Committee Meeting Minutes

ACADEMIC AFFAIRS COMMITTEE

Inn at Virginia Tech and Skelton Conference Center
Drillfield Conference Room

August 29, 2016

Board Members Present

Tom Ryan, chair, Greta Harris, Debbie Petrine, Monty Abbas (faculty representative), Tara Reel (graduate student representative). Jim Chapman, Rector.

Guests

Andrew Barter, Mike Bowers, Kris Bush, Abby Butterfield, Rami Dalloul, Wanda Dean, Karen DePauw, Karen Eley Sanders, Mike Embrey, Jack Finney, Ron Fricker, Mike Friedlander, Rachel Gabriele, Guru Ghosh, Cathy Grimes, Jennifer Harris, Kay Heidbreder, Rachel Holloway, Maria Jernigan, Paul Knox, Marlena Lester, Gary Long, Christina McIntyre, Steve McKnight, Sally Morton, Kim O'Rourke, Ellen Plummer, Menah Pratt-Clarke, Thanassis Rikakis, Timothy Sands, Kimberly Smith, Natasha Smith, Harry Sontheimer, Kenneth Stevens, Judy Taylor, Tracy Vosburgh, Tod Whitehurst, Lesley Yorke.

OPEN SESSION

1. **Welcome.** Tom Ryan, chair of the academic affairs committee, welcomed committee members and guests.

2. **Review of Academic Affairs Committee Accomplishments.** The committee reviewed a summary report of resolutions passed and reports received during the 2015 – 2016 meetings of the committee.

3. **Approval of Minutes. A motion passed unanimously to approve the minutes of the committee's June 6, 2016 meeting.**

4. **Report of Closed Session Action Items.** In Closed Session, the Academic Affairs committee considered eight appointments to emeritus status, one honorary title, seven appointments to endowed professorships, one faculty research leave, National Distinction Salary Adjustments, and the faculty personnel changes report.

   All resolutions considered in the committee's Closed Session passed unanimously.

5. **Provost's Update.** Thanassis Rikakis, executive vice president and provost, introduced Sally Morton as dean of the College of Science. The search for the College of Engineering dean is underway. The search committee has completed its mid-term review of the pool of candidates, had a robust discussion of the desired talents of the dean, and outlined next steps.

Over the upcoming year, the committee and board will receive updates of the university's visioning and planning initiatives including Beyond Boundaries and Destination Areas. During its meeting in August, the board was provided an overview of the budget model and its alignment with the academic goals of the university. In November, the University Scorecard will be reviewed with recommendations for possible adjustments to better align the scorecard with current goals. March will include a discussion of faculty productivity. June will include a review of the metrics going forward.

Preliminary fall 2016 enrollment numbers include 31,091 students enrolled at our Blacksburg campus. This represents a 1.6% increase over 2015. We are continuing our steady growth at the undergraduate level, enrolling 25,785 undergraduates this fall – an increase of 1.8% over 2015. We are pleased we were able to continue our incremental plan to increase seats for Virginia residents in our first-year cohort enrolling 4,308 new Virginia residents out of our overall 5,925 enrollees in our first-year entering class. We are also pleased to enroll our largest transfer cohort with 1,039 enrolling for fall 2016 (compared to 979 in 2015). Over 65% of our transfer cohort transferred from the Virginia Community College System in 2016. One challenge this year was a lower yield of out-of-state students than expected. A lower yield was experienced by all competitive institutions in the commonwealth and nearby states requiring that institutions use waitlists as a method for managing yield.

Recruitment and admissions initiatives such as the College Access Collaborative are efforts to strategically reach untapped communities of students who can contribute to Virginia Tech's success. Additional and targeted enrollment and admissions initiatives include new regional admissions counselors in Northern Virginia and Richmond. In August and September, the director of admissions hosted breakfasts with high school guidance counselors in Abingdon, Danville, Lynchburg, Blacksburg, Norfolk, Richmond, and Fairfax. At these gatherings, the director discussed the VT Shaped student, new majors, the new admissions approach, and other initiatives.

The new College Access Collaborative has established partnerships with 11 underserved areas, many in southwest, Southside and Hampton Roads areas. The College Access Collaborative is leveraging resources from a Jesse Paul DuPont grant and hosted the ACCESS College Foundation. ACCESS is a foundation originating in the South Hamptons Roads area that has raised over $500M in financial aid and have placed foundation advisors in the South Hamptons roads area high schools. The event was an overwhelming success. We believe this is a

beginning of a long range relationship with this foundation that will aid in broadening our underrepresented student application pool – as well as creating new advocates for Virginia Tech among the high school counselors in the South Hampton areas.

Efforts to strengthen and advance Agency 229, comprised of Virginia Cooperative Extension and the Virginia Agricultural Experiment Station, include increased collaborations between the commonwealth's Agricultural Research and Extension Centers (ARECs) and local industries aimed at advancing the commonwealth's industrial agriculture opportunities for the 21st Century. In September, key agricultural agencies and industry partners will meet and articulate a new 21st Century profile for agency 229. Investments in Agency 229 will result in improved public-private partnerships and will result in living labs for students and opportunities for commercialization.

With Teresa Mayer, vice president for research and innovation, the university is pursuing the elements necessary to aggressively advance innovation. Improvements designed to advance private/public partnerships, commercialization, increase research expenditures, and initiatives that draw on expertise in myriad domestic and international locations including Roanoke and the National Capital Region. New initiatives and strengthening infrastructure offer an integrated and comprehensive "ecosystem" dedicated to innovation excellence.

6. **Academic Administration**

   *a) Resolution of Intent to Acquire and Integrate the Virginia Tech Carilion School of Medicine. Michael Friedlander, vice president for health sciences and technology, presented a resolution expressing intent to acquire and integrate the Virginia Tech Carilion School of Medicine into Virginia Tech. The word acquire in the resolution refers to the academic and research enterprise, not a monetary acquisition.

