VCOM 2018 Research Retreat

State of Research at VCOM

P. Gunnar Brolinson, DO, FAOASM, FACOFP, FAAFP
Vice Provost for Research
Discipline Chair for Sports Medicine
Team Physician Virginia Tech
Director of Primary Care Sports Medicine Fellowship
First, some housekeeping…

• Sessions Saturday and Sunday: Heritage Room
• Breakfast Saturday and Sunday: Heritage Room
• Lunch Saturday in Heritage Room
• Posters in Gallery tonight and during Saturday lunch
• Lots to do in Asheville!
  – Dining, Shopping, Gingerbread House contest, Biltmore house tours. Etc…
First, some housekeeping…

Everyone will be provided 8 GB USB Pens at Saturday morning sign-in

- Retreat presentations
  - Will also be uploaded to website with videos
- Recent publications from VCOM colleagues as well as publications of particular interest to OMM research
- Research Administration forms & information
  - In particular new Proposal Information Form required going forward
  - Information on new CITI training course – Research Study Design – and how to register
- Human subjects in research resources
  - New Common Rule updates
- Info on latest AOA funding opportunities focused on:
  - Chronic Pain Management
  - OMM Applied to Musculoskeletal Injuries and Prevention
VCOM By The Numbers

DIVERSITY

VCOM is ranked #3 in U.S. Medical Schools with highest African American enrollment — U.S. News and World Report

VCOM is ranked #4 for Hispanic and Latino enrollment of 179 medical schools in the U.S. and Puerto Rico — based on 2017-2018 enrollment data from AAMC.org and AAMC.org

Average enrollment of 14% underrepresented minorities — Total includes all three VCOM campuses Classes of 2007-2002

VCOM Administration and Faculty have received National Awards from Minority Access, Inc. seven years in a row!

AFFORDABILITY

IN THE TOP 10 most affordable private medical schools in the U.S. — U.S. News and World Report and Physicians Money Digest

RESIDENCIES

#5 for graduates entering primary care residencies — 2018 U.S. News and World Report

#2 in graduates receiving first choice of residency — 2018 U.S. News and World Report

99-100% residency match rate — VCOM Outcomes Report

VCOM has graduated over 2600 physicians since 2007

182 VCOM Military Graduates

1900 current students across 3 campuses
Research area of emphasis and expertise

- Musculoskeletal Research
- OMM/OMT
- Neuroscience
- Cancer Research
- Community Health and Healthcare Delivery

Cross-campus teams will be developed
- Specific strengths at each campus
- Introduce specific internal funding initiatives
- Genetic and genomics research a critical aspect in all areas
Distinguished Speakers: Saturday Session

Tillie Harris, PhD
Executive Director of the
Grant Training Center

David Gangemi, PhD
Former Senior Science Advisor
for the Assistant Secretary of Defense,
Health Affairs
Distinguished Speakers: Sunday Session

Joel D. Stitzel, Jr., PhD
Professor, Biomedical Engineering
VT-WFU School of Biomedical Engineering and Sciences

Stefan Duma, PhD
Harry C. Wyatt Professor, VT-WFU School of Biomedical Engineering and Sciences
Director, Institute for Critical Technology and Applied Sciences
Medical School Rankings…

• To become the top ranked stand-alone DO school in research, we must have 8 NIH grants:
  – We must submit \(8 \times 6 = 48\) NIH proposals to achieve this
    • We submitted 23 NIH proposals in FY2018
    • We submitted 16 NIH proposals in FY2017
  – It is a numbers game!

• Funding from non-NIH agencies should be leveraged to build preliminary data for a NIH grant application.
  – Many private foundations encourage or require this
  – Major aim of REAP and One Health programs
What Are We Doing?

