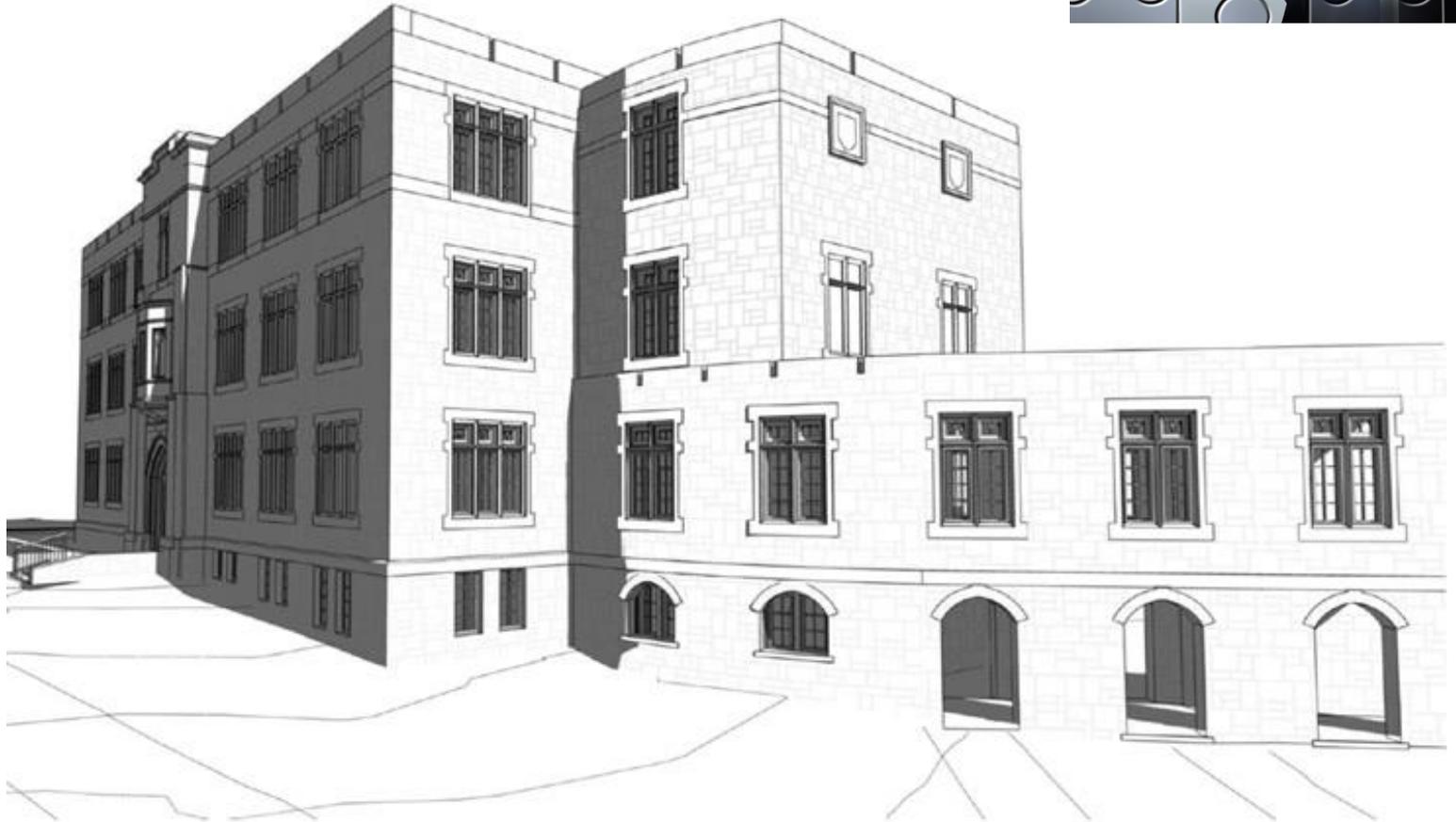


VIRGINIA TECH COLLEGE OF
SCIENCE

The Proposed School of Neuroscience





What is Neuroscience?