   The committee unanimously approved the Resolution of Intent to Acquire and Integrate the Virginia Tech Carilion School of Medicine.

   b) **Report of Reappointments to Endowed Chairs, Professorships, or Fellowships.** Jack Finney, vice provost for faculty affairs, presented to the committee three reappointments to endowed chairs, professorships, or fellowships.

   *c) Resolution to Ratify the 2016 – 2017 Faculty Handbook. Jack Finney presented for approval a resolution to ratify the university's faculty handbook.

   The committee unanimously approved the Resolution to Ratify the 2016 – 2017 Faculty Handbook.

7. **Academic Affairs**

   a) **Update on Bachelor of Science Degree in Computational Modeling and Data Analytics.** Mark Embree, professor of mathematics and leader of the Computational Modeling and Data Analytics program, reported on the progress of the undergraduate B.S. degree in computational modeling and data analytics (CMDA) approved by the board in 2014. CMDA was designed by a collaborative team from computer science, math, statistics, and physics. In the spring of 2017, 20 students will graduate with a B.S. in CMDA. The benchmark provided the State Council of Higher Education (SCHEV) in 2014 was 110 majors by 2018; to date, far exceeding the target, 255 students have declared CMDA as their primary or double major.

   b) **Update on Bachelor of Science Degree in Neuroscience**. Professor Harald Sontheimer, executive director of the School of Neuroscience, reported on the progress of the undergraduate B.S. degree in neuroscience approved by the board in 2014. Currently, 400 students are enrolled in the program that offers opportunities in four majors: clinical, experimental, computational and systems neuroscience, and cognitive and behavioral.

7. **Adjournment 11:00 a.m.**

2015-16 Academic Affairs Committee Selected Accomplishments

2015-16 Academic Affairs Committee (AAC) themes and topics: (1) Academic Affairs Committee, (2) Academic Initiatives and Administration, (3) Academic Administration and Support (4) Faculty Affairs, (5) Global Strategies, and (6) Inclusive Excellence.

Committee breakfasts: Vice Provosts (November 2015); Faculty Senate representatives (March 2016); Graduate student leaders (June 2016).

Academic Affairs	
Enrollment Management	• Updated on student enrollment (March 2016). • Enrollment Management Group (EMG) annual update (June 2016).
Academic Affairs Committee Orientation	• Role of Academic Affairs Committee (August 2015). • Established Academic Affairs Committee focus areas (August 2015).
Curriculum and Degree Management	• Presentation on the process for the development and management of new degrees (November 2015).

Academic Initiatives and Administration	
Pratt Fund	• Approved Pratt Fund Budget(November 2015). • Reviewed Pratt Fund Expenditures Report (June 2016).
Degree Actions	• Approved School of Neuroscience in the College of Science (November 2015)

Academic Administration and Support	
General Education	• Approved Revisions to the Undergraduate Honor System (March 2016). • Updated on Preparing Virginia Tech Graduates for 21st Century Economies (November 2015). • Conferred Honorary Degree on Irving Linwood Peddrew III (March 2016)
Graduate Education	• Update on Graduate Education at Virginia Tech (March 2016).
Accreditation Update	• Updated on Fifth Year Interim Report with the Southern Association of Colleges and Schools – Commission on Colleges (SACSCOC) regional accreditation process (August 2015).

Faculty Affairs	
Academic Administration	• Approved Resolution to Revision of the Commission on Equal Opportunity and Diversity's Charge (August 2015). • Approved Resolution to Amend Virginia Tech's Equal Opportunity and

	Affirmative Action Statement to Comply with Executive Order 13665 (November 2015). • Approved Resolution Establishing an Honors College at Virginia Tech (June 2016)
Faculty Actions	• Approved 30 appointments to emeritus/emerita status. • Approved 31 endowed chairs, professorships, and fellowships appointments. • Approved Resolution for 2015 – 2016 Faculty Salary Adjustments (August 2015). • Approved 1 appointments to Alumni Distinguished Professor (March 2016). • Approved 1 Exemption to Virginia Conflict of Interest Act (August 2015). • Approved 72 Faculty Research Leaves (November 2015, March 2016). • Approved 86 Promotion, Tenure, and Continued appointments (June 2016). • Approved Resolution Establishing the Collegiate Professor Series of faculty ranks (June 2016)
Faculty Handbook	• Ratified the 2015-2016 *Faculty Handbook* (August 2015).

SUMMARY
Reappointments to Endowed Chairs, Professorships, or Fellowships (3)

August 29, 2016

College of Engineering

Danesh Tafti   William S. Cross Professorship

Christopher Fuller   Samuel Langley Professor of Engineering

College of Science

Harry Dorn   Dr. A.C. Lilly, Jr., Faculty Fellowship of Nanoscience

ENDOWED PROFESSORSHIP
William S. Cross Professorship

The William S. Cross Professorship in the College of Engineering was established 1984 by a generous gift from William S. Cross, Jr. The creation of this professorship enables the college of engineering, Virginia Tech to generate new interest in research and scholarship. Dean Taylor has nominated Dr. Danesh K. Tafti as the William S. Cross Professor, based on the recommendations of the Department of Mechanical Engineering and Honorifics Committee.

Dr. Tafti has excelled at scholarship, teaching, service, and outreach since he began his academic career at Virginia Tech in 2002. Through his innovative teaching methods making use of interactive classroom instruction technologies combined with hands on learning experiences, he has had tremendous impact on hundreds of Mechanical Engineering students. He has been instrumental in integrating computational fluid dynamics (CFD) techniques into the College of Engineering through mentoring senior capstone design projects and various research projects. This has engaged a multitude of students in hands-on extracurricular activities and sponsored research.

Dr. Tafti has excelled at developing new methods in computational fluid dynamics with research and scholarship. He has obtained external grants in excess of $19 million. Dr. Tafti has been instrumental in developing two new courses and teaching in the Mechanical Engineering Department all while continuing to maintain his presence as an active researcher. He has teamed with other departments to advise joint students when necessary.

