VCOM 2017 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: Cedric’s Banquet Room
• Breakfast Saturday and Sunday: Cedric’s Gallery
• Lunch Saturday in Cedric’s Loft
• Posters in Gallery tonight and during Saturday lunch
• Lots to do on Estate! Dining, shopping, winery, house tours
Distinguished Speakers

Michael Flynn, PhD
Director of Research
HCA South Atlantic Region
Former Chair Health and Human Performance College of Charleston

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

- VCOM submitted 52 extramural proposals in FY2017
  - Submitted 50 in FY2016
- 42% (22) submitted to federal agencies
- 73% (16 of 22) federal submissions to NIH:
  - R15, R21, R01, Training and Career Development (F, K series)
  - 7 NIH proposals submitted in FY2016
- We are much more active in research, but…
  - Need to focus on building VCOMcentric NIH portfolio
Medical School Research Rankings

• Primary cited source is US News and World Report Medical Schools Rankings
  – 170 Medical schools: 140 LCME (MD schools), 30 AOA (DO schools)
  – 116 provided information sufficient for ranking

• Rank assessment weighting
  – Peer assessment score (deans, medical directors): 20%
  – Residency directors score: 20%
  – Student selectivity (MCAT, GPA, acceptance rate): 20%
  – Faculty resources (faculty to student ratio): 10%
  – Research activity (total $, $/faculty): 30%
    • ONLY NIH FUNDING COUNTS!!!!
NIH Funding Rankings (2015)

<table>
<thead>
<tr>
<th>ORGANIZATION</th>
<th>CITY</th>
<th>STATE</th>
<th>AWARDS</th>
<th>FUNDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>JOHNS HOPKINS UNIVERSITY</td>
<td>BALTIMORE</td>
<td>MD</td>
<td>1239</td>
<td>$615,547,548</td>
</tr>
<tr>
<td>UNIVERSITY OF CALIFORNIA, SAN FRANCISCO</td>
<td>SAN FRANCISCO</td>
<td>CA</td>
<td>1176</td>
<td>$552,905,697</td>
</tr>
<tr>
<td>UNIVERSITY OF MICHIGAN</td>
<td>ANN ARBOR</td>
<td>MI</td>
<td>1079</td>
<td>$478,483,024</td>
</tr>
<tr>
<td>UNIVERSITY OF PENNSYLVANIA</td>
<td>PHILADELPHIA</td>
<td>PA</td>
<td>1077</td>
<td>$466,539,624</td>
</tr>
<tr>
<td>UNIVERSITY OF PITTSBURGH AT PITTSBURGH</td>
<td>PITTSBURGH</td>
<td>PA</td>
<td>1023</td>
<td>$465,720,056</td>
</tr>
<tr>
<td>STANFORD UNIVERSITY</td>
<td>STANFORD</td>
<td>CA</td>
<td>899</td>
<td>$406,224,947</td>
</tr>
<tr>
<td>YALE UNIVERSITY</td>
<td>NEW HAVEN</td>
<td>CT</td>
<td>904</td>
<td>$397,380,740</td>
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<tr>
<td>UNIVERSITY OF WASHINGTON</td>
<td>SEATTLE</td>
<td>WA</td>
<td>847</td>
<td>$395,548,478</td>
</tr>
<tr>
<td>UNIVERSITY OF CALIFORNIA SAN DIEGO</td>
<td>LA JOLLA</td>
<td>CA</td>
<td>815</td>
<td>$387,200,632</td>
</tr>
<tr>
<td>DUKE UNIVERSITY</td>
<td>DURHAM</td>
<td>NC</td>
<td>734</td>
<td>$386,439,025</td>
</tr>
<tr>
<td>ROWAN UNIVERSITY SCHOOL/OSTEOPATHIC MED</td>
<td>STRATFORD</td>
<td>NJ</td>
<td>7</td>
<td>$2,515,451</td>
</tr>
<tr>
<td>DES MOINES UNIV OSTEOPATHIC MEDICAL CTR</td>
<td>DES MOINES</td>
<td>IA</td>
<td>2</td>
<td>$1,282,851</td>
</tr>
<tr>
<td>MICHIGAN STATE UNIVERSITY</td>
<td>EAST LANSING</td>
<td>MI</td>
<td>150</td>
<td>$53,621,128</td>
</tr>
</tbody>
</table>

