

## Vita of James J. Bull

Born: January, 1949

Address:

Integrative Biology C0930  
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**Education:**

1971	B.S. in Zoology, Texas Tech University, Lubbock
1977	Ph.D. in Biology, University of Utah, Salt Lake City
1977-80	University of Wisconsin, Madison NIH Postdoctoral Trainee, Genetics (with J.F. Crow)
1980-81	University of Sussex, England NATO Postdoctoral Fellow (with J. Maynard Smith)

**Positions:**

2000-present	University of Texas, Austin Professor of Integrative Biology (following reorganization)
1991-2000	University of Texas, Austin Professor of Zoology
1986-91	University of Texas, Austin Associate Professor of Zoology
1983-86	University of Texas, Austin Assistant Professor of Zoology
1981-82	University of Utah, Salt Lake City Research Assistant Professor of Biology

**5-YEAR REPORT OF ACTIVITIES: (1997-2004)**

## Teaching

### 1. Graduate students supervised:

Past:

- S. Messenger (completed 1997; co-chair with Hillis)  
Position: analyst and Lawrence Livermore labs
- W. Crill (completed 1998; co-chair with Hillis)  
Position: postdoc in virology at CDC, Ft. Collins
- K. Agnew (completed 1999; co-chair with Singer)  
Position: asst. professor at Hendrix College
- M. Brauer (completed 2000; co-chair with Hillis)  
Position: postdoc with D. Bottstein at Princeton
- K. Kichler Holder (completed 2001; co-chair with Hillis)  
Position: none (has followed her husband, on a postdoc and has two young children)
- M. Badgett (completed 2002; M.S. degree)  
Position: technician and supervisor at Ambion
- J. Sachs (completed 2004)  
Position: postdoc at UC Berkeley
- A. Holloway (completed 2004; co-chair with Hillis)  
Position: postdoc at UC Davis

Current:

- R. Heineman (5<sup>th</sup> yr)
- W. Harcombe (3<sup>rd</sup> yr)
- R. Springman (2<sup>st</sup> yr)

### 2. Postdoctoral fellows supervised

past:

- K. Crandall (1994-6 with Hillis; Assist. Prof., Brigham Young University)

current:

- S. Brown (2004-present with L. Meyers)

### 3. Graduate courses taught:

- 2006 Spring: unofficially teaching a community evolution class with L. Meyers and U. Mueller
- 2004 Spring: co-teaching with L. Myers (Model systems in evolution; I may not be an official instructor)
- 2002 Fall: Research Design (Bio 385K); (7 grads enrolled; 3 others attended)  
evaluations 4.7 for course, 5.0 for instructor, but only 3 responses
- 2002 Spring: Research Design (unofficial; done at request of 5 grad students)
- 2001 Spring: Research Design (unofficial; done at request of 7 grad students)
- 1997 Spring: Practical Statistics (Zoo 384)

**4. Undergraduate courses:**

**a. Courses Created**

In 1990-1991, Craig Pease and I developed a Biology course for nonmajors entitled Process and Politics of Biology (under the “Topics” course Bio 301C). The title has been changed to Biology for Business, Law, and Liberal Arts, and at the time of reorganization it was given its own number (Bio 301D). This course evolved from our earlier teachings of 301M, and its goal is to teach students critical thinking about the scientific process without focusing excessively on encyclopedic memorization of biological details. As no text seems suited to this material, we wrote our own book (inclusive of sample problems), which is revised annually. The book is presently formatted like a manuscript and is both on-line (<http://www.utexas.edu/courses/bio301d>) and is also sold to the students through Paradigm Notes, with no royalty charges.