Engaging students in service learning projects is a common theme in Dr. Tafti's teaching. He has chaired 19 PhD and 19 MS degree thesis committees; mentored 14 post-doctoral researchers and 1 visiting scholar; served on 57 PhD and 31 MS thesis committees; and mentored and directed the undergraduate research of at least 10 individuals.

Dr. Tafti through his scholarship in computational fluid dynamics and in the field mechanical engineering has made outstanding contributions to Virginia Tech, to the Commonwealth of Virginia and to the nation by his innovative teaching methods, his service and outreach to the community, and through his 102 journal publications and 3,313 citations. He is also the author/co-author of 111 Conference Proceedings, and 17 Conference Abstracts and Presentations.

REAPPOINTMENT:

The president and executive vice president and provost have confirmed the reappointment of Dr. Tafti to the William S. Cross Professorship in Engineering for a renewable period of 5 years, effective August 10, 2016, with a salary supplement and operating budget as provided by the endowment.

August 29, 2016

ENDOWED PROFESSORSHIP
Samuel Langley Professor in Engineering

The Virginia Tech Samuel Langley Professorship is supported with funds allocated to Virginia Tech from NASA, through the National Institute of Aerospace (NIA), for salary support and for other purposes such as graduate student support. The holder of the Samuel Langley Professorship should work in support of Virginia Tech and NIA activities. NIA is a non-profit research and graduate education institute created to conduct leading-edge aerospace and atmospheric research, develop new technologies for the nation and help inspire the next generation of scientists and engineers. NIA serves as a strategic partner with NASA Langley Research Center and the aerospace community to enable research creativity and expand technology development opportunities. Dean Taylor has nominated Dr. Fuller as the Samuel Langley Professor, based on the recommendations of the Department of Mechanical Engineering and Honorifics Committee.

Dr. Fuller has excelled at scholarship, teaching, service, and outreach at Virginia Tech. Through his innovative teaching methods making use of interactive classroom instruction technologies combined with hands on learning experiences, he has impacted hundreds of Mechanical Engineering students. He has been instrumental in integrating advanced sound and vibrations techniques into the College of Engineering through mentoring senior capstone design projects and state-of-the-art research. This has engaged a multitude of students in hands-on extracurricular activities and integrated research and education.

Dr. Fuller has excelled at developing sound and vibration techniques with research and scholarship. He has obtained external grants worth $4.4 million during the past 10 years alone. Dr. Fuller is focused on providing innovative teaching methods making use of interactive classroom instruction technologies combined with hands on learning experiences.

Engaging students in service learning projects is a common theme in Dr. Fuller's teaching. His work with NIA and earlier in his career at Virginia Tech resulted in supervising to completion of over 24 PhD and 39 MS students. He also has presented countless keynote and distinguished speaker lectures and written over 170 journal articles. He currently has 10 patents, 4 of which are in commercial production.

Dr. Fuller through his scholarship in sound and vibration and in the field of Mechanical Engineering has made outstanding contributions to Virginia Tech, to the Commonwealth of Virginia and to the nation by his innovative teaching methods, his service and outreach to the community, and through his publications.

REAPPOINTMENT:

The president and executive vice president and provost have confirmed the reappointment of Dr. Christopher R. Fuller to the Samuel Langley Professorship in Engineering for a renewable period of 5 years, effective August 10, 2016 with a salary supplement and operating budget as provided by the endowment.

August 29, 2016

ENDOWED FACULTY FELLOWSHIP
Dr. A.C. Lilly, Jr., Faculty Fellowship of Nanoscience

The Dr. A.C. Lilly, Jr., Faculty Fellowship was established in the College of Science through an endowment by Dr. A.C. Lilly, Jr., a former professor of the Physics Department. Dr. Lilly established the *Faculty Fellowship Endowment in Nanoscience* to provide support for an outstanding faculty member in the field of nanoscience.

Dr. Lay Nam Chang, Dean of the College of Science, concurs with the recommendation of the College of Science Honorifics Committee to extend the appointment of Professor Harry Dorn for an additional year.

Dr. Dorn joined the Department of Chemistry in 1974 as an Assistant Professor and rose through the ranks to Full Professor in 1985. In 2012, Dorn joined the Virginia Tech Carilion Research Institute (VTCRI) in Roanoke, VA as a professor and research principal investigator. In 2013, the Dorn laboratory and collaborators discovered an endohedral metallofullerene that represents a "missing link" with low symmetry that can transform to many previously characterized metallofullerenes.

Dr. Dorn's expertise with nanomaterials has been recognized internationally, nationally, and within the Commonwealth of Virginia. He was invited to serve on the NSF Working Group to Define Major Research Facilities for Nanoscale Science & Technology (2001), the First (and Second) Conference on Nanoscience and Nanotechnology (co-sponsored by Oak Ridge National Lab, 2000 & 2001) and the steering committee of INanoVA, a conference on nanotechnology in Virginia. Dr. Dorn was awarded the Virginia Tech Alumni Award for Research Excellence in 2006.

Dr. Dorn's scholarship record is truly remarkable. He has published over 180 peer-reviewed articles including several in *Science* and *Nature*. Dr. Dorn averages ~400 citations per year since 2008, with an h-index of 41, and he is the holder of three U.S. patents. He has been funded to pursue both the basic science of nanomaterials and their applications. Dr. Dorn has been a PI on proposals bringing in more than $6 million since 2005.

Dr. Dorn has also been involved in nanoscience education. He has developed "A Hands-On Short Course on Buckyballs, Nanotubes, and Other Nanomaterials," which was funded by a grant from the NSF-NUE. He has also created a new graduate-level interdisciplinary course on carbonaceous nanomaterials first offered in 2008 and co-taught with Professor Mool Gupta in the Department of Electrical Engineering at the University of Virginia.

REAPPOINTMENT:

The president and executive vice president and provost have confirmed the reappointment of Dr. Harry Dorn to the Dr. A.C. Lilly, Jr., Faculty Fellow for a one-year term, effective August 10, 2016, with a salary supplement as provided by the endowment and the eminent scholar match, if available.