- According to the NIH’s latest rankings, VCOM has no NIH funding
- Only 2 stand-alone DO schools have NIH funding
### NIH Funding Success Rate (2015)

<table>
<thead>
<tr>
<th>Type of Grant</th>
<th>Activity</th>
<th>Number of Applications Reviewed</th>
<th>Number of Applications Awarded</th>
<th>Award Amount</th>
<th>Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>DP1</td>
<td>209</td>
<td>20</td>
<td>$15,528,785</td>
<td>9.6%</td>
</tr>
<tr>
<td>New</td>
<td>DP2</td>
<td>497</td>
<td>45</td>
<td>$105,713,520</td>
<td>9.1%</td>
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<tr>
<td>New</td>
<td>DP3</td>
<td>80</td>
<td>19</td>
<td>$37,064,446</td>
<td>23.8%</td>
</tr>
<tr>
<td>New</td>
<td>DP5</td>
<td>80</td>
<td>16</td>
<td>$6,350,468</td>
<td>20%</td>
</tr>
<tr>
<td>New</td>
<td>PO1</td>
<td>165</td>
<td>27</td>
<td>$47,622,855</td>
<td>16.3%</td>
</tr>
<tr>
<td>New</td>
<td>R01</td>
<td>24,587</td>
<td>3,934</td>
<td>$1,785,057,520</td>
<td>16%</td>
</tr>
<tr>
<td>New</td>
<td>R09</td>
<td>2,502</td>
<td>44</td>
<td>$11,856,891</td>
<td>17.5%</td>
</tr>
<tr>
<td>New</td>
<td>R15</td>
<td>1,602</td>
<td>248</td>
<td>$94,688,012</td>
<td>15.5%</td>
</tr>
<tr>
<td>New</td>
<td>R21</td>
<td>14,350</td>
<td>2,067</td>
<td>$457,630,666</td>
<td>14.4%</td>
</tr>
<tr>
<td>New</td>
<td>R33</td>
<td>100</td>
<td>14</td>
<td>$5,349,179</td>
<td>14%</td>
</tr>
<tr>
<td>New</td>
<td>R34</td>
<td>416</td>
<td>93</td>
<td>$23,339,092</td>
<td>22.4%</td>
</tr>
<tr>
<td>New</td>
<td>R35</td>
<td>224</td>
<td>43</td>
<td>$34,725,508</td>
<td>19.2%</td>
</tr>
<tr>
<td>New</td>
<td>R36</td>
<td>37</td>
<td>11</td>
<td>$647,440</td>
<td>29.7%</td>
</tr>
<tr>
<td>New</td>
<td>R37</td>
<td>4</td>
<td>4</td>
<td>$1,553,880</td>
<td>100%</td>
</tr>
<tr>
<td>New</td>
<td>R50</td>
<td>251</td>
<td>251</td>
<td>$102,031,151</td>
<td>100%</td>
</tr>
<tr>
<td>New</td>
<td>RF1</td>
<td>12</td>
<td>12</td>
<td>$47,664,207</td>
<td>100%</td>
</tr>
<tr>
<td>New</td>
<td>RM1</td>
<td>4</td>
<td>2</td>
<td>$4,409,443</td>
<td>33.3%</td>
</tr>
<tr>
<td>New</td>
<td>U01</td>
<td>1,766</td>
<td>378</td>
<td>$290,843,414</td>
<td>21.4%</td>
</tr>
<tr>
<td>New</td>
<td>U19</td>
<td>96</td>
<td>24</td>
<td>$61,527,580</td>
<td>25%</td>
</tr>
<tr>
<td>New</td>
<td>U34</td>
<td>51</td>
<td>18</td>
<td>$6,574,906</td>
<td>35.3%</td>
</tr>
<tr>
<td>New</td>
<td>UA5</td>
<td>1</td>
<td>1</td>
<td>$354,749</td>
<td>100%</td>
</tr>
<tr>
<td>New</td>
<td>UC4</td>
<td>24</td>
<td>9</td>
<td>$90,603,200</td>
<td>37.5%</td>
</tr>
<tr>
<td>New</td>
<td>UG3</td>
<td>3</td>
<td>3</td>
<td>$2,128,188</td>
<td>100%</td>
</tr>
<tr>
<td>New</td>
<td>UH2</td>
<td>175</td>
<td>33</td>
<td>$25,794,359</td>
<td>21.7%</td>
</tr>
<tr>
<td>New</td>
<td>UH3</td>
<td>7</td>
<td>2</td>
<td>$2,569,873</td>
<td>28.6%</td>
</tr>
<tr>
<td>New</td>
<td>UM1</td>
<td>22</td>
<td>7</td>
<td>$41,450,979</td>
<td>31.8%</td>
</tr>
<tr>
<td>New</td>
<td>UM2</td>
<td>1</td>
<td>1</td>
<td>$23,043,250</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Total New**  
47,338 applications reviewed, 7,735 applications awarded, total $3,356,552,578 awarded, 16.3% success rate in 2015.

