Department overview

Virginia Tech’s Department of Biological Sciences is a strong and vibrant unit in the College of Science that is proud of its reputation for teaching excellence and its internationally-known research efforts. The department oversees the largest degree-granting program at Virginia Tech, with more than 1700 majors this past year, and also provides instruction to thousands of other students from across the college and the university. This is accomplished by the efforts of 35 T&R faculty and another 15 permanent and temporary instructors, including a number of retired faculty; these individuals include numerous members of the Academy of Teaching Excellence, two Alumni Distinguished Professors, and three Diggs Teaching Fellows. Faculty in the department are key players in teaching/training grants, including serving as co-PIs on two of Virginia Tech’s five NSF IGERT projects, as well as the Scieneering initiative recently funded by the Howard Hughes Medical Institute. The department runs an award-winning undergraduate advising operation and is heavily involved in other service and outreach efforts; we are very pleased to have been recognized with a 2011 Engaged Department Award.

Arguably the department’s greatest strength, and closely integrated with classroom teaching and both community and professional service, are its research programs. Our T&R faculty conduct research in a wide array of life sciences subdisciplines and increasingly in interdisciplinary collaborations, tackling problems in areas ranging from restoration ecology, evolutionary biology and computational biology to molecular microbiology, plant chemical ecology, cancer biology, and neuroscience. Much of this research is carried out by some 85 graduate students and a growing cadre of postdoctoral fellows, with many laboratories also providing substantive research opportunities for undergraduates. These efforts are funded by grants from the NSF, NIH, USDA, and a variety of other sources, which totaled $7M last year. Our junior faculty have been recognized in several instances by NSF CAREER awards, while more senior faculty include a University Distinguished Professor and the Bailey chair. We now also count three scientists from the Virginia Tech Carilion Research Institute and two at the Virginia Bioinformatics Institute among our research-active tenured/tenure-track faculty (note that their grants are not included in our numbers). However, we measure our successes not only by recognition of our faculty by their peers, by the dollar amounts of our grants, or by the number of journal articles published in high-impact journals, all of which are detailed in this report, but by the accomplishments of our students and our alumni. These individuals go on to careers in a myriad of life-sciences related disciplines, including academia, industry, medicine and dentistry. We have a highly-engaged Alumni Advisory Board and each year celebrate the accomplishments of current and former graduate students at the department’s popular Research Day.

The department has benefited from much-needed new research space over the past several years, especially for our molecular research groups. This has allowed us to compete well for recruitment - and retention - of faculty, students, and staff. At the same time, we face new challenges posed by being spread across five physically-separate locations on campus (seven counting the VTCRI and VBI). The department also continues to struggle with an unsustainable majors to faculty ratio, currently at 45:1, and increasing pressures to teach courses for other
majors, both existing and proposed, so that we are at capacity for both the personnel and facilities required to meet these needs. At the same time, morale is high and the department continues to emphasize collegiality and a willingness to work with other units to achieve common goals as its most important strengths. We are a very stable department in terms of leadership, having just appointed only the 9th head in our almost 120-year history. As attested to by an internal audit conducted during FY11, we are also a very well-run operation, with two talented Associate Heads directing the undergraduate and graduate programs, as well as a talented bookkeeping operation, highly-skilled IT and instrument/facilities support, and a well-run main office that oversees personnel appointments, PR, and many other aspects of our complex department. With these many strengths we feel well-positioned to help lead the growing prominence of life sciences teaching and research at Virginia Tech.

I. Learning

A. Undergraduate Programs

Faculty and departmental teaching awards (incl. college, university and national awards):

George Simmons: Class of 2011 Most Influential Professor
Ann Stevens, Richard Walker: Biological Sciences Outstanding Advising Award
Lisa Belden, Stephen Melville: Biological Sciences Outstanding Teaching Award
Ignacio Moore, Richard Walker: College of Science Certificate of Teaching Excellence
Jack Evans: University Alumni Award for Excellent in Undergraduate Advising
Richard Walker: University Alumni Award for Excellence in Teaching

Undergraduate student achievements and awards:

Charles Baker, a junior honors student triple majoring in physics, biological sciences, and mathematics in the College of Science, awarded a Barry M. Goldwater scholarship for 2011-2012.

Grants in teaching and learning:

Banerjee: VT Fralin Institute Summer Undergraduate Research Fellowship (SURF) to support Benjamin Wurst 12-week research project, $1000 (for materials and reagents)
Belden: National Science Foundation (DEB). REU Supplement, $15,000
Rosenzweig, Hawley, Belden, Moore, Sible, Stevens, Walker, Winkel: 2011 Engaged Department Award, $5,000
Sible: HHMI Undergraduate Science Education Grant, 2010-2014. PI: Wubah, Co-PI's: Sible, Watford, Dolan, Jones. $1.4M (Walker replaced Jones in Fall 2010)
Sible: VT FYE - Pathways to Success, 2010-2011 PI: Sible, co-PI's: Wilson and Kinder. $28,500

One to two notable events or programs related to undergraduate education:

Biological Sciences Faculty hosted a total of 154 undergraduate researchers in 24 labs.

