

COLUMBIA UNIVERSITY SENATE  
ELECTIONS COMMISSION

February 3, 2010

Re: University Senate Reapportionment

Lee C. Bollinger  
Office of the President  
535 West 116th Street  
New York, NY 10027

Dear President Bollinger:

On behalf of the University Senate Elections Commission, I am pleased to submit the enclosed report and recommendations for reapportionment of seats in the University Senate. Based upon its analysis of population shifts within the University, the Commission recommends five one-seat adjustments to the current apportionment.

Section 21 of the University Statutes requires that eighty-one of the Senate's 107 seats be reapportioned every five years among the faculties of the Columbia Corporation and its affiliated institutions. The seats subject to reapportionment are forty-two for tenured officers of instruction, fifteen for non-tenured officers of instruction, and twenty-four for students. The last reapportionment occurred in 2004–05 and was effective for the Senate's spring 2005 elections. The present reapportionment will be effective from the Senate's spring 2010 elections until the next scheduled reapportionment in 2014–15.

The enclosed report is intended to satisfy the Elections Code provision that the Commission "advise the Senate" on the reapportionment process. While preparing this report, the Commission consulted with the Provost's Office of Planning and Institutional Research to obtain the most accurate and up-to-date population figures for the applicable Senate constituencies. With assistance of staff and the Senate parliamentarian, the Commission analyzed these data alongside relevant provisions of the University Statutes and Elections Code to determine the appropriate apportionment of Senate seats. These determinations form the basis of the Commission's recommendation that five one-seat changes be made to the current apportionment of seats.

I commend this report to your attention and respectfully request that it be forwarded to whomever its contents may concern.

For the Elections Commission,

/s/

Benjamin Brickner, chair

cc: Sharyn O'Halloran, chair, Executive Committee  
Monica Quaintance, chair, Structure and Operations

COLUMBIA UNIVERSITY SENATE  
ELECTIONS COMMISSION

**To:** The Columbia University Senate  
**DATE:** February 3, 2010  
**RE:** 2010 Quinquennial Reapportionment Report

**EXECUTIVE SUMMARY**

Section 21 of the University Statutes requires the Senate to reapportion eighty-one of its 107 seats every five years among the faculties of the Columbia Corporation and its affiliated institutions.<sup>1</sup> Seats subject to reapportionment are forty-two for tenured officers of instruction, fifteen for non-tenured officers of instruction, and twenty-four for students.

The Elections Code provides that the Elections Commission shall “advise the Senate” on the quinquennial reapportionment of seats.<sup>2</sup> This report is intended to fulfill this charge by presenting (1) populations of each constituency to be reapportioned, (2) their changes since the last reapportionment and (3) the Commission’s recommendations for reapportionment of seats. Based upon its analysis of the population data, and application of relevant provisions of the University Statutes and Elections Code, the Commission recommends five one-seat adjustments to the current apportionment as shown below.

Tenured Officers of Instruction	Non-tenured Officers of Instruction	Students
Medicine + 1 seat	Continuing Education + 1 seat	all constituencies <i>no change</i>
Public Health + 1 seat	all other constituencies <i>no change</i>	
A&S – Pure Sciences – 1 seat		
Law – 1 seat		
all other constituencies <i>no change</i>		

The Commission also recommends that the Senate consider certain apportionment-related revisions to the University Statutes. These recommendations are discussed below.

Reapportionment last occurred in 2004–05, effective for the Senate’s spring 2005 elections. The present reapportionment will be effective from the Senate’s spring 2010 elections until its next scheduled reapportionment in 2014–15.

This report proceeds with an overview of reapportionment followed by a description of the Commission’s process, analysis and specific recommendations. Detailed population data and a draft resolution implementing one of the Commission’s recommendations are presented as appendices.

<sup>1</sup> University Statutes, §§ 21(a)(1), (a)(2) and (b), available at [http://www.columbia.edu/cu/secretary/pdf\\_and\\_word/trustees\\_charter\\_july08.pdf](http://www.columbia.edu/cu/secretary/pdf_and_word/trustees_charter_july08.pdf).

<sup>2</sup> University Senate Elections Code, § 6, available at [http://www.columbia.edu/cu/senate/topbar\\_pages/elections.html#elections\\_code](http://www.columbia.edu/cu/senate/topbar_pages/elections.html#elections_code).

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### OVERVIEW OF SENATE REAPPORTIONMENT

Because the University Senate was founded as a representative assembly within a dynamic institution, the need for its periodic reapportionment is clear. Inevitable change in the relative size of the University's faculties and schools requires occasional reallocation of seats to ensure the proportion of representation among the Senate's constituencies remains stable over time.

When the Senate was last reapportioned in 2004–05, only four one-seat adjustments were necessary, all among tenured officers of instruction. At that time, the University Statutes provided for biennial reapportionment. As the next scheduled reapportionment approached, in 2006–07, the Senate determined that the historic stability of University populations made a longer interval between adjustments more appropriate. Accordingly, at its March 2007 plenary session, the Senate adopted a "Resolution to Reduce the Frequency of Senate Reapportionment" to once every five years.<sup>3</sup> The University Trustees concurred in the resolution and the Statutes were amended accordingly, thus extending the 2004–05 apportionment by three years, to 2009–10.