- Average win rate is 16%.
- Therefore, VCOM should in theory submit 6 NIH proposals to win 1 grant award.
What Does This Mean?

• 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 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
What Are We Doing?

• Expenditures of federal funds in FY17 more than doubled from FY16
  – From $594k to $1.29 million
  – Accounted for 58% percent of VCOM sponsored research expenditures in FY2017

• Gaining valuable experience and gathering preliminary data for future NIH submissions
What Are We Doing?

• VCOM research expenditures significantly increased in FY16 and FY17

• Research expenditures are:
  – Monies spent on research performed at VCOM
    • Facilities, equipment, research salary release time, etc
  – General institutional funds, internal grants or grants and contracts from public or private sponsors
Research Expenditures

The graph shows the research expenditures from 2008 to 2017. The expenditures are as follows:

- 2008: $3,835,686
- 2009: $4,087,438
- 2010: $4,088,628
- 2011: $5,010,561
- 2012: $3,755,640
- 2013: $4,225,388
- 2014: $3,926,689
- 2015: $3,272,035
- 2016: $9,317,154
- 2017: $7,693,977

The expenditures were highest in 2016 and lowest in 2012.
A little more “granular”…

Salaries Charged to Research

Internally Funded Research

2012 2013 2014 2015 2016 2017

$0 $500,000 $1,000,000 $1,500,000 $2,000,000 $2,500,000 $3,000,000 $3,500,000 $4,000,000 $4,500,000

$0 $500,000 $0.00 $100,000.00 $200,000.00 $300,000.00 $400,000.00 $500,000.00 $600,000.00 $700,000.00

2012 2013 2014 2015 2016 2017
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
What Are We Doing?

• First REAP round completed June 2017
  – 14 awards and $600,000 in funding
• Output includes publications, presentations and grant submissions:
  – 5 extramural grants submitted (2 to NIH),
    • 3 NIH submissions in development
  – 6 publications in peer reviewed journals
  – 1 publication in press and 4 manuscripts in review
    • 3 manuscripts in development
  – 12 presentations at national conferences
  – 9 VCOM students involved in presentations and publications
What Are We Doing?

Expanding research services to facilitate research activity:

• 2 new, full-time support staff in Research Dept
  – Jennifer Caccciola, MPH
  – Debbie Geiger, BS
• 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
What Are We Doing?

Commitment to Osteopathic-focused research

• 11 grant submissions to AOA’s research grant programs (2016-2017):
  – Osteopathic Philosophy, Chronic Diseases & Conditions, OMM/OMT and Musculoskeletal Injuries and Prevention

• 2 grants awarded during this period:
  – 2016: Jennifer Berglind, PhD, Use of the lymphatic pump technique as a novel therapy for IBD
  – 2017: Gunnar Brolinson, DO: Head impact biomechanics, concussion and osteopathic structural diagnosis and treatment
What Can We Do Better?

