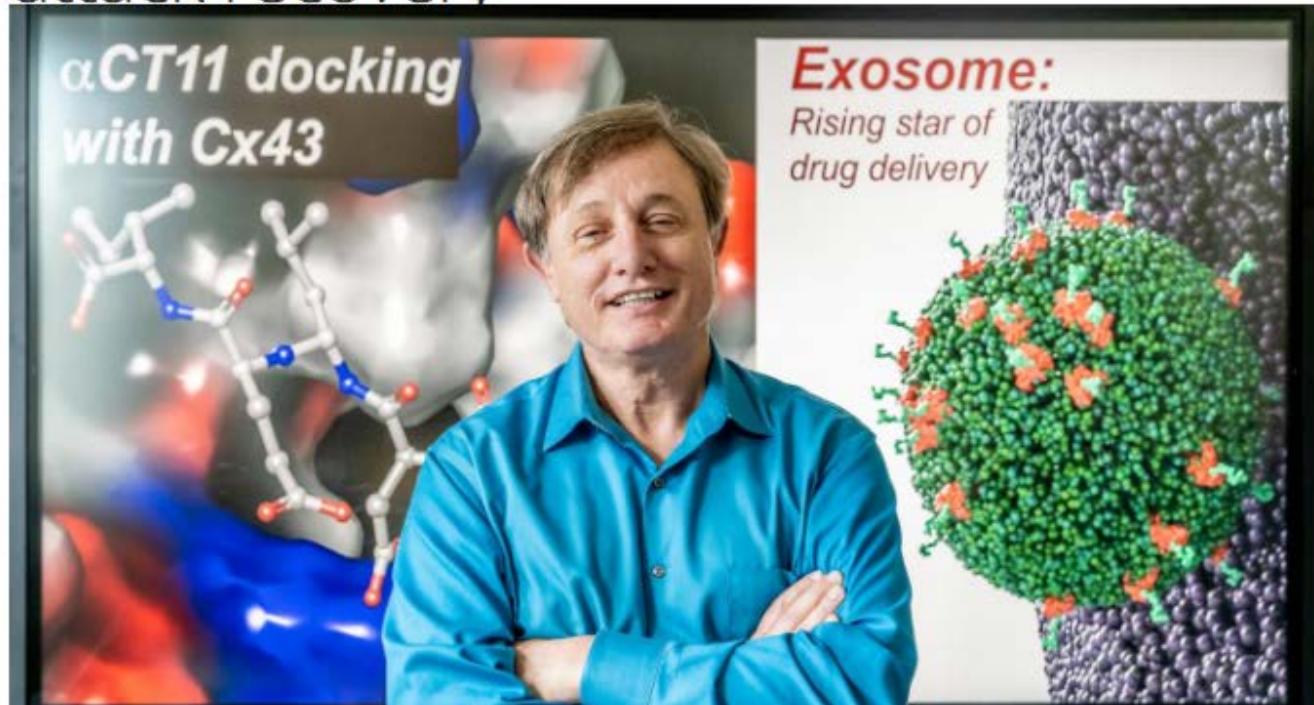


FirstString receives the Tibbets Award. Maria Contreras-Sweet, Administrator of the U.S. SBA (left), Christina Grek, Director of Translational Research (FirstString Research; center), Mark Walsh, Assoc. Administrator (SBA; right)

- ❖ 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



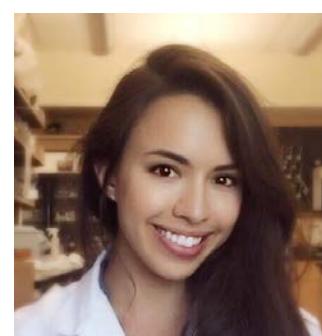
**James MacKillop, Ph.D.**  
Senior Scientific Advisor



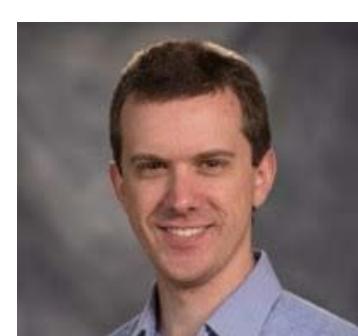
**Anita Kablinger, MD, CPI**  
Carilion PI; Collaborator