New undergraduate courses developed or approved included: BIOL2104: Cell and Molecular Biology in SCALE-UP (Sible); online versions of BIOL2804: Ecology (Buikema) and BIOL2104: Cell and Molecular Biology (Walker); BIOL2984: Introduction to Biological Sciences Research (Walker); BIOL4974: Research Skills (Belden); BIOL4564/5564: Wildlife Disease Ecology (Hawley); BIOL4734/5734: Inflammation Biology (Li); BIOL 4844/5844G Proteomics and Biological Mass Spectrometry (Lazar); 4854/5854G Cytogenetics (Cimini); BIOL5104G: Adv Developmental Biology (Banerjee); BIOL5154: Exercises in Grantsmanship (Nilsen); BIOL5214: Biomacromolecular Structure (Finkielstein); BIOL5314: Advanced Plant Ecology (Nilsen); BIOL 5864: Physical Chemistry of the Cell (Xing).

Joseph Falkingham served as chair for the new Bringing Science to Market (BS2M) Program.

Undergraduate Majors in Biological Sciences: Enrollment Trends:

<table>
<thead>
<tr>
<th>Primary Majors</th>
<th>Fall 02</th>
<th>Fall 03</th>
<th>Fall 04</th>
<th>Fall 05</th>
<th>Fall 06</th>
<th>Fall 07</th>
<th>Fall 08</th>
<th>Fall 09</th>
<th>Fall 10</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>1049</td>
<td>1217</td>
<td>1297</td>
<td>1295</td>
<td>1312</td>
<td>1366</td>
<td>1453</td>
<td>1498</td>
<td>1602</td>
</tr>
<tr>
<td>Secondary Majors</td>
<td>24</td>
<td>43</td>
<td>73</td>
<td>58</td>
<td>65</td>
<td>59</td>
<td>51</td>
<td>56</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td>1073</td>
<td>1260</td>
<td>1370</td>
<td>1353</td>
<td>1377</td>
<td>1425</td>
<td>1504</td>
<td>1554</td>
<td>1654</td>
</tr>
</tbody>
</table>

In academic year 2010-2011, 380 students graduated (up from 351 last year, 288 in 2008-2009 and 318 in 2007-08). This increase is likely due to the greater numbers of majors. Many graduates achieved honors, as shown in the following table:

<table>
<thead>
<tr>
<th></th>
<th>Dec 2010</th>
<th>May 2011</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total graduates</td>
<td>80</td>
<td>300</td>
<td>380</td>
</tr>
<tr>
<td>Magna cum laude</td>
<td>4</td>
<td>46</td>
<td>50</td>
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<tr>
<td>Summa cum laude</td>
<td>7</td>
<td>47</td>
<td>54</td>
</tr>
<tr>
<td>Cum laude</td>
<td>10</td>
<td>49</td>
<td>59</td>
</tr>
<tr>
<td>Commonwealth scholars</td>
<td>4</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>In honors</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Health scholars</td>
<td>1</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Honors scholars</td>
<td>0</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Honors baccalaureate</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Graduate Programs
Graduate student achievements and awards (incl. college, university and national awards):

Amanda Cronin Rumore (Lawrence), Virginia Tech Graduate Woman of the Year 2011
Michael Painter (Phillips), College of Science Outstanding Master's Student for 2010-2011
Zhe Bao (Nilsen), 2010 ICTAS Doctoral Scholar
Matthew Becker (Belden), Julie Danner (Moore): Smithsonian Fellowship
Julie Castner (Moore), $2K research award from the American Ornithologist Union and $27,000 Smithsonian Institution Predoctoral Fellowship
Jared Heffron (Popham), Graduate School Outstanding Dissertation Award, Honorable Mention
Jonathan Moore, GSA Symposium Best Oral Presentation Award
Revathy Ramachandran (Stevens), Best Oral Presentation at the ACC Interdisciplinary Forum for Discovery in Life Sciences 10/10
Lorna Ringwood (Li), Biological Sciences Graduate Student Teaching Award

Eighth Annual Biological Sciences Research Day in February, 2011: William Silkworth (Cimini lab), the best oral presentation; Julie Danner (Moore) and Casey Jakubowski (Popham), first place poster awards; Vicki Garcia (Walters), Kevin Geyer (Barrett), and Reza Sohrabi (Tholl), second place poster awards; Sihui Zhang (Kuhn), third place poster award

Grants related to graduate education:


Interdisciplinary Graduate Education Program (iGEP) grants awarded to Multiscale Transport in Environmental and Physiological Systems program (Kuhn, Co-PI: Winkel, Xing, and Yang, participants) and Molecular Plant Sciences program (Tholl and Winkel, participants)

One to two notable events or programs related to graduate recruitment and/or education:

Buikema: "New GTA" Workshops in Fall 2010

Falkinham: New courses: Molecular Biotechnology BIOL 5984, as part of the joint VT-Georgetown U. program, Biomedical Technology; Development and Management, taught every spring in Northern VA over 4-6 weekends; CEE/FST/HNFE/BIOL 5984, Water for Health, first class in new graduate Interdisciplinary water interface program, taught in Spring 2011
**Kuhn: IGERT recruiting seminar, University of Texas - San Antonio, MARC/MBRS Seminar Series**

Summary of graduate student enrollment, types of support, graduate stipend payroll, and number of postdocs for FY 2004 through FY 2010