The scientific study of Brain-Mind & Behavior

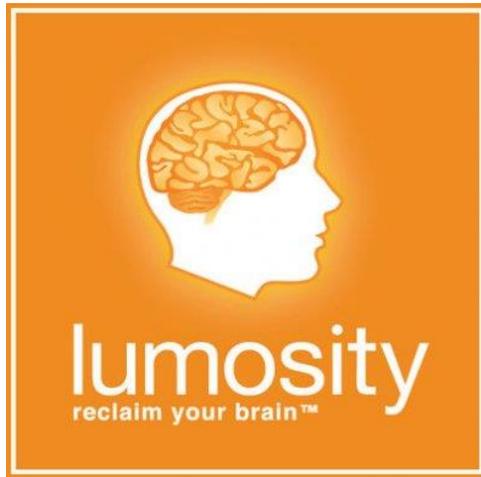
- **Broad, interdisciplinary**
- **Attempts to explain complex behavior at a genetic, molecular, cellular and systems level**
- **Evolved from neurology and biology as independent discipline**
- **One of the “hot” emerging majors with tremendous student interest**





What draws students to Neuroscience?

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VT Neuroscience is Broad!

- Genetic Neuroscience
- Molecular Neuroscience
- Cellular Neuroscience
- Neurophysiology
- Systems Neuroscience
- Developmental Neuroscience
- Cognitive Neuroscience
- Clinical Neuroscience
- Behavioral Neuroscience
- Social Neuroscience
- Neuroeconomics
- Neuroethology
- Neuro-Law
- The Artistic Brain
- Computational Neuroscience
- Neuro-Robotics





Careers Paths of Neuroscience Students

Pre-Health Major (Med/Dentistry/Vet/PA/Optomety)

- **Physician, Dentist, Veterinarian, Physicians Assistant**

Pre-Lifesciences Major (Graduate studies)

- **Graduate Faculty, Federal Research National Institutes of Health (NIH)/Centers for Disease Control and Prevention (CDC), Biotech, Big Pharma, Sales & Product Support**

Pre-Professional Major (A broad range of professions)

- **Law, Business, Finance, Architecture, Marketing, Art, Science Policy, Educational Leadership**





Why a “School of Neuroscience”?

- Captures the interdisciplinary nature of Neuroscience and prevents “siloing”
- Communicates to students and faculty that Virginia Tech is making this a major emphasis area
- Positions VT-Neuroscience to be a **Destination Program**
- Support the “One Health Mission” of Virginia Tech, Virginia Tech Carilion Research Institute (VTCRI), Veterinary Medicine and Carilion Clinic
- Tremendous potential economic impact for Virginia Tech and the commonwealth





Direct Economic Impact

- **Additional 800-1000 students**
=> \$4M/year additional tuition revenue
- **30 additional faculty at Virginia Tech & VTCRI**
=> \$20 M/year grant expenditures
- **Institutional & individual training grants**
- **Joint large grant initiatives with engineering, computer science, Veterinary Medicine, Carilion Clinic**
- **Access to federal funding streams where Virginia Tech is not currently receiving its market share (NINDS, NIMH, NIDA, NSF, DOD)**





Ensures that we compete for marquee programs



THE WHITE HOUSE IS ANNOUNCING
**OVER \$300 MILLION IN PUBLIC AND PRIVATE INVESTMENTS
IN SUPPORT OF THE BRAIN INITIATIVE**

the WHITE HOUSE
**BRAIN
INITIATIVE**

BRAIN RESEARCH THROUGH ADVANCING
INNOVATIVE NEUROTECHNOLOGIES

Since President Obama announced the **BRAIN Initiative** in April 2013, dozens of leading technology firms, academic institutions, scientists and other key contributors to the field of neuroscience have answered his call and made significant commitments to advancing the Initiative.



FEDERAL COMMITMENTS

PURKINJE CELLS

Building off of \$100 million in commitments announced last year at NIH, NSF and DARPA, the BRAIN Initiative is growing to five participating federal agencies with the addition of FDA and IARPA.