**b. Taught**

2005 Fall: Biology for Business, Law, and Liberal Arts (Bio301D); two sections (420 undergrads) evaluations 4.3 instructor, 3.8 course (combined)  
2004 Fall: Biology for Business, Law, and Liberal Arts (Bio301D); two sections (420 undergrads) evaluations 4.0, 4.3 instructor, 3.5, 3.5 course  
2003 Fall: Biology for Business, Law, and Liberal Arts (Bio301D); two sections (420 undergrads) evaluations 4.1, 4.2 instructor, 3.7, 3.7 course  
2002 Fall: Biology for Business, Law, and Liberal Arts (Bio301D); two sections (400+ undergrads) evaluations 4.2 instructor, 3.7 course (combined)  
2001 Fall: Biology for Business, Law, and Liberal Arts (Bio301D); two sections (400+ students) evaluations 4.3 instructor, 3.8 course for both sections  
2000 Fall: Biology for Business, Law, and Liberal Arts (Bio301D); two sections (400+ students)

**5. teaching colleagues (for team-taught courses):** Pease (gone), Hillis, Singer

**6. recent teaching assistants:** W. Harcombe (2005), A. Holloway (2004), M. Maas (2002), R. Heineman (2002, 03, 04,05), J. Sachs (2002-1999), N. Gerardo (2000), M. Brauer (1998), A. Himler (2001, 04,05), M. Badgett (2001)

**7. teaching awards:** Dad's Centennial Professor (1998-99); nominated by CNS for Distinguished Academy of Teachers (2003, 2004, 2005)

**8. course syllabus and exam:** syllabus, book, exams, and sample problems available to anyone at <http://www.utexas.edu/courses/bio301d>. This site gets 1-3 requests per year from people outside UT wishing to use it in their class.

**Research**

**1. Publications** (last five years):

## 2006

117. Bull, J.J. 2006. Optimality models of phage life history and parallels in disease evolution. *J. Theor. Biol.* (in press)
116. Bull, J.J., J. Millstein, J. Orcutt, and H. A. Wichman. 2006. Evolutionary feedback mediated through population density, illustrated with viruses in chemostats. *American Naturalist* **167**: E39-E51.

## 2005

115. Heineman, R. H., I.J. Molineux, and J.J. Bull. 2005. Evolutionary robustness of an optimal phenotype: re-evolution of lysis in a bacteriophage deleted for its lysin gene. *J. Molecular Evolution* **61**: 181-191.
114. Bull, J.J., L. Meyers, and M. Lachmann. 2005. Quasispecies made simple. *PLOS Computational Biology* **1**: e61.
113. Harcombe, W., and J. J. Bull. 2005. Impact of phages on two-species bacterial communities. *Applied Environ. Microbiol.* **71**: 5254-5259.
112. Springman, R., M.R. Badgett, I. J. Molineux, and J.J. Bull. 2005. Gene order constrains adaptation in bacteriophage T7. *Virology* **341**:141-152.
- \*\* Bull, J.J., and S. P. Otto. 2005. The first steps in adaptive evolution. *Nature Genetics* **37**: 342-343. (News and Views)
111. Cowperthwaite, M. C., J. J. Bull, L. Ance Meyers. 2005. Distributions of beneficial mutations in a biological simulation model *Genetics* **170**:1449-1457.
110. Wichman, H. A., J. Millstein, and J. J. Bull. 2005. Adaptive molecular evolution for 13,000 phage generations: a possible arms race. *Genetics* **170**:19-31
109. Sachs, J.L., and J. J. Bull. 2005. Experimental evolution of conflict mediation between genomes. *Proceedings National Academy Sciences* **102**:390-395.

## 2004

108. Sachs, J. L., U. G. Mueller, T. P. Wilcox, and J. J. Bull. 2004. The evolution of cooperation. *Quart. Rev. Biology* **79**:135-160.
107. J. J. Bull, M. R. Badgett, R. Springman, and I. J. Molineux. 2004. Genome properties and limits of adaptation in bacteriophages. *Evolution* **58**:692-701.

106. Bruce R. Levin and James J. Bull. 2004. Population and evolutionary dynamics of phage therapy. *Nature Reviews Microbiology* **2**:166-173.
105. Bull, J.J., D. W. Pfennig, I-N. Wang. 2004. Genetic details, optimization, and phage life histories. *Trends in Ecology and Evolution* **19**:76-82.