<table>
<thead>
<tr>
<th>Year</th>
<th>PhD students enrolled</th>
<th>MS students enrolled</th>
<th>Total students enrolled</th>
<th>PhD/MS ratio</th>
<th>Fellowships/ training grants</th>
<th>Funded GRAs</th>
<th>Funded GTAs</th>
<th>Active students not funded</th>
<th>(GRA+fellow)/GTA ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004-05</td>
<td>37</td>
<td>40</td>
<td>77</td>
<td>0.93</td>
<td>13</td>
<td>27</td>
<td>46.7</td>
<td>2</td>
<td>0.58</td>
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<tr>
<td>2005-06</td>
<td>46</td>
<td>26</td>
<td>72</td>
<td>1.77</td>
<td>19</td>
<td>32</td>
<td>39</td>
<td>1</td>
<td>0.82</td>
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<tr>
<td>2006-07</td>
<td>52</td>
<td>21</td>
<td>73</td>
<td>2.48</td>
<td>17</td>
<td>17</td>
<td>41</td>
<td>1</td>
<td>0.76</td>
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<tr>
<td>2007-08</td>
<td>65</td>
<td>15</td>
<td>80</td>
<td>4.33</td>
<td>17</td>
<td>24</td>
<td>37</td>
<td>1</td>
<td>1.16</td>
</tr>
<tr>
<td>2008-09</td>
<td>69</td>
<td>12</td>
<td>81</td>
<td>5.75</td>
<td>17</td>
<td>17</td>
<td>46</td>
<td>1</td>
<td>1.35</td>
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<tr>
<td>2009-10</td>
<td>71</td>
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<td>84</td>
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<td>46</td>
<td>1</td>
<td>1.24</td>
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<tr>
<td>2010-11</td>
<td>70</td>
<td>13</td>
<td>83</td>
<td>6.4</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Fellowship payroll</th>
<th>GRA stipend payroll</th>
<th>GTA stipend payroll</th>
<th>Total Payroll</th>
</tr>
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<tbody>
<tr>
<td>2004-05</td>
<td>$231,133</td>
<td>$571,061</td>
<td>$583,192</td>
<td>$1,154,253</td>
</tr>
<tr>
<td>2005-06</td>
<td>$372,438</td>
<td>$614,801</td>
<td>$528,485</td>
<td>$1,143,286</td>
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<tr>
<td>2006-07</td>
<td>$419,105</td>
<td>$413,812</td>
<td>$567,415</td>
<td>$1,212,360</td>
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<tr>
<td>2007-08</td>
<td>$306,319</td>
<td>$643,863</td>
<td>$617,790</td>
<td>$1,634,091</td>
</tr>
<tr>
<td>2008-09</td>
<td>$690,005</td>
<td>$510,227</td>
<td>$738,201</td>
<td>$1,667,533</td>
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<tr>
<td>2009-10</td>
<td>$779,023</td>
<td>$765,056</td>
<td>$779,023</td>
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<td>2010-11</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Full-time postdocs</th>
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<tbody>
<tr>
<td>2004-05</td>
<td>10</td>
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<tr>
<td>2005-06</td>
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<tr>
<td>2006-07</td>
<td>25</td>
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<td>2007-08</td>
<td>25</td>
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<tr>
<td>2008-09</td>
<td>21</td>
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<tr>
<td>2009-10</td>
<td>15</td>
</tr>
<tr>
<td>2010-11</td>
<td>12</td>
</tr>
</tbody>
</table>

1 Snapshot taken in spring of academic year; roughly half of postdoctoral fellows are funded outside of Department accounting codes.
2 Includes a small number of students from other life science departments occasionally funded to meet critical teaching on short notice.
3 Stipend data are for a 12-month basis, August 10 through August 9.
4 Fellowships include the “PhD 2010,” Cunningham, Malý, Paterson, Cairns, Fraîn Life Sciences Institute, ICTAS Doctoral Fellowships, all GRA support from VBI for Biological Sciences students, various minority fellowships, and training grants.
5 There were also ten PhD students advised by Biological Sciences faculty who are in the Genetics, Bioinformatics and Computational Biology Major, two in the Computer Science Major, one in the Psychology major, and one in the Chemistry major. The actual total of PhDs advised is 71+14=85.

**Number of Graduate Degrees in Biological Sciences Awarded**

<table>
<thead>
<tr>
<th>Year</th>
<th>03-04</th>
<th>04-05</th>
<th>05-06</th>
<th>06-07</th>
<th>07-08</th>
<th>08-09</th>
<th>09-10</th>
<th>10-11</th>
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<tbody>
<tr>
<td>MS</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>10</td>
<td>7</td>
<td>11</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>PhD</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>4</td>
<td>3</td>
<td>10</td>
<td>9</td>
<td>7</td>
</tr>
</tbody>
</table>
Graduate student recruitment into Biological Sciences (includes CDB students in 07-08, 08-09, 09-10; does not include small numbers of transfers from other recruitment programs)