August 29, 2016

Virginia Tech
College of **Science**

Today's land-grant university must address the economic and societal needs of this generation - our graduates must have the capacity to solve complex problems of a regional, national, and global scale

Sally C. Morton

Dean, College of Science

August 2016

CMDA Program

Global Systems Science

Intelligent Infrastructure

School of Neuroscience

Integrated Security

Adaptive Brain and Behavior

VirginiaTech
1872
College of Science

Spirit of Beyond Boundaries

- Retooling Science

- Recognize progress and what remains to be done

- Nurture and *increase* their numbers and contributions

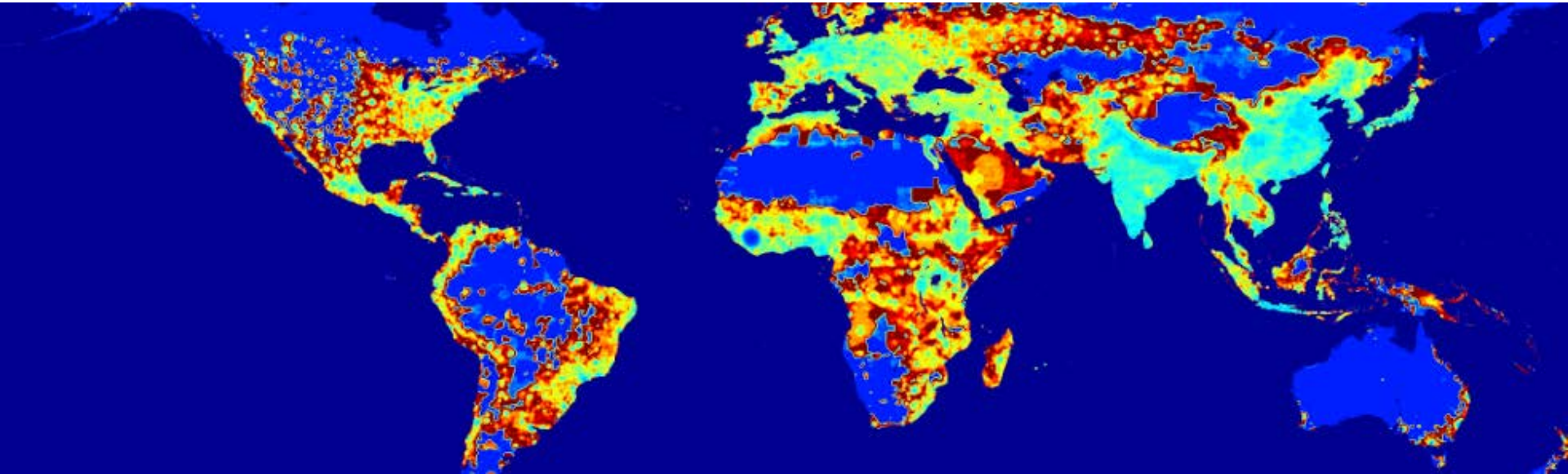- Emulate their success in other underrepresented groups

VirginiaTech
College of Science

NEW UNDERGRADUATE MAJOR AT VIRGINIA TECH

Computational Modeling and Data Analytics

CMDA = CS + MATH + STATISTICS + APPLICATIONS

VirginiaTech 1872

What CMDA Offers Students

HOW DO YOU MODEL THE WORLD ?

HOW DO YOU LEARN FROM VOLUMINOUS DATA ?

HOW DO YOU COMPUTE FAST ENOUGH TO MATTER ?

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What CMDA Offers Students

STATISTICS FOR BIG DATA
Data mining, machine learning, visualization

APPLIED MATHEMATICS FOR MODELING
Linear algebra, differential equations, numerical analysis

HIGH-PERFORMANCE COMPUTING
Parallel/GPU programming for data/science/engineering apps

ACCESS TO RELEVANT APPLICATIONS
Natural and social sciences, engineering, humanities, internet

PRACTICAL SKILLS FOR PROBLEM SOLVING
Ethics, collaboration, leadership, presentation skills

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What do CMDA Students Offer?

CMDA SKILLS ARE NEEDED IN MANY INDUSTRIES

INTERNET, SOCIAL MEDIA, SHARING ECONOMY	ENERGY
NATIONAL DEFENSE AND COUNTERTERRORISM	CLIMATE MODELING AND WEATHER PREDICTION
SATELLITE TECHNOLOGY SPACE EXPLORATION	PUBLIC POLICY
MATHEMATICAL BIOLOGY STATISTICAL GENETICS	SMART INFRASTRUCTURE
SPORTS ANALYTICS	SCIENTIFIC SOFTWARE DEVELOPMENT
FINANCIAL ENGINEERING	MANAGEMENT CONSULTING

CMDA History

SPRING 2014   *CMDA approved by Virginia Tech BOV*

JULY 2014   *CMDA approved by SCHEV*

SPRING 2015   *Students can first declare the CMDA major*

FALL 2015   *First freshman class arrives (45 students)*

FALL 2016   *Second freshman class arrives (52 students)*

SPRING 2017   *First students will graduate*

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CMDA Student Numbers

- "Benchmark of success" in the SCHEV proposal:

  "110 majors by the target year of the program (2018–2019)"

- Thus far **255 students** have declared the CMDA major (either as their primary major or a double major).

- In May 2017, about **20 students** will graduate in our first class.

- Among applicants for Fall 2016: **68 in-state, 89 out-of-state**.

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Early Adopters

CMDA savvy VT Statistics majors collect a Mathematical Association of America prize for their "Outstanding" solution to the 2016 Mathematical Contest in Modeling.