**Cynthia Lawrence**  
Business Mentor



**Elaine Bradford, MS**  
Research Coordinator



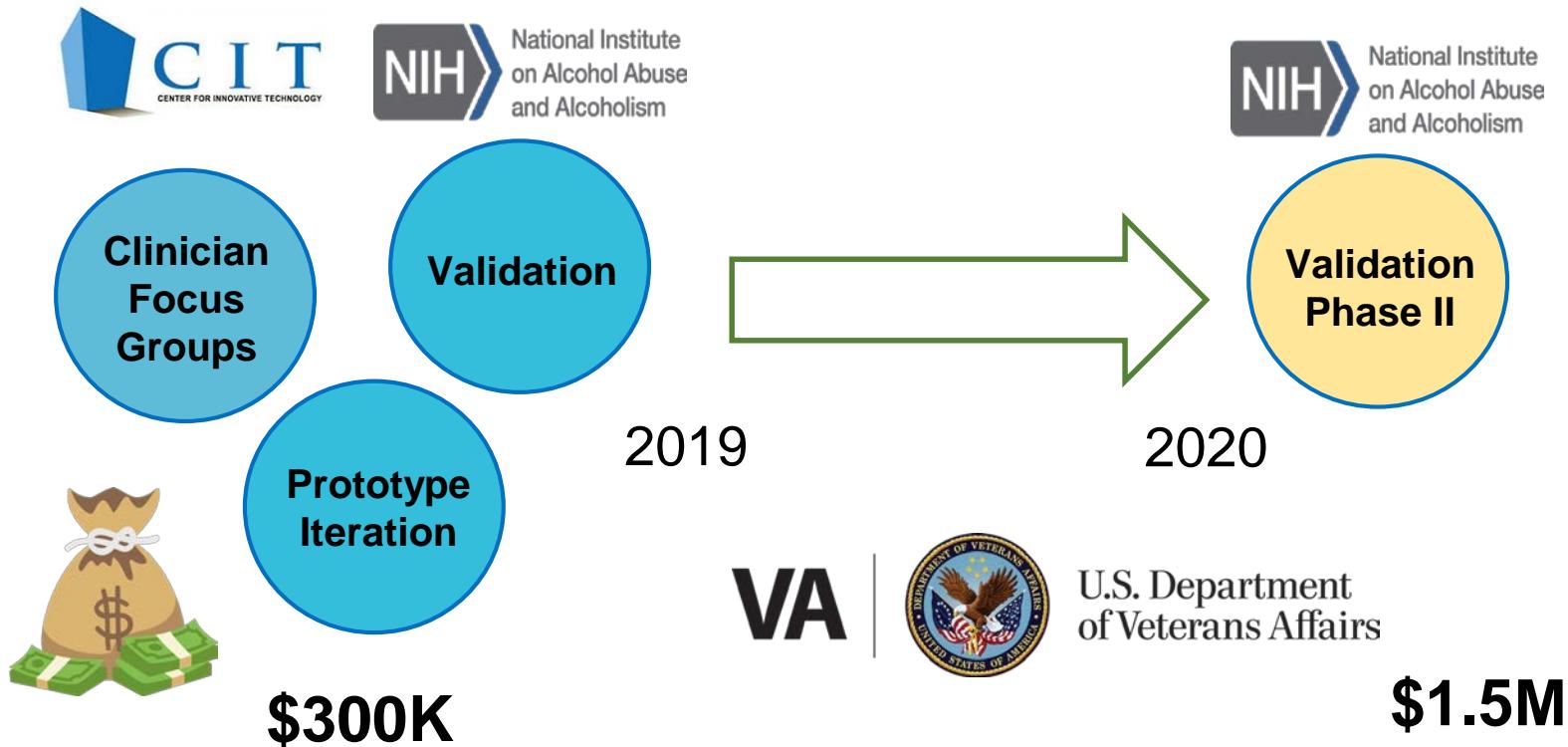
**Andrew Lindberg**



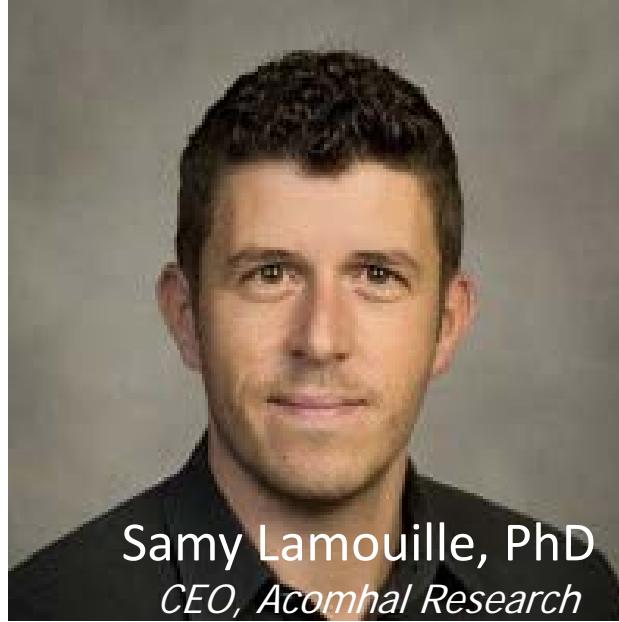
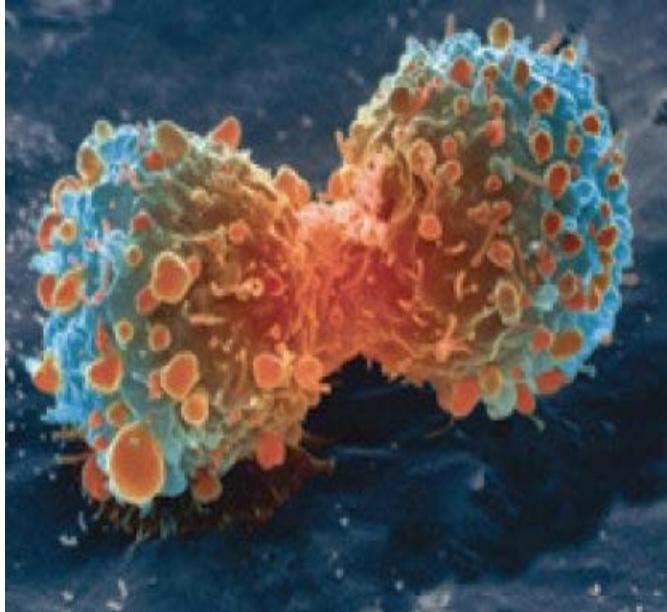
ROANOKE - BLACKSBURG  
TECHNOLOGY COUNCIL  
CONNECT • GROW • LEAD



# Where are they now?



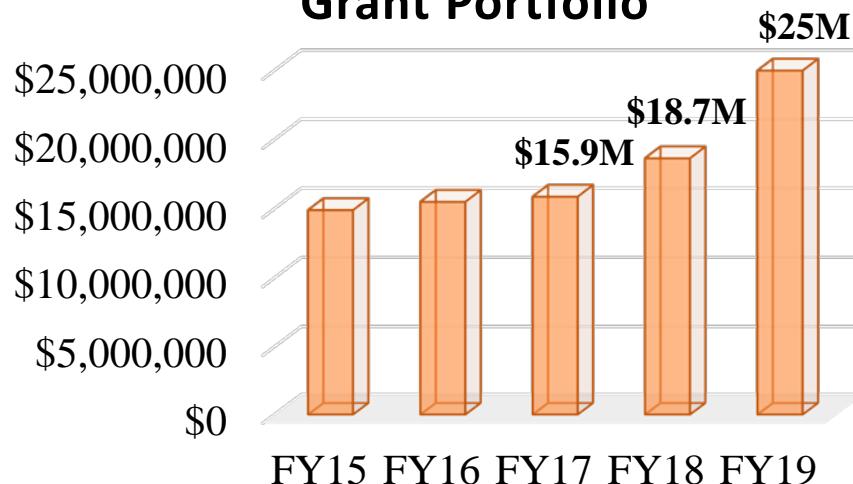
# Acomhal Research Inc: JM2 peptide drug



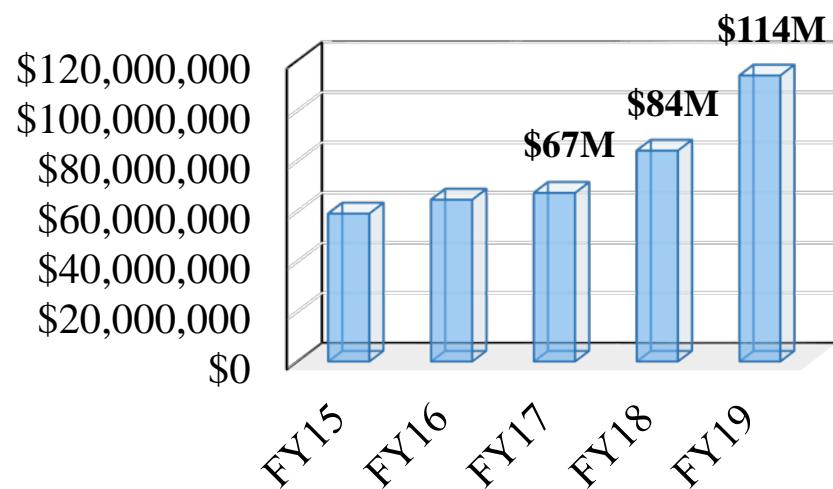
Samy Lamouille, PhD  
*CEO, Acomhal Research*