<table>
<thead>
<tr>
<th>Class</th>
<th>No. Applicants</th>
<th>% Accepted</th>
<th>% of Accepted Enrolled</th>
<th>No. Enrolled</th>
<th>GRE Verbal</th>
<th>GRE Quantitative</th>
<th>GRE Total</th>
<th>GPA²</th>
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<tr>
<td>1991</td>
<td>125</td>
<td>46</td>
<td>14</td>
<td>8</td>
<td>530</td>
<td>650</td>
<td>1180</td>
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<tr>
<td>1992</td>
<td>114</td>
<td>26</td>
<td>11</td>
<td>3</td>
<td>566</td>
<td>654</td>
<td>1220</td>
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<tr>
<td>1993</td>
<td>99</td>
<td>32</td>
<td>22</td>
<td>7</td>
<td>539</td>
<td>640</td>
<td>1179</td>
<td>3.5</td>
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<tr>
<td>1994</td>
<td>108</td>
<td>56</td>
<td>66</td>
<td>40</td>
<td>550</td>
<td>605</td>
<td>1155</td>
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<tr>
<td>1995</td>
<td>154</td>
<td>28</td>
<td>72</td>
<td>31</td>
<td>582</td>
<td>626</td>
<td>1208</td>
<td>3.59</td>
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<tr>
<td>1996</td>
<td>121</td>
<td>24</td>
<td>59</td>
<td>17</td>
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<td>1997</td>
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<td>68</td>
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<td>18</td>
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<td>681</td>
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<td>2008</td>
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<td>16</td>
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<td>1193</td>
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<tr>
<td>2009</td>
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<td>65</td>
<td>15</td>
<td>529</td>
<td>661</td>
<td>1190</td>
<td>3.59</td>
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<tr>
<td>2010</td>
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<td>21</td>
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<td>13</td>
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<tr>
<td>2011</td>
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<td>7</td>
<td>100</td>
<td>8</td>
<td>587</td>
<td>703</td>
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<td>3.67</td>
</tr>
<tr>
<td>Mean</td>
<td>112</td>
<td>28</td>
<td>63</td>
<td>18</td>
<td>532</td>
<td>648</td>
<td>1179</td>
<td>3.52</td>
</tr>
</tbody>
</table>

¹ Students applying for spring and fall semester of indicated year.
² Calculated for students entering in regular status; GPA is for latest degree (undergraduate or MS) for domestic students; GRE is for both domestic and international students.
³ Data on GPA are not available for this year.

II. Discovery

Faculty awards/honors (e.g., NSF CAREER awards, Humboldt Fellowships):

Biological Sciences Outstanding Research Award: Dana Hawley, Jianhua Xing
Society of Mathematical Biology Arthur T. Winfree Prize: John Tyson
American Association for Cancer Research Minority Scholar Award in Cancer Research, National Breast Cancer Scholarship: Carla Finkielstein
VT Scholar of the Week, August 2010: Liwu Li
Popular Mechanics Breakthrough Award, 2010: Brenda Winkel (with Karen Brewer, Chemistry and Roger White, Theralase)
Notable research awards (incl. PIs, Amount, Title and Funding Agency):

**Jeb Barrett,** $198,768 (of $388,251 total), “Collaborative Research: Control over the spatial distribution and activity of microbial communities in antarctic soils,” National Science Foundation

**Lisa Belden,** $63,172, “Beneficial bacteria and disease prevention in amphibians: can probiotics save our frogs?,” Morris Animal Foundation


**Daniel Capelluto,** $155,655, “Structural basis of Dishevelled-2 membrane targeting in the Wnt/PCP signaling pathway,” National Institutes of Health (R03)

**Daniel Capelluto,** $25,000, “Molecular basis of Tollip IRAK-1 complex formation,” Jeffress Memorial Trust

**Daniela Cimini,** $349,998 (of $1,050,000 total), “Molecular architecture and mechanical properties of the kinetochore: a biophysical approach,” Human Frontier Science Program

**Carla Finkielstein,** $31,965 (of $6,506,600 total), NIH/National Cancer Institute, Appalachian Community Cancer Network II

**Dana Hawley,** $56,805 (of $1,730,359), “Ecological consequences of the Kingston, TN ash spill on aquatic and terrestrial consumers,” Tennessee Valley Authority

**Dana Hawley,** $670,000, “CAREER: Dual Effects of Intraspecific Competition On Pathogen Dynamics in a Songbird: From Endocrinology to Epidemiology,” National Science Foundation

**Khidir Hilu,** co-PI, $1,992,527, “Acquisition of a heterogeneous supercomputing instrument for transformative interdisciplinary research,” National Science Foundation MRI-R2

**Jeff Kuhn,** $20,000, “Characterizing Actin Architecture in a New In Vitro Model of Cell Motility,” Jeffress Memorial Trust

**Liwu Li,** $165,000, “Novel Regulation and Function of IRAK,” National Institute of Health, Administrative Supplement

**Liwu Li,** $150,000, “Novel signaling cross-talk between nuclear receptors and TLR pathways,” American Heart Association

**Liwu Li,** $53,783, “Therapeutic target and intervention of chronic inflammatory diseases,” Techulon, Inc.

**Erik Nilsen,** $5,250, “Functional significance of leaf idioblasts in Vireya leaves to water relations and photosynthesis,” American Rhododendron Society

**Erik Nilsen,** $45,750 subcontract, “Biotechnological improvement of switchgrass for higher biomass yield,” DOE, Southeastern Sun Grant Initiative

John Tyson, co-PI, $2.13M total, “Integrating Top-down and Bottom-up Models in Systems Biology with Application to Cell Cycle Control in Budding Yeast,” National Institutes of Health

Jeff Walters, $143,676, "Demographic and population response of red-cockaded woodpeckers on Camp LeJeune Marine Base to a basewide management plan," Department of Defense

Jianhua Xing, $466,021, “Model reduction in systems biology: the Mori-Zwanzig projection method,” NSF/NIH joint program

Jianhua Xing, $217,567, “Examining possible physiological roles of hysteretic enzymes in regulatory networks,” National Science Foundation

Number of manuscripts, number of books and book chapters (CY 2010); high impact papers:

A total of 71 journal articles and eight book chapters were published by members of the department in CY2010. High impact papers included the following:

- V.Shulaev, et al. (including Rick Jensen), “The Genome of the woodland strawberry (Frageria vesca)”, Nature Genetics, Published Online December 26, 2010

Number of presentations (CY 2010); notable invited lectures:

Members of the faculty gave 29 invited talks at other institutions and 118 additional presentations at conferences, workshops, and other meetings outside of the VT campus. Notable invited lectures included:

- Int'l Polar Year Oslo Science Conference, Oslo, Norway (Barrett)
- Duquesne University, Pittsburg, PA (Belden)
- Biophysical Society Conference, Baltimore, MD (Capelluto)
- Int'l Symposium on Cell Cycle and Cell Differentiation from A to Z, Nagoya City, Japan and MEXT Int'l Workshop on Mitosis/Cell Proliferation Control (Cimini)
• University of Colorado Comprehensive Cancer Center, Aurora, CO and University of
  Buenos Aires School of Medicine (Finkielstein)
• Institute of Ecology, University of Georgia (Hawley)
• Dept. of Systematic and Evolutionary Botany, University of Vienna, Austria (Hilu)
• Now Generation Sequencing Conference, San Diego (Jensen)
• Mayo Clinic, Rochester, MN (Lawrence)
• NIH "Lambda Lunch" Seminar Series, Bethesda, MD (Popham)
• Zing Conference in Bacterial Cell Biology, Puerto Morelos, Mexico (Scharf)
• Dept. of Cell Biology and Molecular Genetics, Univ. Maryland, College Park MD
  (Stevens)
• Gordon Research Conference on Biogenic Hydrocarbons, Le Diablerets, Switzerland
  (Tholl)
• Oxford Unversity UK (Center for Integrative Systems Biology), AAAS Annual Meeting,
  Mathematics of Integrative Cancer Biology Centers, Berkeley, CA, and Centre for
  Computational Systems Biology, Trento, Italy (Tyson)
• International Ornithological Congress, Campos do Jordao, Brazil (Walters)
• ChemGen IGERT Seminar Series, UC-Riverside, CA (Winkel)
• Biology Dept., University of Pittsburgh (Xing)

III. Engagement

Faculty service (Editorships, NSF/NIH program managers or panel members, leadership
positions in professional societies) (CY 2010):

Grant Review Panels:
NSF SBIR/STTR (Banerjee)
Israeli Science Foundation (Banerjee)
American Heart Association (Capelluto)
American Heart Association Immunology Panel (Li)
NIH Study Section Director's Opportunity Themes Immunology, NIH Study Section Cellular
and Molecular Immunology, NIH Study Section Transformative R01 Roadmap and NIH
Study Section Diabetes and Endocrinology (Li)
Ireland National Research Council (Li)
NIH Panel on Partnerships for Development of New Therapeutics Classes for Select Viral
and Bacterial Pathogens (Melville)
National Academy of Science/National Research Council Federal Review Panel (Popham)
NIH Infectious Disease Microbiology Study Section (Popham)
NSF MCB Grant Review Panel (Stevens)

Editorships:
Journal of the NABS Editorial Board and Book Review Editor (Benfield)
Editorial Board Member, World Journal of Biological Chemistry (Capelluto)
Academic editor for PLoS ONE (Cimini)
Editorial board, Applied and Environmental Microbiology (Falkinham)
Editor, International Journal of Microbiology (Falkinham)
Editorial board member for Standard Methods for the Examination of Water and Wasterwater, 21st ed. (Falkinham)
Guest editor, Special Issue of Functional Ecology (Feb 2011) (Hawley)
Editor, Inflammation Research Association (Li)
Editorial Board of the Journal of Arachnology (Opell)
Editorial Board, Journal of Bacteriology (Popham)
Editorial Board, Molecular Microbiology (Popham)
Advisory Board Member, New Phytologist (Tholl)
Editorial Board, Journal of Theoretical Biology (Tyson)
Editorial Board, Journal of Nonlinear Science (Tyson)
Editorial Board, Journal of the Royal Society Interface Focus (Tyson)
Editorial Board, Freshwater Biology (Webster)
Editorial Board, PlantCyc (Winkel)

Advisory Boards:
USEPA Science Advisory Board, Ecological Processes and Effects Committee (Benfield)
USEPA Member of Technical Qualifications Board for the National Center for Environmental Assessment (Benfield)
USEPA Scientific & Technical Achievement Awards Committee (Benfield)
Voting Committee Member of Joint Task Force, Standard Methods for the Examination of Water and Waste Water, USPHS (Benfield)
Virginia Department of Environmental Quality Academic Advisory Committee (Benfield)
Steering Committee Member, Research Coordination Network for Ecological Immunology (Benfield)
Member of the Board of Directors, Inflammation Research Association (Li)
Chair, AOU California Condor Blue Ribbon Panel (Walters)
Member, USFWS Guam Micronesian Kingfishers Recovery Committee (Walters)
Member of the North Carolina Sandhills Conservation Partnership, Red-cockaded Woodpecker Recovery Working Group (Walters)
Coweeta Long-Term Ecosystem Research Project Science Advisory Committee (Webster)
External Advisory/Review Board for Arkansas State U., EPSCoR Plant-Powered Production Center (Winkel)

Conference Director:
Meeting Organizer, 16th Annual International Meeting of the Inflammation Research Association, Oct 2010 (Li)

Examples of economic development (e.g., industrial partnerships, patents):

Patents:

Compounds and Methods for Inhibiting Platelet Aggregation.
Inventors: Capelluto, Finkielstein, Welsh.
“Compounds and Methods for Inhibiting the Metastasis of Cancer Cells.”
Inventors: Capelluto, Finkielstein, Welsh.