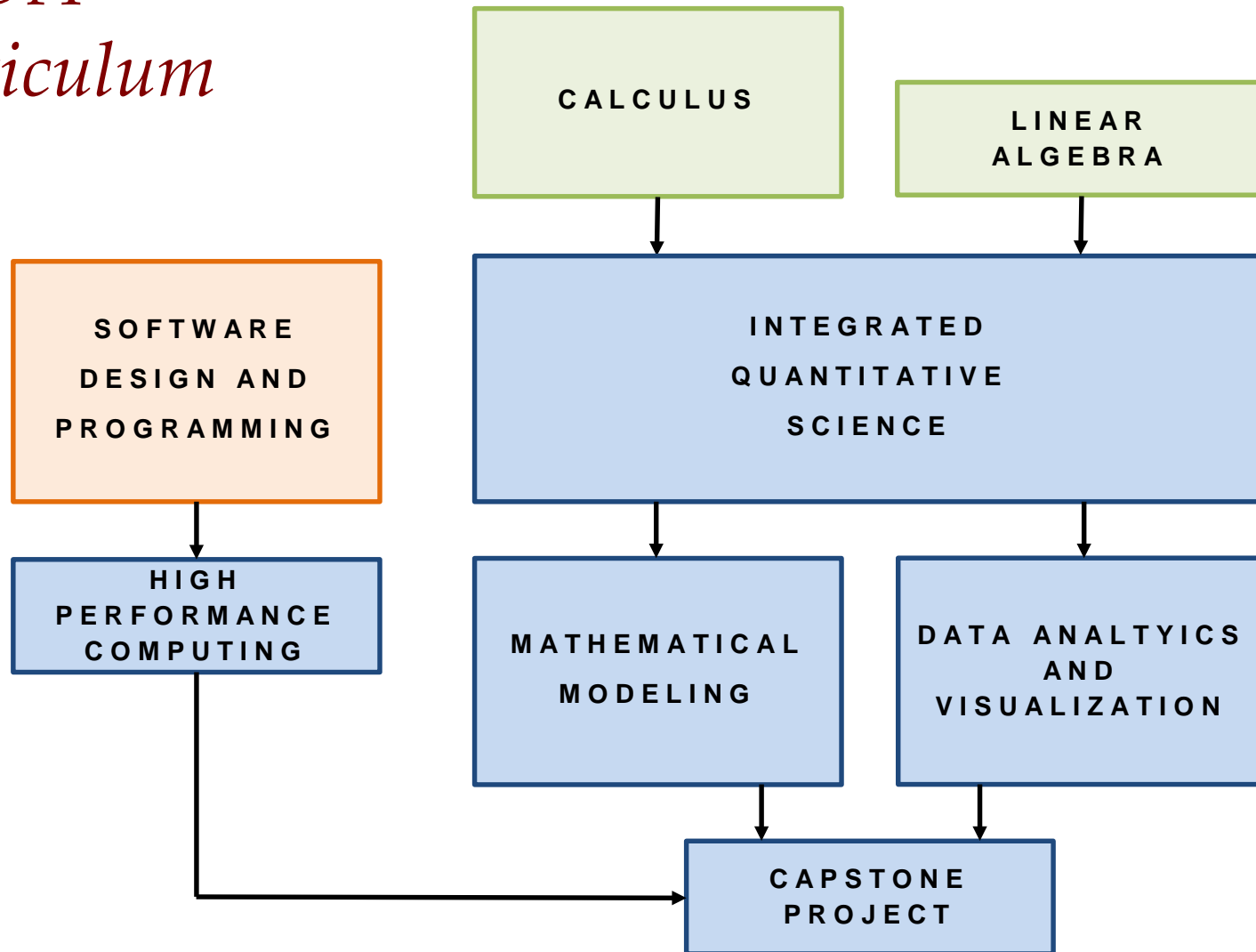*(One of only 13 Outstanding Winners from 7,421 teams, internationally.)*

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An Interdisciplinary Program

- CMDA was designed by a ***collaborative team*** from Computer Science, Math, Statistics, and Physics, under the Academy of Integrated Science.

- The curriculum contains ***10 new courses*** (34 credit hours) that are modern and inherently interdisciplinary.

- In addition to the standard curriculum, CMDA offers special options in ***Physics*** and ***Economics*** that apply CMDA skills in those fields.

  We seek to add new options aligned with other disciplines: *CMDA applications can be found in nearly all departments on campus.*

- Key to the program's success: *strong support from the College of Science leadership, and the chairs of Computer Science, Math, and Statistics.*

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CMDA Curriculum

CALCULUS

LINEAR ALGEBRA

SOFTWARE DESIGN AND PROGRAMMING

INTEGRATED QUANTITATIVE SCIENCE

HIGH PERFORMANCE COMPUTING

MATHEMATICAL MODELING

DATA ANALTYICS AND VISUALIZATION

CAPSTONE PROJECT

Four electives drawn primarily from

CMDA

COMPUTER SCIENCE

MATHEMATICS

STATISTICS

CMDA Design Team

CMDA was primarily designed by a team of existing faculty from four departments.

CMDA/CS 3654 students participate in the "Be the Data" experiment in the VT/ICAT visualization Cube.

COMPUTER SCIENCE
Chris North (machine learning, visualization)
Cal Ribbens (high performance computing)

MATHEMATICS
Chris Beattie (model reduction)
Eric de Sturler (linear algebra, optimization)
Serkan Gugercin (model reduction)
Lizette Zietsman (control theory)

STATISTICS
Xinwei Deng (data mining, machine learning)
Leanna House (Bayesian modeling)
Scotland Leman (Bayesian modeling)
Eric Smith (multivariate analysis, ecology)

PHYSICS
Michel Pleimling (nonequilibrium dynamics)

Faculty Hired for CMDA

JULIANNE CHUNG
Math Department (Fall 2012)
Linear algebra for image reconstruction

MATTHIAS CHUNG
Math Department (Fall 2012)
Math biology, uncertainty quantification

MARK EMBREE
Math Department (Spring 2014)
Linear algebra for data and dynamical systems

TIM WARBURTON
Costain Chair, Math Department (Fall 2015)
High performance computing, discretizations

Faculty Hired for CMDA

LEAH JOHNSON
Statistics Department (Fall 2016)
Statistical biology, quantitative ecology

SRIJAN SENGUPTA
Statistics Department (Fall 2016)
Data analytics, network analysis

- Innovative curriculum and existing research strengths help VT recruit top faculty talent to the program.