NIH NATIONAL INSTITUTES OF HEALTH

NIH is announcing \$46 million in new BRAIN-related grant awards, focusing on new tools and techniques

FDA FOOD AND DRUG ADMINISTRATION

FDA is joining the BRAIN Initiative, with the goal to enhance the transparency of the regulatory landscape for neurological medical devices

IARPA INTELLIGENCE ADVANCED RESEARCH PROJECTS ACTIVITY

IARPA is joining the BRAIN Initiative and will use multidisciplinary approaches to advance understanding of cognition and computation in the brain

DARPA DEFENSE ADVANCED RESEARCH PROJECTS AGENCY

DARPA is building on four existing programs and is planning new investments in the BRAIN Initiative, with the ultimate goal of relieving and rehabilitating warfighters and civilians suffering from traumatic injury and neuro-psychiatric illness

NSF NATIONAL SCIENCE FOUNDATION

NSF is continuing to make investments to support BRAIN Initiative by accelerating fundamental research and the development of new technologies for neuroscience and neuroengineering



Return on investment (annual)

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1. Tuition: \$4-6M
2. Grants: \$20M
3. Contracts: \$10M
4. Licensures
5. Startup Companies



POSSIBLE LONG-TERM OUTCOMES

The BRAIN Initiative has the potential to do for neuroscience what the Human Genome Project did for genomics by supporting the development and application of innovative technologies that can create a dynamic understanding of brain function. It aims to help researchers uncover the mysteries of brain disorders, such as Alzheimer's and Parkinson's diseases, depression, Post-Traumatic Stress Disorder (PTSD), and traumatic brain injury (TBI).

DENTATE GYRUS



Current status of Neuroscience

- Degree approved for fall 2015
- Already 217 students enrolled
- Core curriculum in place
- A growing list of electives in place
- New electives rolling out in 2016
- 75 faculty members affiliated
- 10 additional faculty members to be hired over the next 3 years, with 5 new hires in 2015/2016





NEW Neuroscience courses in 2016

Some will be offered as “Special Study” in the coming semesters

NEUR 4034 Diseases of the nervous system

NEUR 3144 Mechanisms of learning and memory

NEUR 4984 Neuroeconomics

NEUR 3464 Neuroscience and society

NEUR 3XXX Molecular basis for addiction

NEUR 3XXX Neuroimmunology

NEUR 3XXX Neurogenetics

NEUR 4544 Synaptic structure and function

NEUR 4964 Neuroscience capstone experience

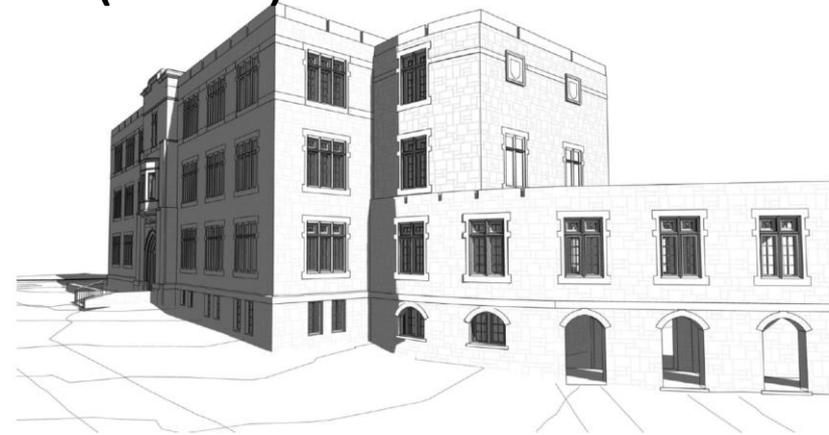




Future of Neuroscience at Virginia Tech

- School of Neuroscience => 2016
- 4 majors being rolled out (clinical, experimental, cognitive, computational)
- A minor will be added (2017)
- Master's/Ph.D. pathways planned (2017/18)
- New location: Sandy Hall (2017)