"Diagnostic Prognostic Tests"
U.S. Patent No 7,622,260, filed on Sep 5, 2002, issued Nov 24, 2009; first notified of award in 2010

“Fungus-induced Inflammation and Eosinophil Degranulation”
Inventor(s): Christopher Lawrence, Hirohito Kita, Jens Ponikau

“Microfluidic Devices and Methods Facilitating High-Throughput, On-Chip Detection of Separation Techniques"
Inventor: I. Lazar
Issued US 7,744,762 B2, June 29, 2010

Alternaria Genomes Portal: New ENSEMBL-based genome browser and annotation platform for fungal genomics, specifically Alternaria species (Lawrence)

Study Abroad programs:

Fall 2010 and Spring 2011: Study in Biodiversity at the Caribbean Center for Education and Research in Punta Cana, Dominican Republic (Via, taught Tropical Ornithology)
Summer I 2010: Study Abroad in Switzerland/Italy, BIOL 3954: Botanizing the Alps (Hilu)
Fall and Winter Break 2010: Antarctica: Humans and the Environment, AUIP Program (Hokies Abroad) (Blanc)
Summer 2010: Fiji: Sustaining Humans and the Environment, AUIP Program (Hokies Abroad) (Blanc)

PK-12 STEM programs:

Barrett: Hosted a Webinar for High School and Middle School teachers through the National Science Teacher Association. 37 teachers participated in a 90-minute session, May 2010
Belden: Designed and completed science activities with local third grade classes
--May, “Parasites in the food web” (6 classes, ~130 students)
--November, “Life-cycles of amphibians and parasites” (5 classes, ~100 students)
Cimini: Hosted high school student Alyssa Osimani in spring 2010; won first prize in her sub-discipline at regional science fair
Evans: Guest speaker at KIPPS Elementary School – one presentation to third graders entitled “Mimicry and Camouflage” and two presentations to fourth graders entitled “What is in this Forest?”

Rosenzweig: Coordinator of VT SOuP, working with the VT STEM K12 Outreach Initiative and the VT Center for Student Engagement and Community Partnerships; Participated in the Montgomery County Public Schools' Science Teachers Workshop; Founder of SEEDS

Scharf: Riverlawn Elementary School in Pulaski County, presentation to the third grade students with the Microbiology Club of VT, Fall 2010

Seyler: Chair, Gilbert Linkous Elementary Science Fair, Mar 2010

Sible: Judge, Prices Fork Elementary Science Fair, 2010

Stevens: With Micro Club: Demonstration/Display at Gilbert Linkous Science Fair, 3/10; VT Kids Tech University demonstration/display 3/10; Gilbert Linkous hands-on activities for 5th grade, 5/10; Riverlawn Elementary in Pulaski hands-on activities for 3rd grade, 12/10; Loaned club microscopes to 5th grade sciences teacher at Gilbert Linkous 12/10; Co-chair of the Gilbert Linkous Science Fair, Mar 2010; Coordinated VT 3-station science field trip for Gilbert Linkous 3rd graders (5/10)

Tholl: Supervised student, Sreemoyee Som, from the Roanoke Valley Governor's School for summer research

Winkel: Member of Advisory Board for Partnership for Research and Education in Plants (PREP), connecting high school classes with research on Arabidopsis genes

Xing: Volunteer, Gilbert Linkous Elementary Science Fair, March 2010

Community and Student Engagement:

Belden: Interview on Virginia amphibians and amphibian population declines with Sandy Hausman for WVTF that aired in February; Presented research overview of parasite and muskrat research at the Virginia Trappers Association meeting in March

Buikema: Science Museum of Western Virginia - Virginia Task Force, 2010; Faculty Advisor, VT Pistol and Rifle Club, 2010; Certified Hunter Education Instructor (2010); Co-taught three NRA certified classes in gun safety

Capelluto: Lecture at the American Heart Association CEO Lunch, Lewis Gale Medical Center in Salem

Finkielstein: Presented at the First USA Science and Engineering Festival in DC in October 2010; Participant in National Breast Cancer Lobby Day 2010; Organized visit of Breast Cancer Advocates to VT; Spoke at an American Heart Association meeting in June 2010 in Roanoke on research

Hawley: Submitted a Departmental Engagement Grant with Rosenzweig, $5000 was awarded - currently incorporating service learning into the Ornithology course as part of the engagement effort; Research was featured in the Virginia Tech Research Magazine (Winter 2011) and in a Scientific American podcast
Moore: Research presentation to the VT Psychology Club, April 2010; lecture on neuroscience of birdsong for the Johns Hopkins Center for Talented Youth Program at VT, Oct 2010

Rosenzweig: Advisor for the BGSA and the Biological Sciences Outreach/Student Chapter of SEEDS; Presentation on the Freshwater Heritage of Blacksburg, Historic Smithfield Lecture Series, May 2010; Member of Blacksburg Town Environmental Advisory Committee; Co-leads "Blacksburg Freshwater Heritage," a town/community project that is implementing education programs related to the TMDL plan to restore Stroubles Creek and Cedar Run, and to maintain or improve water quality of other town streams; Participated in Stream Clean Up with the VT Earth Sustainability Program w/ 30 students

Scharf: Presented at the "Essential Laboratory Math Workshop" coordinated by the COS and presented by the Laboratory Employee Professional Development Network, June 2010

Sible: VT STEM Advisory Committee, Co-hosted Johns Hopkins Center for Talented Youth Program on Neuroscience

Tholl: Conducted undergraduate research lab module on the subject of plant defense and the role of plant specialized metabolism with instructor Dr. Mike Wolyniak and 19 students in his Biology lab course at Hampden-Sydney College, Virginia, between September 20 and October 18, 2010. Supported by Dr. Erin Dolan (PREP, VT) and current NSF grant.