### 2003

104. Bacher J. M., J.J. Bull, and A. D. Ellington. 2003. Evolution of phage with chemically ambiguous proteomes. *BMC Evolutionary Biology* **3**: 24.
- \*\* Bull, J. and D. Dykhuizen. 2003. Epidemics-in-waiting. *Nature* 426:609-10. (News & Views)
- \*\* Bull, J.J. and D. Ebert. 2003. Parasites at center stage. *Evolution* 57:441-3 (Book review).
103. Bull, J.J., M. R. Badgett, D. Rokyta, and I. J. Molineux. 2003. Experimental evolution yields hundreds of mutations in a functional viral genome. *J. Molecular Evolution* 57:241-8.
102. Ebert, D. and J.J. Bull. 2003. Challenging the trade-off model for the evolution of virulence: is virulence management feasible? *Trends in Microbiology* **11**: 15-20.

### 2002

101. Bull, J.J., B.R. Levin, T. DeRouin, N. Walker, and C. A. Bloch. 2002. Dynamics of success and failure in phage and antibiotic therapy in experimental infections. *BMC Microbiology* **2**:36.
100. Badgett, M.R., A. Auer, L.E. Carmichael, C.R. Parrish, and J.J. Bull. 2002. Evolutionary dynamics of viral attenuation. *Journal of Virology* **76**:10524-10529.
- \*\* Bull, J.J., and C. Parrish. 2002. A binding contract for anthrax. *Science* **297**:201-202. (A Perspective)
99. Rokyta, D., M.R. Badgett, I.J. Molineux, and J.J. Bull. 2002. Experimental genomic evolution: Extensive compensation for loss of DNA ligase activity in a virus. *Mol. Biol. Evol.* **19**:230-238.
98. Ancel Meyers, L. and J.J. Bull. 2002. Fighting change with change: adaptive variation in an uncertain world. *Trends in Ecology and Evolution* **17**:551-557.
97. D.A. Parish, P. Vise, H.A. Wichman, J.J. Bull, and R.J. Baker. 2002. Distribution of LINES and other repetitive elements in the karyotype of the bat *Carollia*: implications for X-chromosome inactivation. *Cytogenet Genome Res.* **96**:191-7.

### 2001

96. Holder, K. K., and J. J. Bull 2001. Profiles of adaptation in two similar viruses. *Genetics* **159**:1393-1404.
95. Bull, J.J., and H.A. Wichman. 2001. Applied evolution. *Annu. Rev. Ecology and Systematics*. **32**:183-217.
94. Bull, J.J., M.R. Badgett, and I.J. Molineux. 2001. A general mechanism for viral resistance to suicide gene expression. *J. Molecular Evolution* **53**:47-54.

## 2000

93. Wichman, H.A., L.A. Scott, C.D. Yarber, and J.J. Bull. 2000. Experimental evolution recapitulates natural evolution. *Phil. Trans. R. Soc. Lond. B* **355**:1677-1684.
- \*\* Bull, J.J. 2000. Deja Vu. *Nature* **408**:416-7. (New&Views).
92. Crill, W.D., H.A. Wichman, and J.J. Bull. 2000. Evolutionary reversals during viral adaptation to alternating hosts. *Genetics* **154**:27-37.
91. Bull, J.J., Badgett, M.R., and H.A. Wichman. 2000. Big benefit mutations in a virus inhibited with heat. *Mol. Biol. Evol.* **17**:942-950.
- \*\* Bull, J.J., and B.R. Levin. 2000. Mice are not furry petri dishes. *Science* **287**:1409-10. (Perspective)

2. **Other publications** from the lab: (Although Hillis and I share a lab, I'm not listing the many systematics-oriented publications from the lab).