- CMDA readily aligns with Destination Area initiatives (e.g. Data Analytics and Decision Sciences).

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Goals & Opportunities for CMDA

STEADILY BUILD UNDERGRADUATE ENROLLMENT

- CMDA is one of the few undergraduate "big data" degrees in the US.

- CMDA can be a *destination degree* that attracts students from around the country to Virginia Tech.

- CMDA can play a central curricular role in the *Data Analytics and Decision Science* destination area.

BUILD CMDA FACULTY/RESEARCH COMMUNITY

- We seek to scale the faculty to match student response, to reach a broader cohort of students and enhance VT's strength in CMDA-related research areas.

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Goals & Opportunities for CMDA

DEVELOP CLOSE RELATIONSHIPS WITH INDUSTRY

- Industry has shown strong support for CMDA since the degree's initial proposal.

- Senior *capstone projects* provide an excellent vehicle to engage industry and give our students practical experiences.

- CMDA has the potential for a strong *Industrial Affiliates* program.

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Goals & Opportunities for CMDA

CMDA FOR THE MASSES

- With proper staffing, CMDA could introduce data science to a broad segment of the VT student population.

- See UC Berkeley's influential new "Foundations of Data Science" course: 4 credits of freshmen level data science (450 students, no prerequisites) + a 2 credit "connector" course in the disciplines (e.g., Data Science for Smart Cities; Data Science and the Mind; Data Driven Policy Making).

CMDA GRADUATE DEGREE

- We are in the early planning stages for a *professional master's degree*.

- An *Urban Computing* graduate certificate is in development, under the leadership of Naren Ramakrishnan (CS) with support from NSF.

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BOV Update 2016

At VT Neuroscience is broad!

Traditional Subject Areas

- **Genetic Neuroscience**
- **Molecular Neuroscience**
- **Cellular Neuroscience**
- **Neurophysiology**
- **Developmental Neuroscience**
- **Cognitive Neuroscience**
- **Behavioral Neuroscience**
- **Clinical Neuroscience**

Expanded Subject Areas

- **Social Neuroscience**
- **Systems Neuroscience**
- **Neuroeconomics**
- **Neuro-Law**
- **Neuroethology**
- **The Artistic Brain**
- **Computational NS**
- **Brain Machine Interfaces**
- **Neuro-Robotics**

Neuroscience prepare Students to succeed in many Professions

Neuro-Medicine

Neuro-Engineering

Entrepreneurship-Biotech

Neurogenetics

Science Policy and Administration

Biomedical Research

Health Care Administration
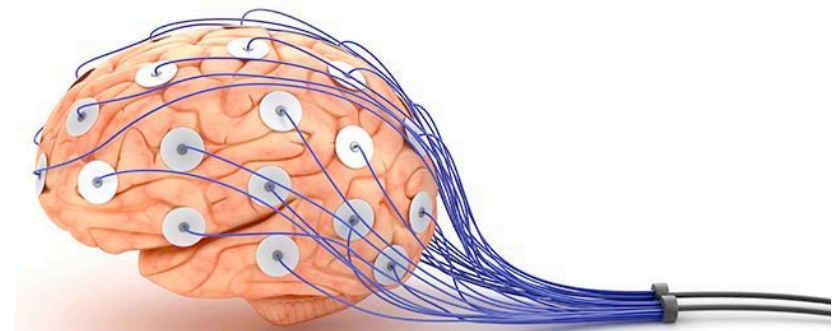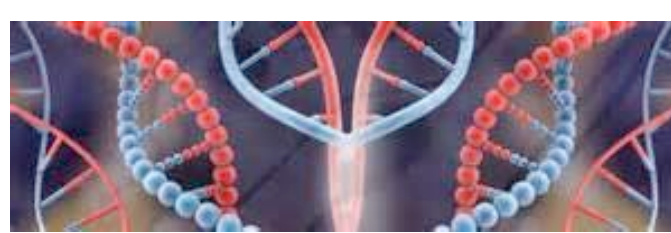
Publishing and Science Writing

Science Times

The New York Times

TUESDAY, JANUARY 17, 2006

N   F1

THE NEW YORK TIMES, TUESDAY, JANUARY 17, 2006

When Art and Science Collide, a Dorkbot Meeting Begins

Biomedical Sales & Product Support

One Degree – Four unique Majors

Clinical NS Major (Med/Dentistry/Vet/PA/Optometry)

- Physician, Dentist, Veterinarian, Physicians Assistant, Nurse, Therapist, MR/EEG technologist, Health Care Administration…

Experimental NS Major (Graduate studies)

- Graduate Faculty, National Institutes of Health (NIH), Department of Defense (DoD), Centers for Disease Control & Prevention (CDC), Biotech, Big Pharma, Sales & Product Support, Device Manufacturing…

**Computational & Systems NS Major (Broad range of professions)**

- Google, Microsoft, Intel, Data Analyst, FBI, Cyber Security, Wall Street, Banking, Autonomous Systems…

Cognitive & Behavioral NS Major

- Law, Business, Finance, Architecture, Marketing, Art, Science Policy, Educational Leadership, Science Writing, Journalism…