- ❖ 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

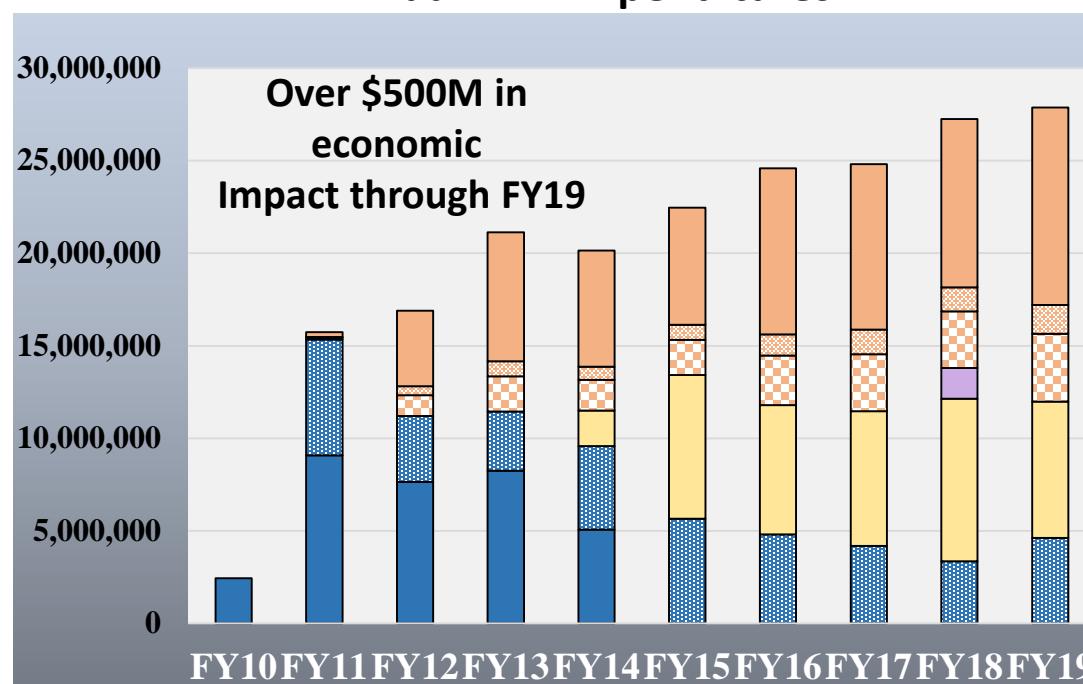
## FBRI Annual Value of FBRI Grant Portfolio



## Total Value of FBRI Grant Portfolio



## Annual FBRI Expenditures



# Sample of funding sources for FBRI research



National Institutes  
of Health



VA



U.S. Department  
of Veterans Affairs



American  
Heart  
Association®



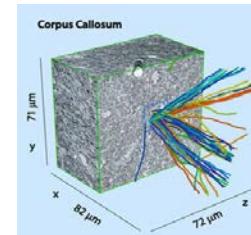
## Major industry partnerships at FBRI



INSIGHTEC

**Thermo Fisher**  
SCIENTIFIC

The world leader in serving science



# FDA deems molecular test for concussions ‘breakthrough device’



Stephen LaConte  
FBRI @ VTC

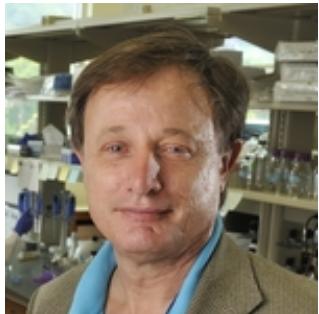


Damon Kuehl  
VTCSOM/CC

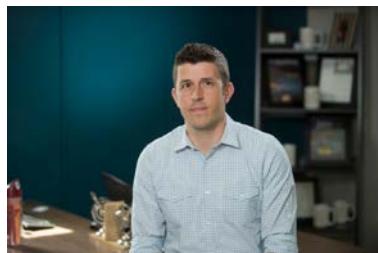
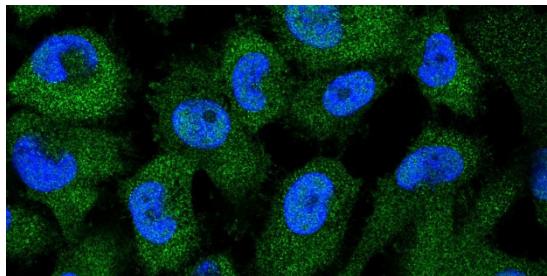


# Fralin Biomed teams re-sensitize brain cancer to temozolomide

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



Rob Gourdie



Samy Lamouille



John Rossmeisl, VT CVM



Zhi Sheng



**LINAC  
\$3.5M**

**VTC** | Fralin Biomedical  
Research Institute



# 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





Fralin Biomedical  
Research Institute



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

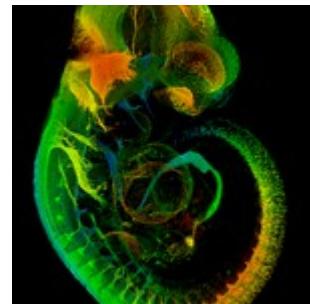


## Trauma Management Therapy for PTSD in Roanoke



FDA deems molecular test for concussions 'breakthrough device'

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

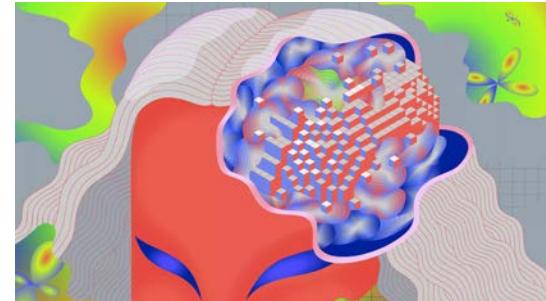


Pioneering neuro-geneticist to join Fralin Biomedical Research Institute



*The Cancer Letter*

Virginia Tech announces cancer research initiative



**THE VERGE**

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

By [B David Zarley](#)

Jan 28, 2019

米国製薬業界週報

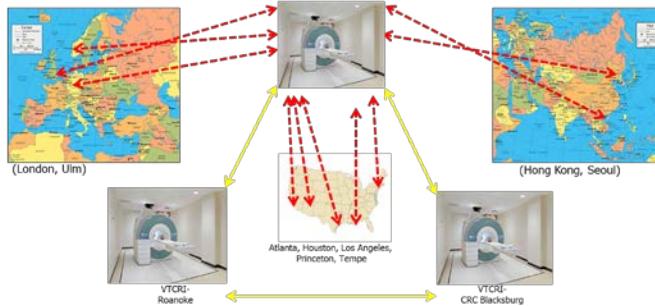
Roanoke, Virginia, USA research team identifies a new strategy in the fight against brain cancer