Xing: Volunteer exhibition at Kid's Tech University Science Fair

IV. Engagement

One to two notable activities by students, faculty and/or staff activities promoting diversity:

Numerous Biological Sciences faculty hosted MAOP scholars (Belden, Hawley, Hilu, Nilsen, Popham, Tholl), VT-PREP scholars (Cimini, Hawley, Li, Phillips, Yang), students from a minority NSF REU program (Lawrence, Melville, Popham), a VA-NC AMP student (Nilsen), and IMSD fellows (Lawrence, Li, Winkel) in their research laboratories.

Carla Finkielstein hosted two visiting high school students from Buenos Aires on exchange program with ENET N1 Otto Krause school; as part of the same program, local students Josh Green and Meredith Simmons traveled to Otto Krause in Argentina

Diversity awards and honors (e.g., MAOP scholarships; McNair Scholars):

Capelluto: Carl Storm Underrepresented Minority Fellowship Award, Gordon Research Conferences

Finkielstein: Graduate student, Linda Villa, received MAOP Scholarship
V. Trends in FTE faculty positions in the department (past ten years; data from VT Institutional Research).

<table>
<thead>
<tr>
<th>Type of Appointment</th>
<th>Fall 2001</th>
<th>Fall 2002</th>
<th>Fall 2003</th>
<th>Fall 2004</th>
<th>Fall 2005</th>
<th>Fall 2006</th>
<th>Fall 2007</th>
<th>Fall 2008</th>
<th>Fall 2009</th>
<th>Fall 2010</th>
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<tbody>
<tr>
<td>Tenured Instructional Faculty</td>
<td>33</td>
<td>29</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>28</td>
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<td>Tenure-Track Instructional Faculty</td>
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<td>8</td>
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<td>Non-tenure Track Instructional Faculty</td>
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<td>Research Faculty</td>
<td>7</td>
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<td>9</td>
<td>12</td>
<td>18</td>
<td>21</td>
<td>16</td>
<td>20</td>
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<tr>
<td>P-14 Faculty, 9A-9B only **</td>
<td>6</td>
<td>6</td>
<td>6</td>
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<td>7</td>
<td>5</td>
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<td>Professional Faculty without Tenure</td>
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<tr>
<td>Grad/ Sr Grad Teaching Assistants</td>
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<td>45</td>
<td>46</td>
<td>43</td>
<td>39</td>
<td>49</td>
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<tr>
<td>Grad/ Sr Grad Research Assistants</td>
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<td>GRAND TOTAL</td>
<td>123</td>
<td>129</td>
<td>125</td>
<td>127</td>
<td>134</td>
<td>141</td>
<td>152</td>
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<tr>
<td>Tenure-Track Faculty</td>
<td>40</td>
<td>36</td>
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<td>34</td>
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<tr>
<td>Non-tenure Track Faculty</td>
<td>16</td>
<td>18</td>
<td>20</td>
<td>20</td>
<td>28</td>
<td>30</td>
<td>30</td>
<td>31</td>
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<tr>
<td>TOTAL FACULTY</td>
<td>56</td>
<td>54</td>
<td>54</td>
<td>54</td>
<td>63</td>
<td>69</td>
<td>69</td>
<td>68</td>
<td>69</td>
<td>53</td>
</tr>
<tr>
<td>GRA+GTA</td>
<td>67</td>
<td>75</td>
<td>71</td>
<td>73</td>
<td>71</td>
<td>72</td>
<td>83</td>
<td>85</td>
<td>85</td>
<td>79</td>
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</table>

VI. Budget trends (past eight years)

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</thead>
<tbody>
<tr>
<td>Faculty salary</td>
<td>556,285</td>
<td>567,867</td>
<td>581,541</td>
<td>606,014</td>
<td>628,680</td>
<td>688,649</td>
<td>643,690</td>
<td>602,731</td>
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<tr>
<td>Staff salary</td>
<td>446,301</td>
<td>456,793</td>
<td>554,371</td>
<td>594,379</td>
<td>618,051</td>
<td>632,772</td>
<td>632,773</td>
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<tr>
<td>Operating</td>
<td>392,946</td>
<td>392,946</td>
<td>421,946</td>
<td>422,946</td>
<td>422,946</td>
<td>341,651</td>
<td>342,520</td>
<td>342,520</td>
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<tr>
<td>TOTAL</td>
<td>4,325,508</td>
<td>4,452,867</td>
<td>4,590,592</td>
<td>5,079,407</td>
<td>5,190,663</td>
<td>5,181,557</td>
<td>4,918,551</td>
<td>4,746,705</td>
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<tr>
<td>Changes in base</td>
<td>-119,000</td>
<td>+127,359</td>
<td>+137,725</td>
<td>+488,815</td>
<td>+111,256</td>
<td>-9,106</td>
<td>-263,006</td>
<td>-171,846</td>
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<td>from previous year</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Enrollment support</td>
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<td>62,000</td>
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<td>86,812</td>
<td>98,230</td>
<td>238,345</td>
<td>226,418</td>
<td>333,469</td>
<td>378,267</td>
<td>397,844</td>
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<tr>
<td>ASO hire behinds</td>
<td>65,000</td>
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<tr>
<td>Summer teaching funds</td>
<td>72,100</td>
<td>65,900</td>
<td>80,300</td>
<td>94,418</td>
<td>116,343</td>
<td>147,697</td>
<td>148,576</td>
<td>168,167</td>
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<tr>
<td>SCHEV equipment</td>
<td>260,800</td>
<td>202,458</td>
<td>200,870</td>
<td>240,872</td>
<td>251,747</td>
<td>235,220</td>
<td>253,222</td>
<td>180,000</td>
</tr>
</tbody>
</table>