- VCOM faculty are submitting more applications to NIH and other federal agencies
  - Directly through VCOM
  - More pilot data from VCOM seed programs
  - Collaborations through our academic partners are still important but need more VCOM researchers serving as project PI
  - Solid scores on NIH applications
Research Activity

- VCOM has $9 million in currently active awards
  - Up from $8.2 million this time last year
- VCOM has $8.3 million in pending applications with the potential to receive funding
- Research expenditures total $9.5 million in FY2018
  - 9% increase from FY17
Research Expenditures

2008: $3,835,686
2009: $4,087,438
2010: $5,010,561
2011: $4,225,388
2012: $3,926,689
2013: $3,277,035
2014: $9,317,154
2015: $8,699,856
2016: $9,491,520
2017: $8,699,856
2018: $9,491,520
A little more “granular”…

Salaries Charged to Research

Internally Funded Research
Research Activity

• 59 proposals were submitted to extramural sponsors in FY18
  – Up nearly 10% from last year!
  – 12 of these awarded (20% success rate!)
  – 11 still pending
• 20 submissions to NIH (34% of all submissions)
• Other federal submissions:
  – HRSA, DOD, NSF, USGS, ORI
• 27 faculty submitted extramural grants during FY18
  – 14 Virginia Campus;
  – 10 Carolinas Campus;
  – 3 Auburn Campus
Research Activity

Number of Extermural Proposals Submitted

<table>
<thead>
<tr>
<th>Year</th>
<th>Auburn</th>
<th>Carolinas</th>
<th>Virginia</th>
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<tr>
<td>2014</td>
<td>14</td>
<td>3</td>
<td>1</td>
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<tr>
<td>2015</td>
<td>9</td>
<td>6</td>
<td>38</td>
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<tr>
<td>2016</td>
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<td>20</td>
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<tr>
<td>2017</td>
<td>15</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>2018</td>
<td>12</td>
<td>5</td>
<td>42</td>
</tr>
</tbody>
</table>
Research Activity

Significant increase in federal awards in FY18!

• NIH K23 to Wei Liu, PhD – Auburn Campus first NIH award!
• Office of Research Integrity award to Skip Garner, PhD
• HRSA award to Ron Januchowski, DO
• US Geological Society award to Pawel Michalak, PhD (to VT)
• HRSA award to Ann Peton (via National Rural Health Association)
• NIH R01 to VT with Chris Reilly, PhD as investigator
Research Activity: Reporting Period Snapshot

• Auburn Campus
  – 9 active grants (3 new this reporting period)
  – 3 recently completed
  – 7 active intramural grants

• Carolinas Campus
  – 5 active grants (3 new)
  – 1 student AOA grant
  – 3 pending applications
  – 2 recently completed
  – 6 proposals submitted in reporting period
  – 3 active intramural grants
  – 1 utility patent in examination

• Virginia Campus
  – 11 active grants (2 new this reporting period)
  – 1 student AOA grant
  – 16 pending applications
  – 5 recently completed
  – 9 proposals submitted in reporting period
  – 19 active intramural grants
  – 1 patent issuing soon
  – 3 patents filed
  – 1 patent in examination
What Are We Doing?

Two internal funding programs:

VCOM increased funding in both of these programs in FY18

• Research Eureka Accelerator Program (REAP)
  – $850,000 available across all campuses FY18
  – 4 focus areas: Biomed Engineering, Genetics, Clinical (Top 5 Health Concerns and Rural Public Health) and a General category

• One Health Research Seed Program
  – $350,000 available across all campuses
  – Collaborative research with faculty from both Virginia Tech’s and Auburn University’s Veterinary Colleges
Research Development: VCOM Funding Programs

REAP Program
- In FY2019 round, 29 applications received, 20 awarded
  - Auburn Campus: 5/4, Carolinas Campus: 7/2, Virginia Campus: 12/10, HCA: 1/0
  - 4 of 4 additional Virginia Campus awards with VT Biomed Engineering
    - Biomed Engineering 1:1 match on these awards
    - VT ICTAS committed over $215,000
- 11 REAP awards met one of the VCOM research strategic initiatives:
  - 2 OMM
  - 2 Genetics
  - 2 Educational Research
  - 2 Neuroscience
  - 2 Community Health
  - 1 ADI Special Request
- 6 other REAP Awards have Biomedical Engineering focus and collaborators from Virginia Tech or Auburn University
Research Development: VCOM Funding Programs