# Roanoke as an International Destination Site for Biomedical Research Technology Innovation

Optically pumped magnetometry



Interactive worldwide real time human functional brain imaging network hub



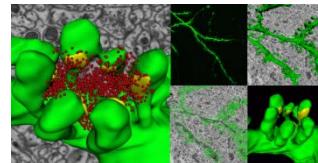
LINAC



small animal MR - PET



SBFEM



Focused ultrasound



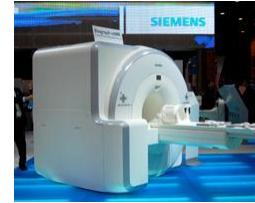
Flourescence activated cell sorter



Super resolution light sheet microscope



Large animal MR-PET

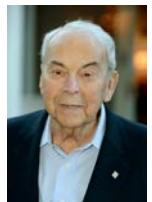


Human high field MRI



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



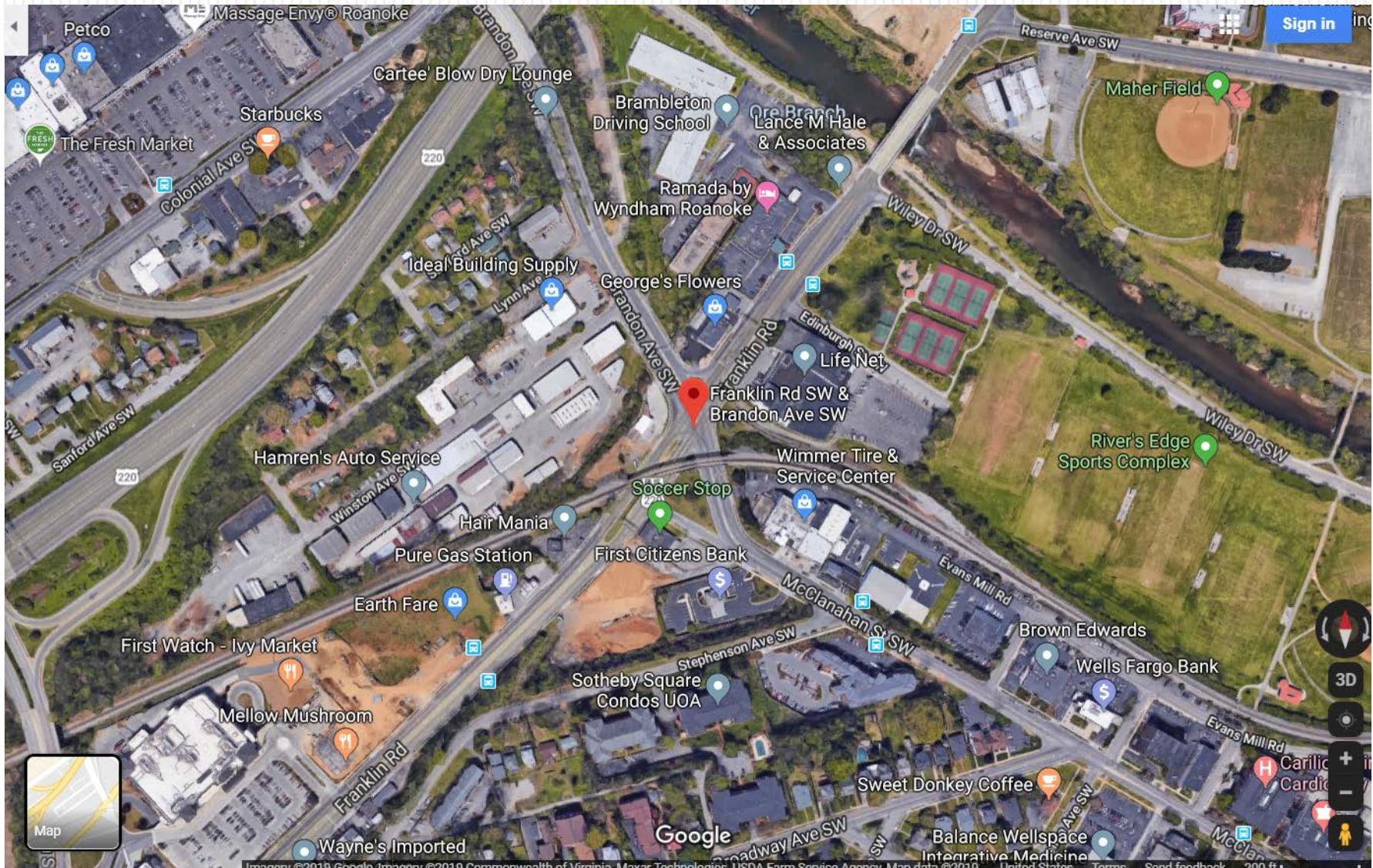
# New Franklin Road Bridge adjacent to VTC



# 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)



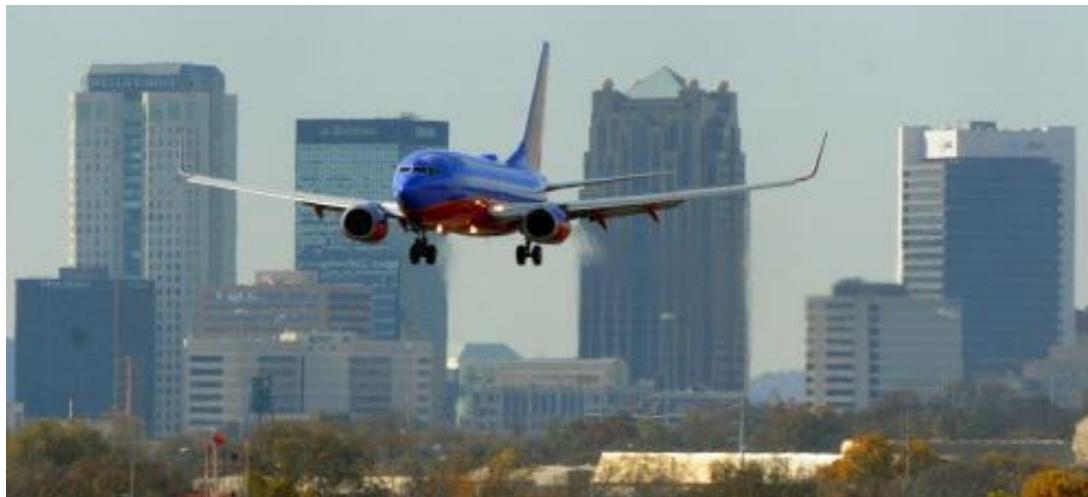
***Economist says Tech, Carilion Roanoke campus will contribute at least \$465 million to economy within 8 years***