Exciting Curriculum

Year	Fall		Spring	
Freshman	NEUR 1004 Neuroscience Orientation Seminar (Sontheimer)	1	NEUR 3464 Neuroscience and Society (Sewell)	3
Sophomore	NEUR 2025 Intro to Neuroscience (Cline)	3	NEUR 2026 Intro to Neuroscience (Clinton)	3
	NEUR 2035 Intro to Neuroscience Lab (Kimbrough)	1	NEUR 2036 Intro to Neuroscience Lab (McCoy)	1
			NEUR 3XXX Neuroscience of Addiction (2017) (Buczynski)	3
Junior	NEUR 3044 Cellular and Molecular Neuroscience	3	NEUR 3084 Cognitive Neuroscience	3
	NEUR 3144 Mechanism of Learning and Memory	3	NEUR 4034 Diseases of the Nervous System	3
	NEUR 4454 Neuroeconomics	3	NEUR XXXX Developmental Neuroscience (will offer Fall 2017 first time but will then move to spring after that)	3
	NEUR 3XXX Neuroscience of Language and Communication Disorders	3	NEUR 4XXX Neuroimmunology	3
	NEUR 3554 Neuroscience Research and Practical Experience	3		
	NEUR XXXX Developmental Neuroscience (2018)			
Senior	NEUR 4084 Developmental Cog Neuroscience	3	NEUR 4044 Senior Seminar, Neuroscience of the Mind	3
	NEUR 4544 Synaptic Structure and Function	3	NEUR 4044 Senior Seminar, Neuroscience and the Law	3
	NEUR 4594 Clinical Neuroscience in Practice	3	NEUR 3XXX Neurogenetics	3
	NEUR 4XXX Neuroplasticity	3	NEUR 4594 Clinical Neuroscience in Practice	
	NEUR 4XXX Sex Differences in the Brain & Body Behavior (2017)	3		
	NEUR 4XXX Drug Development in Neuroscience	3		
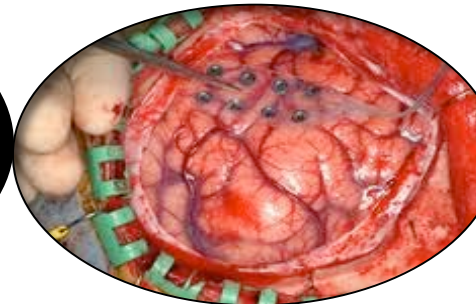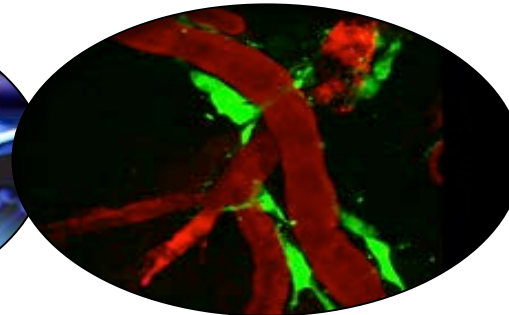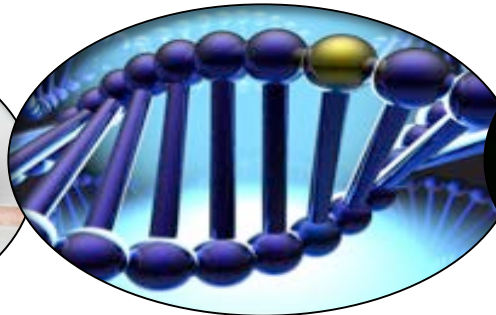
Example: Clinical Neuroscience in Practice NEUR 4594

Gary Simonds, MD: Chief of Neurosurgery Carilion Clinic & Professor, VT School of Neuroscience

Harald Sontheimer, Ph.D.
Professor & Executive Director, School of Neuroscience

**Clinical Faculty from Carilion Neurosurgery**

➢ Students are fully immersed in Operating Room
➢ Participate in Grand Round Presentations
➢ Develop application material
➢ Undergo "Mock" Medical School Interviews

Freshman Year:
Orientation Seminar NEUR 1004 (Sontheimer)

- **Introduction to your Major and to Virginia Tech in general**

- **Develop a personal 4-year plan of study**

- **Gain college survival skills**

- **Learn how to do hand-on research at VT and beyond**

- **Think about your future, jobs etc.**

- **Learn Professionalism**

- **Learn fundamentals of hypothesis testing**

- **Acquire content knowledge, how is Depression different from missing your loved ones?**
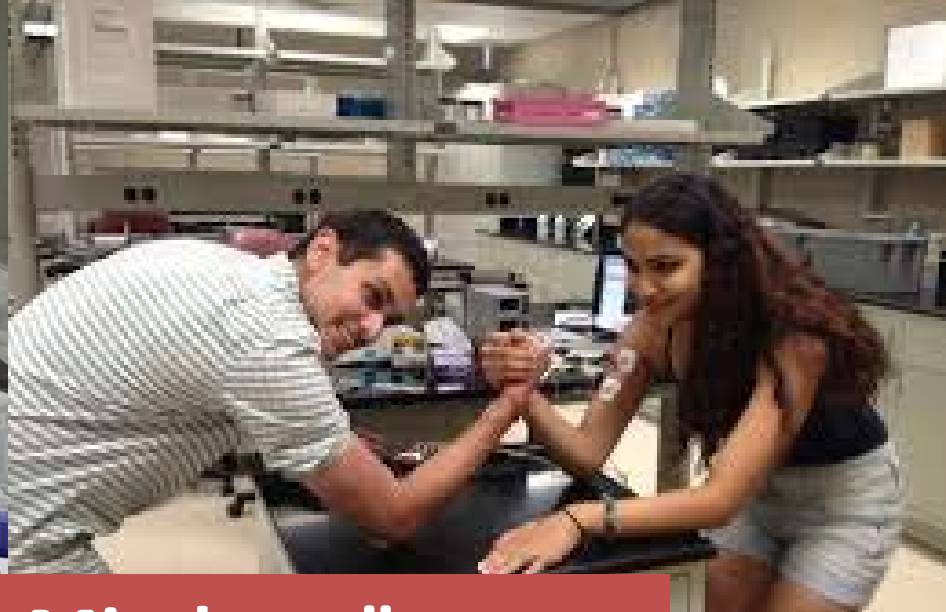
"Hand's on Minds on"
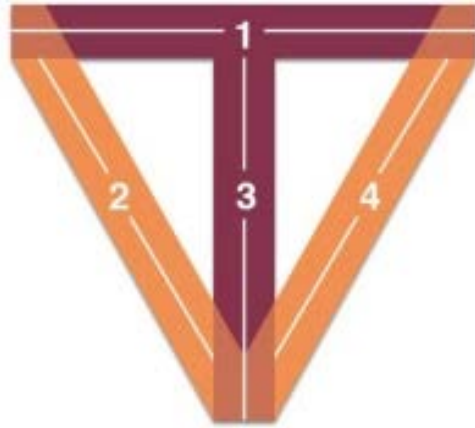
Profile of current Students

- ~ 400 students

  122 Freshman

  143 Sophomores

  96 Juniors

  33 Seniors

- 63% Female - 37% Male
- 12% diverse students
- 16% Out-of-state
- 9.8% Honors (6.8% for university)
- 73 students on Dean's List

The Neuroscience Student is VT shaped!