• Total amount of VCOM funded faculty “research” time for our 3 campuses
  – FY2017 $3,161,705
  – FY2016: $2,242,257

• Current total amount of extramural funding for “salary support” for our 3 campuses
  – FY2017 $859,705
  – FY2016: $297,300

• When more faculty salaries are supported on grants…more VCOM funds for research related resources
What Can We Do Better?

Utilize our amazing resources and regional capabilities!

• OMNEE consortium hospital partners
• Keynote presentation: “Research in the New World of HCA GME” Dr. Mike Flynn
• Osteopathic Medical Network of Excellence in Education.
• 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?

OMNEE workforce capabilities
• Currently have 420 trainees
  – 410 residents
  – 10 fellows
• Over last two academic years, 21 workshops with roughly 425 participants
  – Ultrasound central line/manual central line
  – Lumbar puncture
  – Suturing and wound closure
  – Joint injection
• Additional 30 hospitals not in OMNEE partnership but are VCOM core training sites or affiliated training sites.

http://www.omnee.net/
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
## What to do individually?

### Brolinson Grant Submissions FY16 and FY17

<table>
<thead>
<tr>
<th>Role</th>
<th>Title</th>
<th>Sponsor</th>
<th>Result</th>
<th>Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCOM PI</td>
<td>MRI: Acquisition of a Force-measuring treadmill for biomedical experimentation and assistive device development</td>
<td>NSF</td>
<td>Awarded</td>
<td>Virginia Tech</td>
</tr>
<tr>
<td>VCOM PI</td>
<td>Returning Athletes with Patellar Tendinopathy to Sport through a Novel Clinical Intervention</td>
<td>NBA</td>
<td>Not Awarded</td>
<td>Virginia Tech</td>
</tr>
<tr>
<td>Consultant</td>
<td>Reducing risk factors for ACL re-injuries using a novel biofeedback approach</td>
<td>NIH R21</td>
<td>Not Awarded</td>
<td>Virginia Tech</td>
</tr>
<tr>
<td>PI</td>
<td>Ex Vivo Pump to Treat Hyperkalemia Resulting from AKI</td>
<td>DOD</td>
<td>Not Awarded</td>
<td>VCOM</td>
</tr>
<tr>
<td>PI</td>
<td>Determining Feasibility and Scalability of a Life/Medical Science Hybrid-core Based Platform</td>
<td>NSF (transfer)</td>
<td>Awarded</td>
<td>VCOM</td>
</tr>
<tr>
<td>VCOM PI</td>
<td>Returning Athletes with Patellar Tendinopathy to Sport through a Novel Biofeedback Intervention</td>
<td>NIH R21</td>
<td>Not Awarded</td>
<td>Virginia Tech</td>
</tr>
<tr>
<td>PI</td>
<td>Head Impact Biomechanics, Concussion and Osteopathic Structural Diagnosis and Treatment</td>
<td>AOA</td>
<td>Awarded</td>
<td>VCOM</td>
</tr>
<tr>
<td>VCOM PI</td>
<td>Multiscale Investigation of Concussion Injury and Repair</td>
<td>Paul Allen Family Foundation</td>
<td>Not Awarded</td>
<td>Virginia Tech</td>
</tr>
<tr>
<td>VCOM PI</td>
<td>Identification and Development of an Osteopathic Approach to Management of Sports-Related Concussion: A Multi-Center Cohort Study</td>
<td>American Medical Society Sports Med</td>
<td>Pending</td>
<td>U Miami</td>
</tr>
<tr>
<td>VCOM PI</td>
<td>The Biomechanics and Biomarkers of Concussion: An Open Resources for Researchers and Clinicians using Head Impact Sensors</td>
<td>NIH R01</td>
<td>Pending</td>
<td>Virginia Tech</td>
</tr>
</tbody>
</table>
Be RELENTLESS!!!!

<table>
<thead>
<tr>
<th>Total Submissions:</th>
<th>10</th>
</tr>
</thead>
<tbody>
<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>
</tr>
</tbody>
</table>

- 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