**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

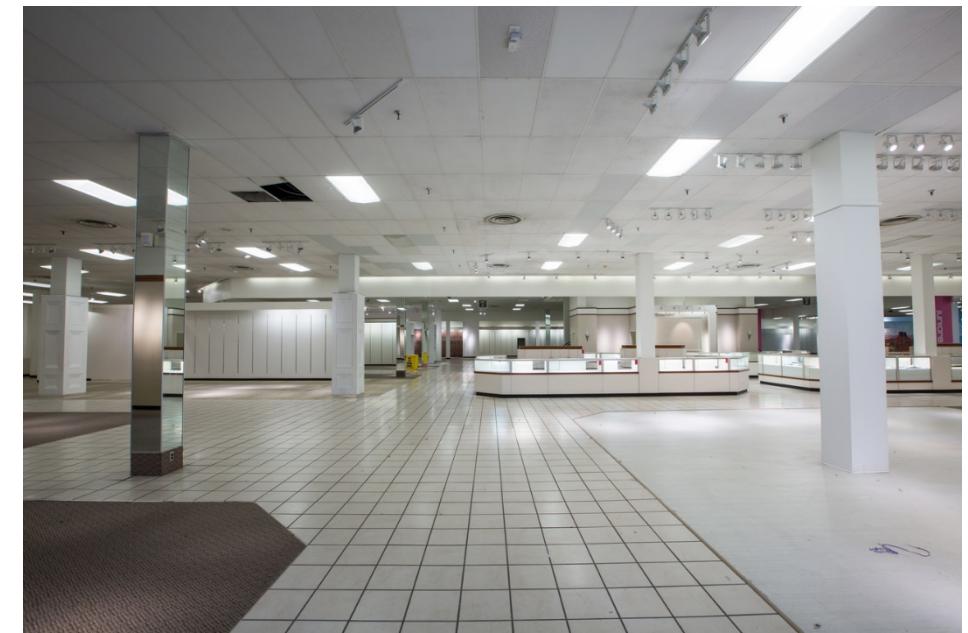
Dr. Kimberly Dunsmore

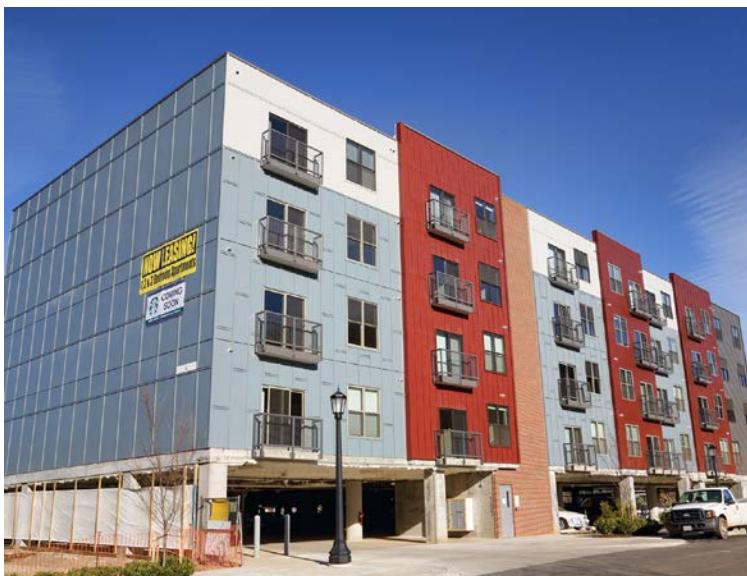
Chair of Pediatrics, Carilion Children's