One Health Research Seed Program
$250K Virginia $100K Auburn

• 13 applications submitted this round (FY2019)

• 9 awarded:
  – 3 with AUCVM:
  – 6 with VMCVM:
Research Development: VCOM Funding Programs

New: Institutional Matching Grants Program

- **AU Samuel Ginn College of Engineering**
  - 1:1 match on collaborative grants
  - $100,000 committed from each institution

- **Co-PI from VCOM and AU Engineering**
  - Biomedical, biomechanical, OMM focus

- Program development ongoing
  - Recently met with CoE Associate Dean for Research and the Director of Program Development
  - Announcement planned December 2018
Research Development:
Intramural Funding Grant Submission Output

• Purpose: to develop independent research programs, extramural awards and scholarly activity
  – Obtain preliminary data necessary to be competitive in the NIH environment
  – VCOM students have unique opportunity to engage in research
• 3 extramural grants awarded based on REAP projects:
  – NIH K23 awarded to Wei Liu, PhD
  – AOA research grant awarded to Jillian Bradley, PhD
  – AOA student training grant based off REAP of Jennifer Berglind, PhD
• 10 extramural proposals as a result of REAP studies are under review (7 to NIH)
• 9 other proposals were submitted but not funded
• 2 proposals are currently in development (NIH, NSF)
What Are We Doing?

- **A Snapshot of VCOM Students in Research in 2018**
  - There are currently 140 active research projects at VCOM with **over 100 VCOM students involved!**
    - This includes funding from federal agencies, nonprofit organizations, several foundations and private corporations as well as our intramural programs mentioned above.
  - Over 150 abstracts across all three campuses from VCOM students submitted to the annual Via Research Recognition Day
  - 65 VCOM students were listed as contributing authors on publications in peer-reviewed journals
  - 2 VCOM students have had their projects funded by grants from the American Osteopathic Association
What Are We Doing?

Expanding research services to facilitate research activity:

- **New, full-time support staff in Research Dept**
  - Jennifer Arnold, BS (Carolinas Campus)
- Utilizing expertise of ADI Partners
- Building new partnerships
- Expanding seed grant programs
- Department Funding Request:
  - New mechanism for requests for lab equipment and set up
  - Facilitates targeted discretionary funding to grow mission specific lab capacity at each campus
Research Dept Resources

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Have questions? We are here to help!
Research Support: Resources & Services

**Mission:**
Provide robust support to faculty engaged in research and scholarly activity

- Identify funding sources; work with faculty to match ideas to funders
- Develop and manage large-scale, cross-campus project teams
- Assist with development and edit of grant proposals and manuscripts
- Assist with understanding proposal requirements
- Administer internal grant programs and other capacity building programs
- Offer statistical consulting for both research and manuscript development
- Assist with technology transfer and licensing of intellectual property
- Guide faculty through human subjects research regulations; offer training

**Available to support faculty, students, residents and our hospital partners!**
Research Support:
Resources & Services

• **Research Matcher**
  – New part of *Clinical Rotation Evaluation and Documentation Organizer* (CREDO) system
  – Faculty create research profile (interest, capabilities, etc.)
  – Students and faculty can search for collaborators and/or mentors using keywords or by browsing profiles

• **STARJAMR Journal**
  – STudent and Resident Journal of Academic Medical Research
  – Open-access, peer reviewed
  – Students will be required to upload 4th year papers
  – Enhances students’ ability to obtain highly competitive residencies
  – Enhances affiliated residents’ ability to obtain highly competitive fellowship
  – ISSN has been obtained; launch anticipated January 2019
New Funding Spotlight: Osteopathic-focused Research