1. Transdisciplinary – From Decision Making to Law Medicine and Engineering
2. Informal communal learning through apprenticeships
3. Disciplinary depth through rigorous coursework in major
4. Guided experiential learning through research and innovative field experience courses

Our Neuroscience Faculty

- 10 primary NS faculty
- 7 of which are newly hired from pool of >250 applicants

=> These 7 add $10M in committed new NIH funding to VT

- 80+ affiliated faculty members that span every college at VT
- 2 instructors

=> 24 courses including 7 laboratory sections

College of Science
School of Neuroscience

Mike Bowers: Genetics of Language and Communication Disorders
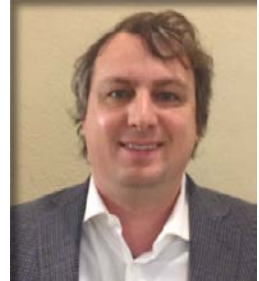
Matt Buczynski: Neurochemistry of Drug Addiction

Sarah Clinton: Epigenetic regulation of Brain Development & Risk for Emotional Dysfunction

Georgia Hodes: Neuroimmunology of mood disorders

Michelle Olsen: Epigenetic regulation of Glial channels in health and disease

Stefanie Robel: Cognitive impairments & Vascular changes after repeated mild traumatic brain injury
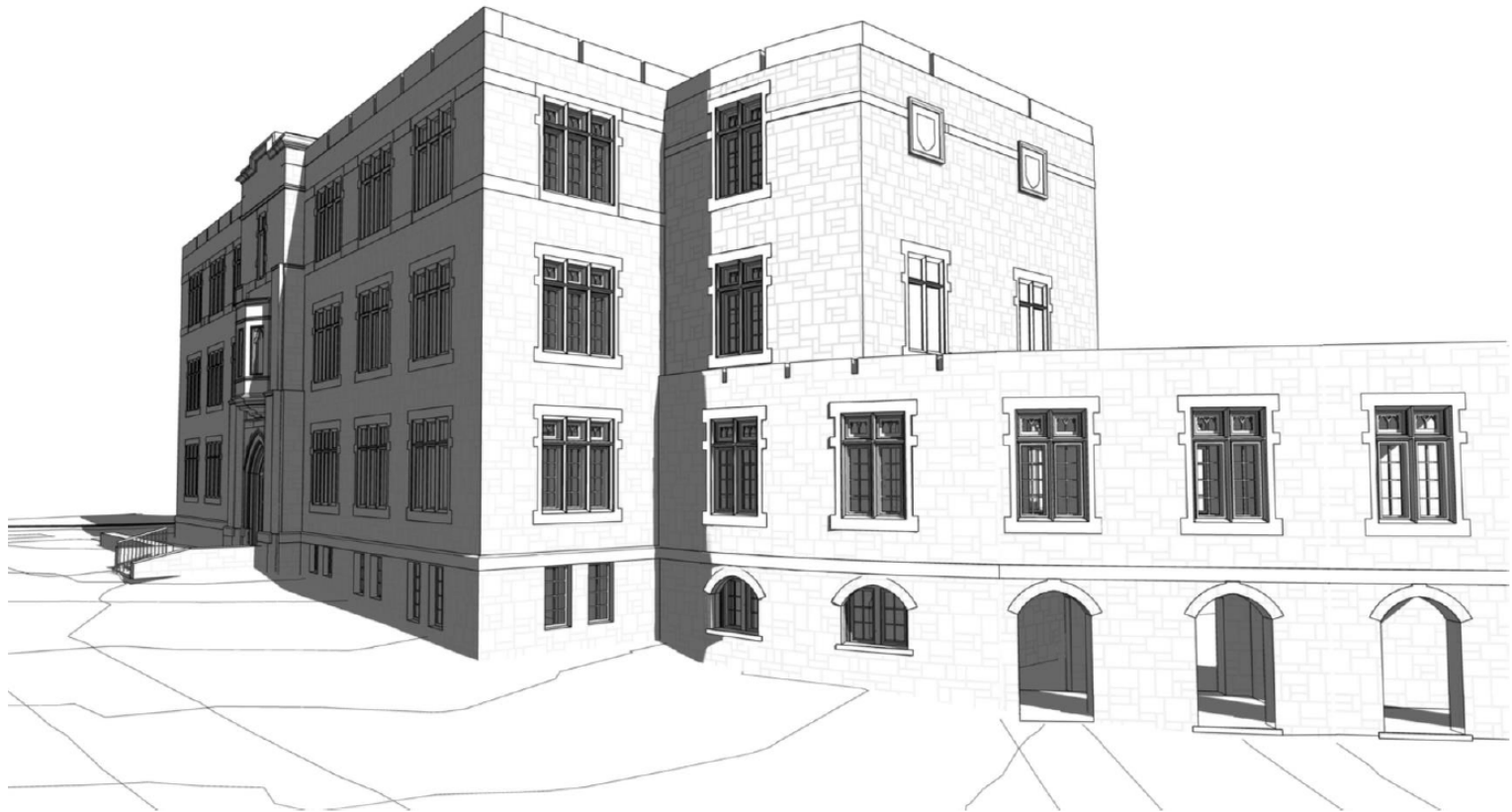
Chris Thompson: Thyroid hormone and environmental toxins affecting brain development in *Xenopus laevis* tadpoles

School of Neuroscience is aligned with multiple Destination Areas

1. Adaptive Brain
2. Data Analytics & Decision Sciences
3. Intelligent Infrastructure

Future Home of Neuroscience

Sandy Hall 2017

SoN will be an important component of the future VT Health Science & Technology District in Roanoke

Neuroscience Q & A