Nov. 1, 2019







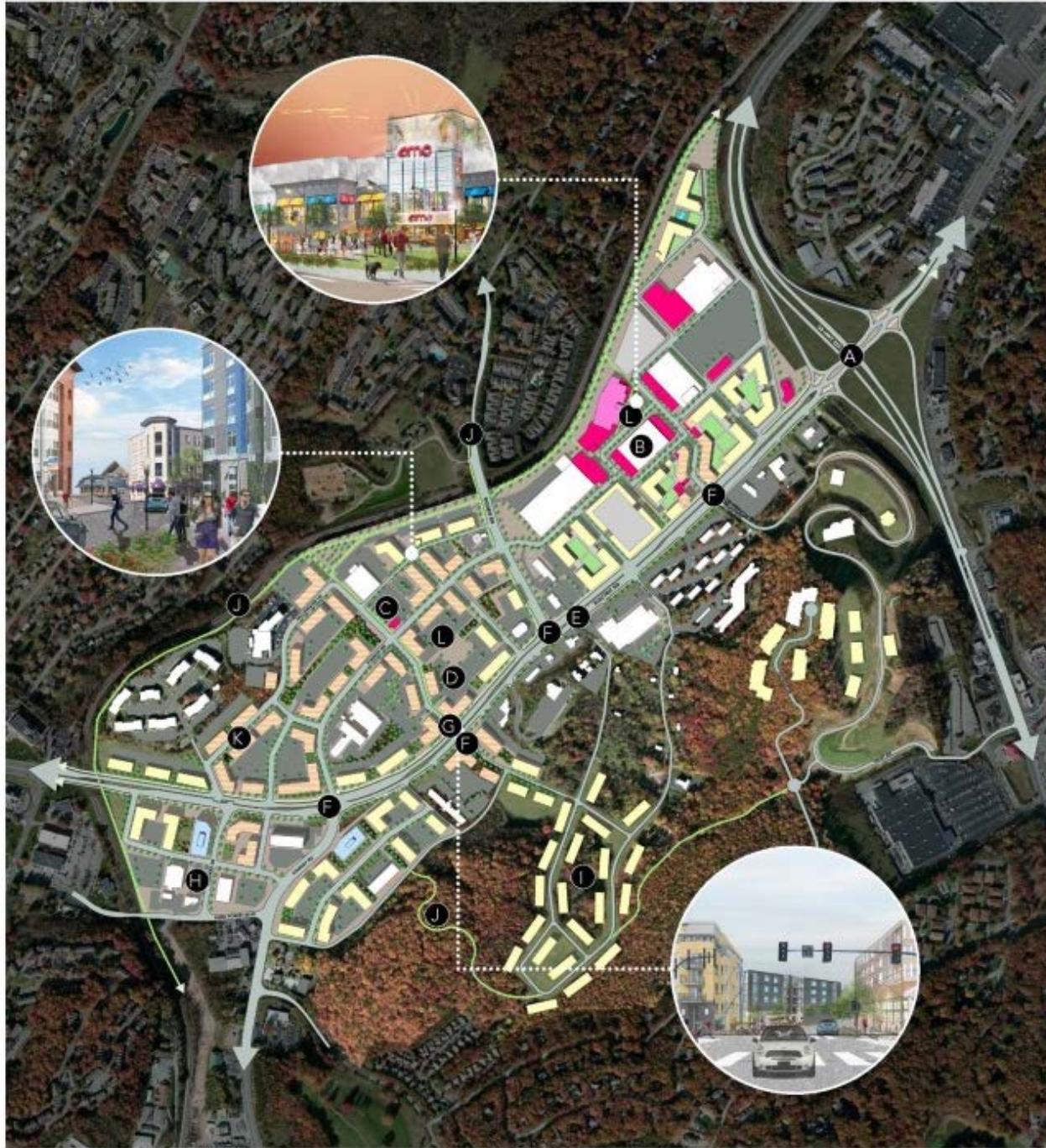




# 419 Town Center Plan

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

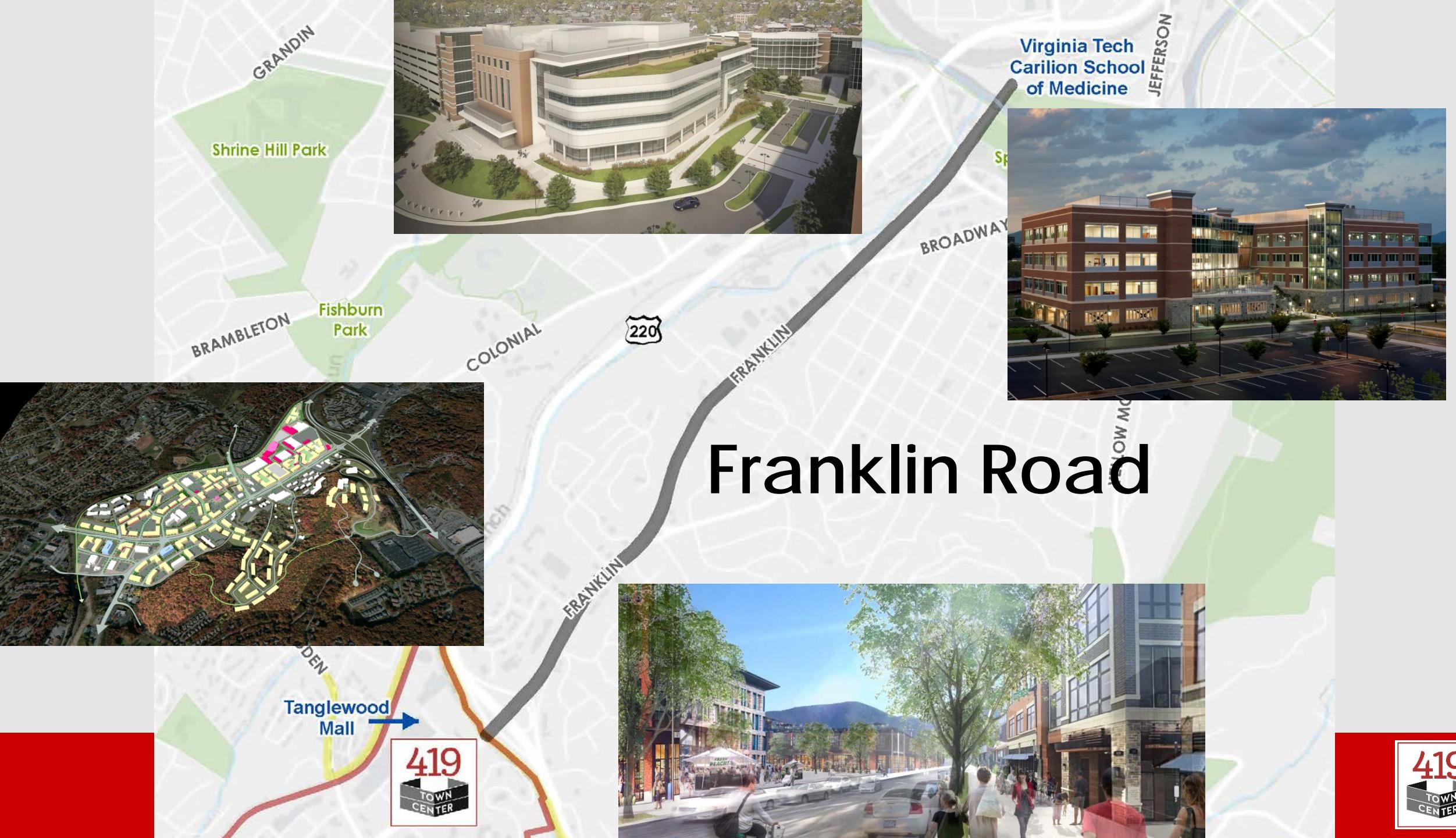
- Planning/Zoning (Regulatory)
- Community Engagement
- Infrastructure Investments