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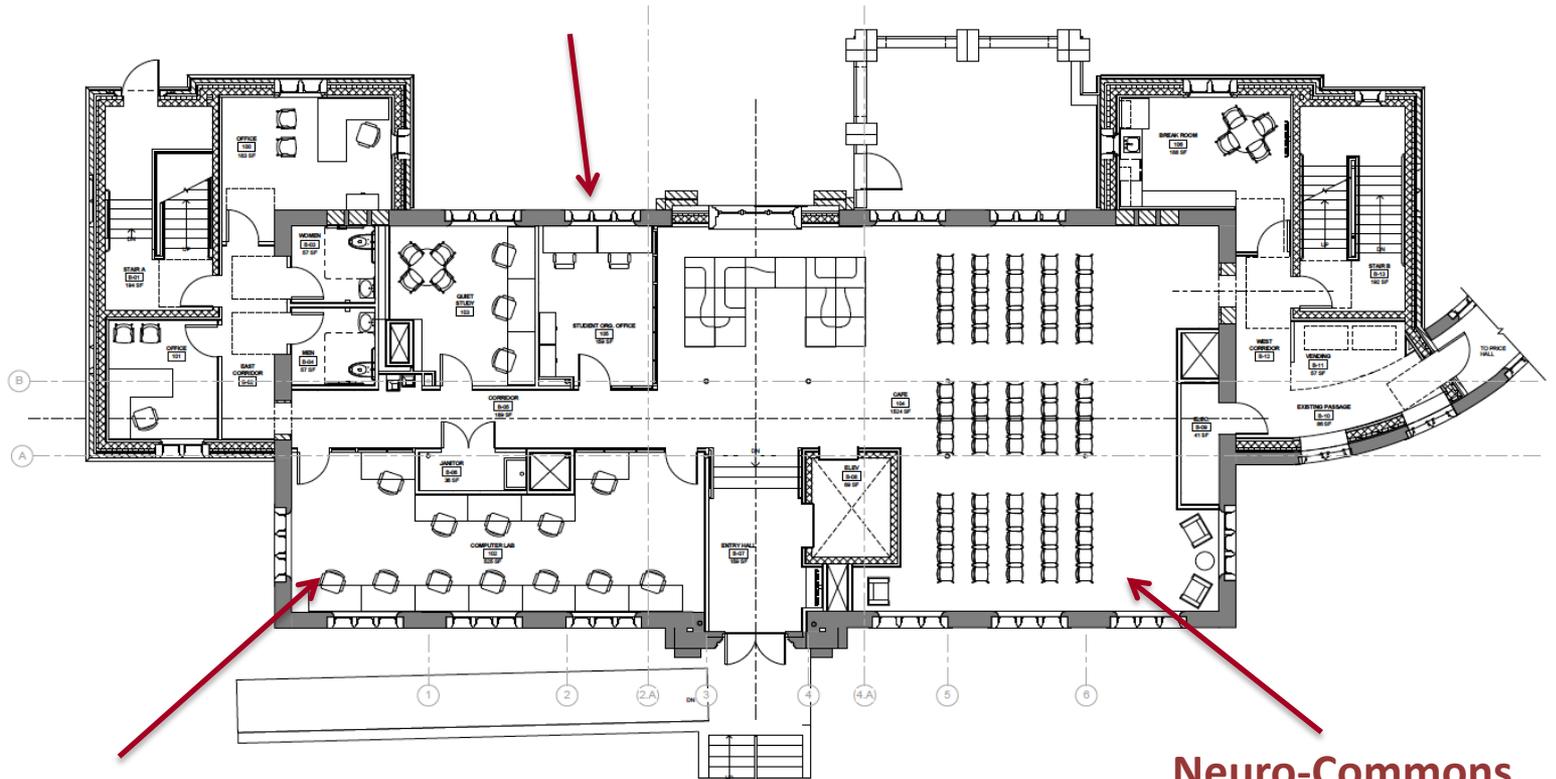


Sandy Hall, School of Neuroscience

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Neuroscience Club



Computer Lab

Neuro-Commons
TED talks



VIRGINIA TECH COLLEGE OF
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Neuroscience Q & A