### 3. **Grants last five years** (1996-2006):

2006-2010 NIH (\$870,000) Experimental models of viral genome evolution

2002-2006 NIH (\$819,000) Experimental models of viral genome evolution (this is a continuation of the earlier NIH, but without the subcontract to Idaho)

1998-2001 NIH (\$934,000) Experimental models of viral adaptation (approximately half the money goes to a subcontract with U. Idaho)

1998-2001 NSF (\$144,000) Viral attenuation and adaptation to multiple hosts

1995-1997 NSF (\$140,000; Co-PI with Hillis, Molineux) experimental molecular evolution using bacteriophage

4. **Recognition for research accomplishments:** (J. Friedrich Miescher Regents Professorship, University of Texas); American Academy of Arts and Sciences (elected 2003)

### 5. **Major invited lectures:**

Departmental seminars:

UC Davis, UNLV, U. Idaho, (1996-7); Medical College of Ohio, SELU , MSU (1998-9); U. Houston, UT Galveston, Duke U. (1999-2000), Indiana U. (2001), Southwest Res. Fndn, U. Houston (2002); UNC, Cornell (2002-3); UC Davis, U. Utah, U. Arizona (2004); Rockefeller U., U. Nebraska (invited for 2006; declined 1-2 others);

Invited symposia, plenary lectures and workshops (1997-2006):

NIH conference on infectious diseases (July 2005)

Gordon Conference on microbial population biology (July 2005)

Conference on viral evolution (2004, Noble Foundation, Ardmore)

Phage Biology meetings, Evergreen College, WA (July 2003)

Evolution education symposium at the Champaign Evolution meetings (June 2002)

Santa Fe Inst. conference on evolutionary robustness (2002);

Co-organized a symposium on applied evolution (SSE meetings, Bloomington, 2000)

3 Gordon Conferences, either as a speaker, session leader, or both (1996, 1997, 1997); Duke

U. distinguished lecturer (2000); Conference on plant virology (1999, Ardmore); co-

organizer of first conference on viral evolution (1999, Ardmore)

## 6. Citations.

6300 (yr 2005)

**downloads.** Some journals provide download information; my Applied Evolution paper (2001, Annual Reviews Ecology and Systematics) was downloaded over 2,000 times in its first 3 years, and it was the 8<sup>th</sup> most downloaded paper in the journal's history. Of course, one expects downloads to be heavily biased in favor of recent issues.

## Service

### 1. Departmental, college, and university committees of significant nature:

#### Departmental & EEB:

Integrative Biology (2005-6): Parmesan tenure (chair)

Integrative Biology (2004-5): physiology search; faculty merit review (chair)

Integrative Biology (2003-4): prelim redesign committee, Cannatella (3<sup>rd</sup> year review)

Integrative Biology (2002-3): Parmesan (3<sup>rd</sup> year review)

Integrative Biology (2001-2): Gutell tenure (chair); Faculty Merit Review (chair)

Integrative Biology (2000-1): math ecology search (chair), biostatistics search, Cannatella hire (chair), Core curriculum (now chair), Gutell promotion

Zoology (3rd year review of Begun and Linder 1998-9; Budget Council Teaching Review 1998-9; Faculty Salary Review 1997-8, 1995-6, Faculty Search 1997-8; Chair of Dudley promotion in 1996-7; Long-range planning 1995-6).

College: P&T rep for IB (2006); Search for Director of Center for Computational Biology and Bioinformatics (chair, 2002-3); Machine shop (1999-present); Safety Specialist Search (1999-2000); Natural Sciences Courses and Curriculum (1995-9)

University: none

**2. Administrative responsibilities:**

Associate Chair for Section of Integrative Biology (1999-present).

**3. Service to professional organizations:**

Reviewing Editor for *Science*(1988-2001)

Associate Editor for *The American Naturalist* (ended 2001), *Journal of Molecular Evolution* (2000-present)

**4. Service on advisory committees:**

NIH study section: (Genetic Variation and Evolution: chair in Feb 06; 3 times in 2005, 2004; Genetics: 2004 (2x), 2003 (2x), 2002 (2x), 2001(2x), 2000, 1999, 1998; Evolution of infectious diseases: 1999)

NIH-NSF panel review for mathematical biology (Oct 2003)

External review of Emory University Dept. of Biology (2000)

External review of U. Idaho NSF Epscore grant (2000, 2001)

**5. Other activities, such as reviews:**

reviewer for: *Nature*, *Proc. Royal Soc. London*, *PNAS*, *Genetics*