# 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









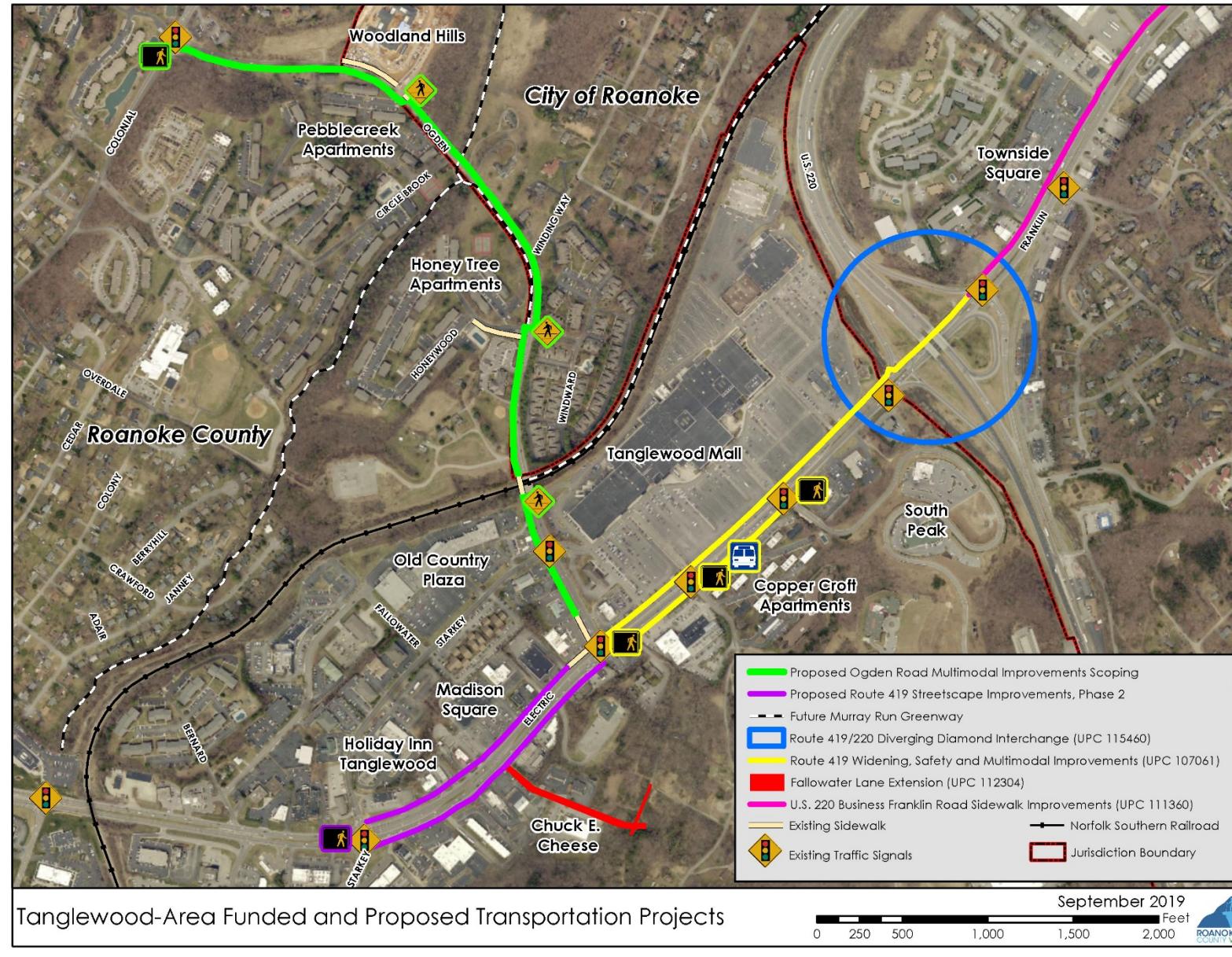
# Community Engagement

- 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

# Funded: Route 419/Route 220 Diverging Diamond Interchange

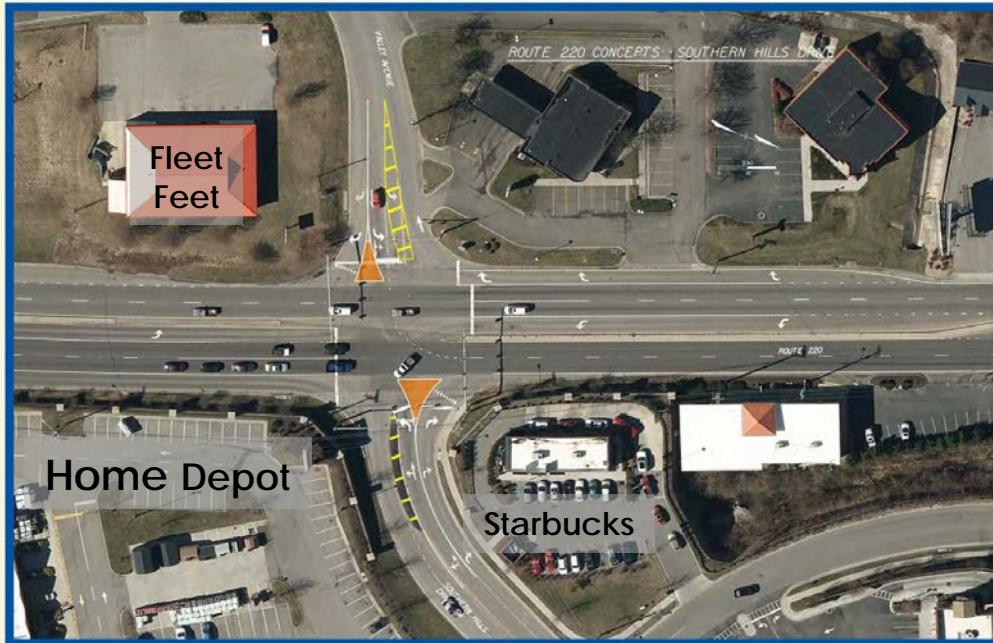
- Reconfiguring travel lanes, ramps, bicycle and pedestrian accommodations through the interchange; reducing traffic signal phases
- Preliminary Engineering: underway | Right-of-Way: 2023 | Construction: 2024



# 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 7<sup>th</sup>**  
**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



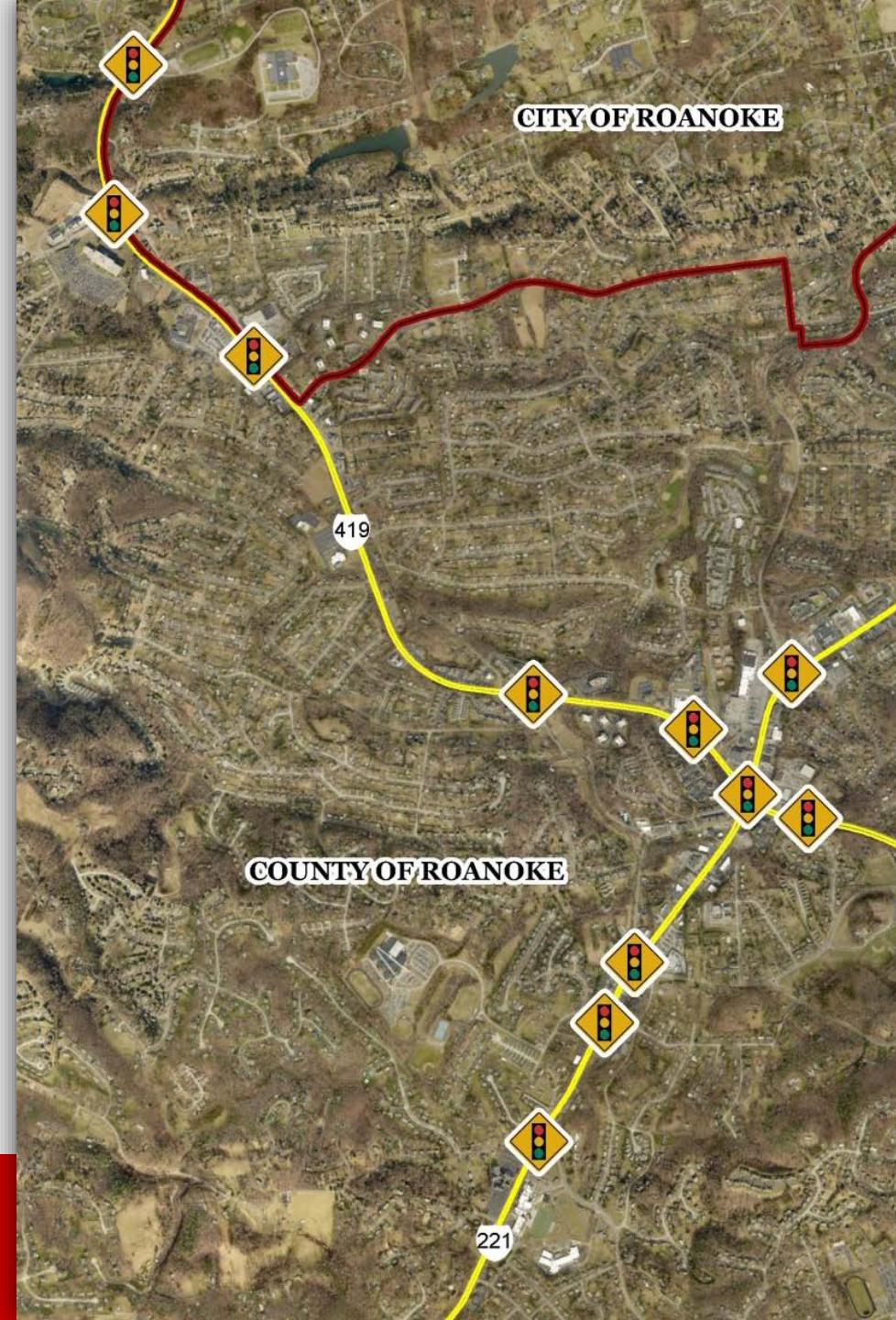
# Partially Funded: Fallowater Lane Extension