- AOA award to Jillian Bradley, PhD
- 2 years, $149,000, began September
- Overuse of antibiotics contributes to development of antibiotic-resistant pathogenic bacteria
- Unnecessary financial burden for uninsured, rural families
- Facial effleurage as alternative therapy to antibiotics
  - Randomized, double-blind study to test ability to improve patient outcomes
- Potential to influence treatment recommendations for sinus infections
New Funding Spotlight: NIH Clinical Trial

- National Institutes of Health
  - National Center for Complementary and Integrative Health
  - K23 Career Development Award
  - Dr. Wei Liu
- Five-year, $825k award
  *Title: Real Time Biofeedback Tai Chi Training for Knee Osteoarthritis*
- First NIH award to VCOM Auburn Campus!
- Direct result of data gathered from REAP project
New Funding Spotlight: NIH Clinical Trial

• Identify the biomechanical mechanisms of Tai Chi exercise
  – Test novel Tai Chi movement strategy intervention
  – Identify altered biomechanics and movement patterns in patients with knee osteoarthritis
  – Unique real-time biofeedback approach

• Goal is to produce significant knee pain reduction
New Funding Spotlight: Training Primary Care Champions

• Health Resources and Services Administration (HRSA)
• Five-year, $1.95 million award
• VCOM Fellowship for Primary Care Transformation Leaders
• Multidisciplinary, cross-campus team lead by Ron Januchowski, DO
• Program directors: Adrienne Ables, PharmD; Alexis Stoner, PhD, MPH; Gunnar Brolinson, DO
New Funding Spotlight: Training Primary Care Champions

- One-year fellowship to focus on academic medicine, leadership, research and scholarship
- Transformative projects at FQHCs
- Fellows increase skill set in teaching, healthcare accountability, and management of population health
- Long-term goals: Improved patient outcomes and increased physician recruitment in underserved areas
- Partners: ReGenesis and Family Health Centers, Inc. focused in Spartanburg, Orangeburg and Cherokee County.
- Support Faculty: Skip Garner, PhD; Dixie Tooke-Rawlins, DO; Ward Stevens, MS, FACHE
- Dr. Januchowski will present on submitting a successful multi-campus proposal at Research Retreat
New Funding Spotlight: Physician Recruitment

• VCOM Physician Educator Retention Program awarded by Wythe-Bland Foundation in September – 3.5 years, $315,000
• Ward Stevens, Vice President, Academic Health Centers and GME
• Goal: Increase the number of VCOM graduates practicing in Wythe and Bland counties.
  – Both counties have PCP shortage (no PCPs in Bland)
• Provides 3 grants to VCOM grads immediately after residency who agree to establish fulltime medical practice in either county and commit to serving as physician educators
  – Total of $105,000 retention bonus to each over the three years of service
  – Three-year recruitment or employment agreement must be executed
  – Committee will review applications, select awardees and monitor compliance
• Those accepted into program must
  – Obtain VCOM appointment
  – Precept upon request a minimum of 6 student rotations a year
  – Participate in minimum of two community outreach events per year
Tech Transfer

• Carolinas Campus:
  – Hanna Sahhar, MD’s Lumbar Puncture Assist Tool utility application currently undergoing USPTO examination; design patents issued last year

• Virginia Campus:
  – Issuance imminent (fees paid September) for Iron Grip patent, invented by Brian Dickens, DO; expected early 2019
  – Utility patent issued May 2017 to VCOM for Cerium Oxide Nanoparticles for the Treatment and Prevention of Stroke and Cardiovascular Disease; Inventor: Beverly Rzigalinski, PhD
  – Design and Utility patents filed in September for Multi-Degree-of-Freedom Surgical Clamp (innovative lip clamp) with Michael Breiner, MD
  – Utility patent filed in June for CREDO Logging System: Skip Garner, PhD and Fred Rawlins, DO
Tech Transfer