*includes T&R, AP, and contract instructors; **conversion of two staff to AP
Ad Hoc Committee on Assessment
Walker (chair) / Buikema / Evans / Lipscomb / Stevens

Curriculum Committee
Walker (chair) / Barrett / Benfield / Cimini / Evans / Opell / Seyler / Sarmadi

Undergraduate Curriculum Revision Committee
Walker (chair) / Barrett / Belden / Buikema / Lipscomb / Stevens / Tyson / Winkel

Diversity Committee
McNabb (chair) / Brown / Lazar / Phillips / Tholl / Yang (Spr) / Mathias / Garcia / He

Executive/Personnel Committee
Winkel (chair) / Barrett / Lawrence / Nilsen / Stevens / Tholl / Tyson / Webster / Xing

Faculty Recognition Committee
Stevens (chair) / Buikema / Walker / Winkel

Faculty Search - ISES
Webster (chair) / Barrett / Belden / Benfield / Brown / Winkel / Norman / Schoenholtz (FREC) / Krometis (BSE)

Faculty Search - Molecular Ecologist (tentative)
Walters (chair) / Hawley / Livnat / Moore / Tholl / Danner / Schmale (PPWS)

Graduate Evaluation Committee
Walters (chair) / Benfield / Cimini / Lawrence / Phillips / Schubot

Graduate Selection Committee
Walters (chair) / Moore / Rasmussen / Schubot

Honors Advisors
Buikema / Simmons

Research Day Committee
Scharf (chair) / Jensen / Hilu / Mury / Voshell / Howard / Silkworth

Safety Committee
Waller (chair) / Benfield / Capelluto / Rodgers / Schubot / Tholl / Tolga Durak (EHSS Rep) / Hart

Student Recognition Committee
Lipscomb (chair) / Capelluto / Elgert / Evans / Li / Via / Baker

Undergrad Research Committee
Seyler (chair) / Walker / Lazar / Altrichter

Department Programs and Technical Functions
Alumni Advisory Board: Winkel (chair) / Finkielstein / Melville
Animal Care: Elgert / Jarrett
BGSA President: Michelle Jusino; VP: Adam Hart
Biological Collections: Hilu / Wieboldt / Rosenzweig
Facilities: Benfield / Waller
Freshman advisors: Evans (chair) / Belden / Benfield / Buikema / Elgert / Haymore / Moore / Lipscomb / Mathias / Phillips / Rosenzweig / Seyler / Simmons / Wilson
Freshman Labs: Buikema / Sarmadi
Dept Greenhouse: Nilsen / Wiley
Microbiology Group Coordinator: Stevens
Micro/immuno labs: Rodgers / Stevens

University/College Reps
Alumni Teaching Award Committee: Stevens / Walker
Acad Tchg Excellence Exec Comm: Stevens (vice chair)
Biology-VBI Greenhouse: Nilsen (chair) / Hilu / Wiley
College Curriculum: Walker
College Diversity: McNabb (co-chair)
College Grad Affairs: Benfield
College Honorifics: Li
College New Majors: Finkielstein (Nanoscience) / Moore (Neuroscience) / Li, Tyson, Xing (Systems Biology) / Tyson (Integrated Science Curriculum)
College P&T: Falkingham
College Instructor Promotions: Rosenzweig
College Research: Tyson
College Scholarship: Falkingham / Yang / Tyson
College Teaching Excellence Committee: Moore / Walker
EEB Seminar: Hawley (chair) / Belden / Northington
Faculty Senate: Lazar
Fralin SURF Program: Melville (coordinator)
ILSB Faculty Stakeholders Committee: Banerjee
Latham Facilities Committee: Tholl
Life Sciences I Director: Popham
MCBB/VTLSS seminar: Finkielstein (chair)
Staff senate: Bowden
University Animal Care Comm.: Turner
University Biotech Oversight committee: Walker
Univ. Emergency Mgmt & Risk Assessment: Popham
University Honorifics: Buikema
Univ. Intellectual Properties: Falkingham
Univ. Micro Grad Program: Popham (chair)
Univ. Mol Plant Sciences Grad Program: Tholl (chair)
Univ. Office of Sustainability Liaison: Rosenzweig
Univ. Undergraduate Honors System: Buikema
VT Postdoc Association: Cimini

OWLS / Emeritus Faculty

Assistant Professors/Mentors
Diya Banerjee: Huckle / Stevens Jeff Kuhn: Walker / Winkel
Bryan Brown: Benfield Adi Livnat: Phillips
Daniel Capelluto: Li Konark Mukherjee: TBD
Daniela Cimini: Walker Birgit Scharf: Stevens
Dana Hawley: Moore Florian Schubot: Popham
Debbie Kelly: TBD Jianhua Xing: Tyson

Club Advisors
BGSA: Rosenzweig / Microbiology: Stevens, Scharf / Nursing: Evans / Optometry: Evans / Pharmacy: Evans / Phi Sigma Honor Society: Popham / Scuba: Waller / SEEDS: Rosenzweig