- 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

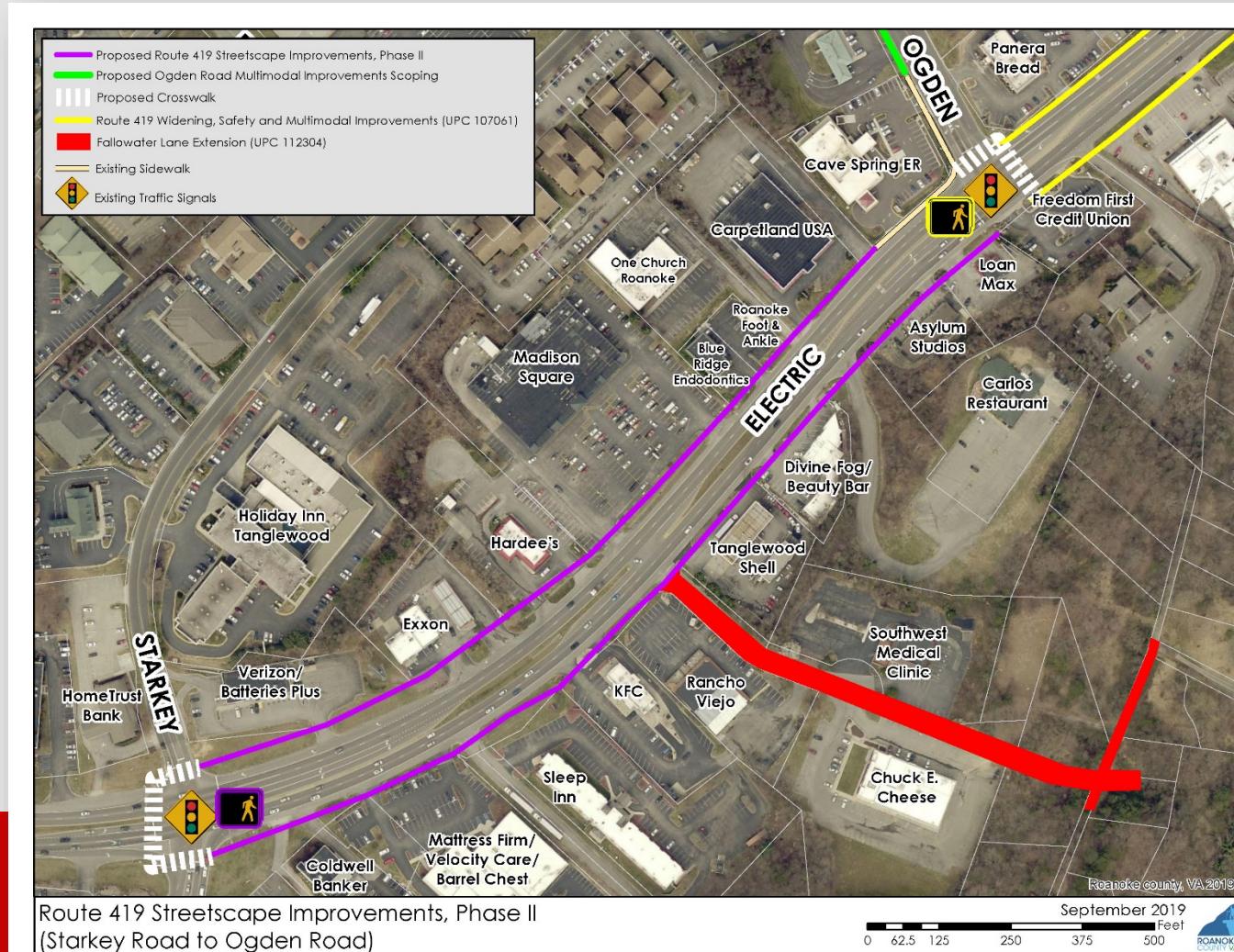
- VDOT is coordinating signals:
  - Route 419 from Colonial Avenue to Valley Drive
  - Route 221 from Garst Mill Road to Ranchcrest Drive
- Infrastructure is in place and systems will be activated in late 2019/early 2020



# Proposed Projects

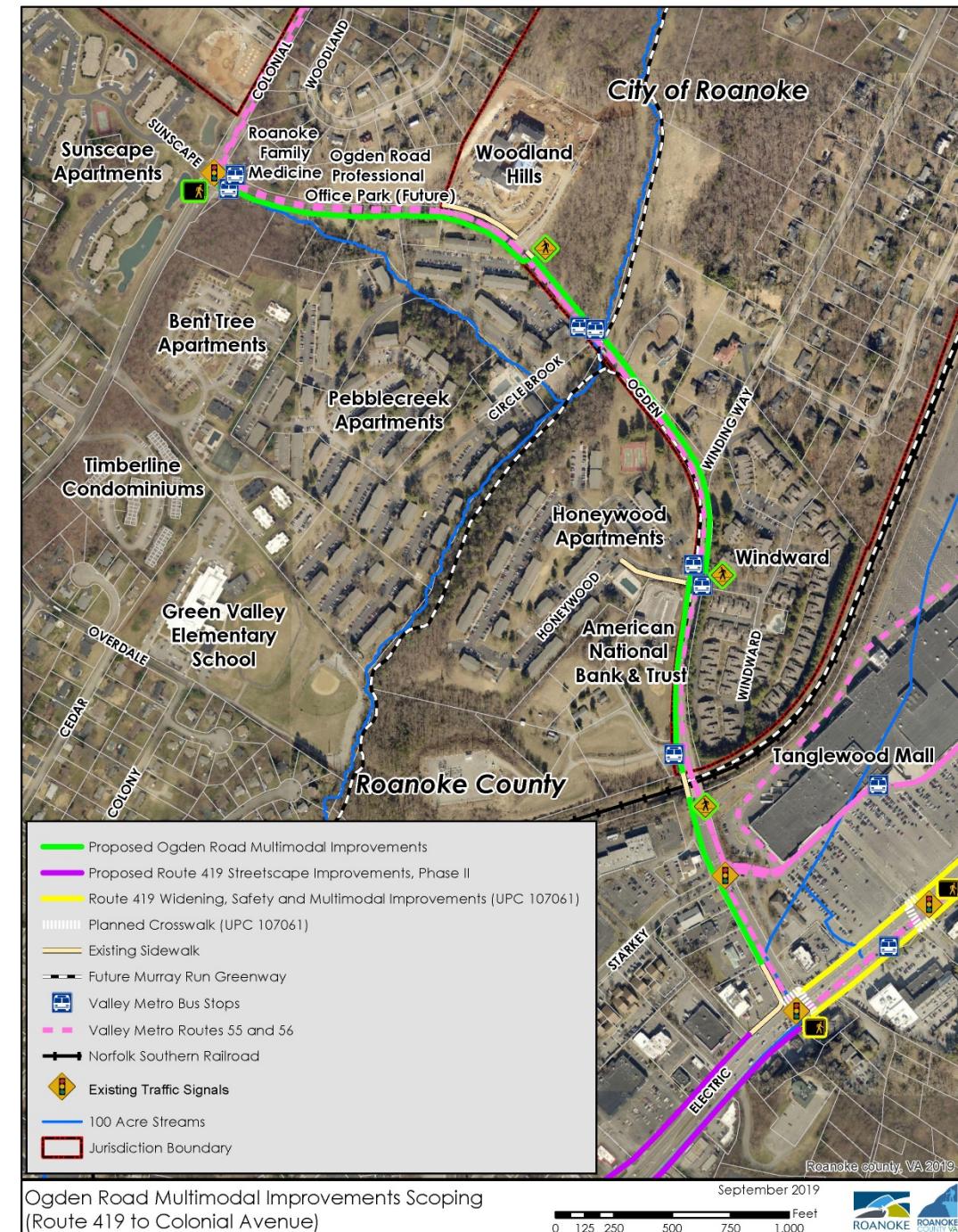
# Unfunded: Route 419 Streetscape Improvements, Phase II (Starkey to Ogden)

- 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