• Virginia Campus Continued:
  – Provisional filed in July for Cerium Oxide Nanoparticles for Preservation of Blood and Blood Products; inventor: Beverly Rzigalinski, PhD
  – Cerium Oxide Nanoparticles for Treatment and Prevention of Alzheimer’s Disease, Parkinson’s Disease and Disorders Associated with Free Radical Production and/or Mitochondrial Dysfunction currently under examination; Inventor: Beverly Rzigalinski, PhD
  – In works: Double Opposing Elliptical Skin Clamp; Dr. Michael Breiner, MD
  – Provision to be filed soon: Compounds that Selectively Potentiate Triheteromeric (GluN1/2A/2B); Blaise Costa, PhD
Publications and Presentations

During the reporting period:

• 38 new publications and abstracts:
  – Virginia Campus: 15
  – Carolinas Campus: 9
  – Auburn Campus: 14
  – 21 VCOM students as contributing authors!

• 2 publications in press
• 12 under review/revision and 6 in preparation
• 15 national/international presentations
What Can We Do Better?

• Research Salaries, $4.45 million:
  – $904,949 salary savings from extramural awards
  – $389,817 funded by internal awards or through cost share
  – $3.17 million covered by VCOM operating budget
  – This total includes salaries and fringe benefits of both faculty and research support staff

• Equipment expenditures roughly $686,203
What Can We Do Better?

Utilize our amazing resources and regional capabilities!

• HCA hospital partners
• Keynote presentations focus on VCOM specific strategic initiatives
• 26 partner hospitals in 8 states.
• 6 COM partners in 5 states
  – VCOM, Liberty (Virginia), CUSOM (North Carolina)
  – Burrell (New Mexico), ICOM (Idaho), U of Incarnate Word (Texas)
• Most partner hospitals are within our core region.
What Can We Do Better?
Operationalize Strategic Plan!

- Strategic Goal 1: Create a Research Council at VCOM
- Strategic Goal 2: Identify, formalize and strengthen the research focus areas at each campus and recruit new faculty members for specific research focus areas
- Strategic Goal 3: Invest in research focus areas through new internal seed grants
- Strategic Goal 4: Incorporate research design and data analysis methodologies into the OMS educational experience
- Strategic Goal 5: Create a culture of innovation and support for intellectual property development
Your Research Data Storage

- A root folder has been created for each of you on the new Research Drive, so you can begin storing data there at your convenience.
  - Only you have permissions on your shared folder
- If you are collaborating with different faculty on different projects, separate folders within your main folder can be created that will be secured to only the people you need to have access.
- This drive is automatically backed up
  - the sooner you put your data there, the sooner we have that protection of having a secure backup copy!
VCOM Capabilities

- Contemporary biomedical research now involves massive amounts of data to make discoveries, especially in the areas of genetics, genomics, modeling and data mining

- **VCOM now has a new class of supercomputer** which is producing results previously not possible
  - At a cost of $25,000 we built our supercomputer using two nVidia V-100 cards installed in a dedicated Linux server, that has the power of ~100 PC workstations. Computer can easily be grown as needed.
  - nVidia is the largest supplier of high performance computing in the world, with the two largest supercomputers assembled from thousands of V-100 cards
  - We are using the system to compute how multiple gene mutations lead to cancer; we model mutated proteins found in certain tumors to determine their role in cancer; and are exploring Deep Learning (AI) as a knowledge discovery tool....
BE RELENTLESS!!!!

<table>
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<th>Total Submissions:</th>
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<tr>
<td>Pending:</td>
<td>2</td>
</tr>
<tr>
<td>Award Percentage (based on non pending):</td>
<td>38%</td>
</tr>
<tr>
<td>Not Awarded Percentage (based on non pending):</td>
<td>63%</td>
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- There can only be one state of mind as you approach any profound test; total concentration, a spirit of togetherness, and strength.
  – Pat Riley

Ability is what you're capable of doing. Motivation determines what you do. Attitude determines how well you do it. Lou Holtz