In approaching its advisory role, the Commission was aided by Senate officials – particularly Tom Mathewson and Howard Jacobson – who provided insight into the Senate's past practice of apportionment. Additionally, staff in the Provost's Office of Planning and Institutional Research – particularly Zeid Sitnica and Norberto Govin – provided high quality population data for the Senate's various constituencies. The Commission is grateful to these individuals for their assistance.

### PROCESS, ANALYSIS AND RECOMMENDATIONS

The Statutes provide that only three of the Senate's eleven constituencies be reapportioned: (1) tenured officers of instruction, (2) non-tenured officers of instruction and (3) students. In each case, the apportionment language varies; therefore, the Commission's methodologies also varied, as described below.

#### TENURED OFFICERS OF INSTRUCTION —

The relevant language of the University Statutes reads as follows:

The forty-two memberships for officers of instruction having an appointment without stated term [i.e., tenured] as professor or associate professor . . . shall be apportioned by the University Senate every five years among the Faculties of the Columbia Corporation in proportion to the number of such officers of instruction; provided, however, that each such faculty, other than the Faculties of Arts and Sciences and Health Sciences, which shall not be entitled to elect any members, shall be entitled to elect at least one member; and for the purposes of this paragraph (1), apportionment and election of members from the Faculties of the College, General Studies and the Graduate School of Arts and Sciences, treated as one group, shall be among the three disciplines of the Social Sciences, Humanities, and Pure Sciences, respectively . . . [Section 21(a)(1)]

Current population data for this constituency were provided by the Provost's Office of Planning and Institutional Research. Historical data, used herein for comparison purposes, are available online at

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<sup>3</sup> "Resolution to Reduce the Frequency of Senate Reapportionment for Tenured Faculty and Student Seats," adopted Mar. 30, 2007. See [http://www.columbia.edu/cu/senate/archives/resolutions\\_archives/resolutions/06-07/reappres07.htm](http://www.columbia.edu/cu/senate/archives/resolutions_archives/resolutions/06-07/reappres07.htm); see also <http://www.columbia.edu/cu/senate/minutes/06-07/senminsmarch30.htm>.

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[http://www.columbia.edu/cu/opir/abstract/faculty\\_staff.html](http://www.columbia.edu/cu/opir/abstract/faculty_staff.html). These data are summarized in Appendix A.1.

Because the Statutes specify officers of instruction having an appointment “without stated term,” included in this constituency are both traditionally tenured officers and those with “tenure of title.”<sup>4</sup> During its analysis, the Commission encountered the following challenges: (1) ensuring that officers of instruction with multiple appointments were not double-counted and (2) determining the most desirable method for apportioning seats “in proportion to” populations of the Columbia Corporation faculties.

Double-counting. Seventeen tenured officers of instruction hold multiple appointments within the University. For example, David M. Schizer serves as both Dean of the Law School (an administration member) and Professor of Law (a tenured officer of instruction). To avoid counting these individuals in multiple Senate constituencies, the Commission has relied upon the Provost’s analysis of appointments data provided by the Columbia Corporation faculties. This analysis distinguishes between primary and secondary academic appointments, based upon the salary and full-time equivalency of each, enabling the Commission to assign individuals to a single constituency. For the present reapportionment, individuals holding multiple appointments have been counted in the constituency of their primary appointment.

Apportionment Method. Due to the specific numbers of tenured officers in each faculty, and the fixed number of tenured officer seats, the ideal number of seats for each constituency is fractional and simple rounding awards too many seats overall. Therefore, it is necessary to use a more sophisticated apportionment method that ensures both proportional representation and assignment of the correct number of seats.

The Commission considered several possible methods, including the fairly intuitive Largest Remainder Method and a method of modified rounding used by the Senate in 2005. However, both suffer from serious deficiencies, including the potential for paradoxical results and arbitrarily large deviations from proportional representation among constituencies with multiple seats. These shortcomings led the Commission to reject both methods as inadequate. A description of these methods, their deficiencies, and a comparison of their apportionment results are presented in Appendix A.2.

Instead, the Commission looked to the U.S. House of Representatives, which shares several similarities with the University Senate including proportional representation, a wide range of constituent populations, and the guarantee of at least one seat for each constituency. The Congress, faced with challenges similar to those noted above, found a solution in the Method of Equal Proportions, which has been used since the 1950 census.<sup>5</sup> This method ensures not only proportional representation and assignment of the correct number of seats, but also minimization of variation in persons-per-Senator among constituencies with multiple seats.<sup>6</sup> For these reasons, in addition to its success during six decades of congressional use in a highly analogous setting, the Commission recommends that the Method of Equal Proportions be used to reapportion the University Senate in 2010 and thereafter. Calculations necessary to apply this method are presented in Appendix A.3.

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<sup>4</sup> This treatment is consistent with past practice. Additionally, see Columbia University Faculty Handbook (2008), <http://www.columbia.edu/cu/vpaa/handbook/instruction.html#tenureoftitle> (“Certain full-time officers of instruction in the Faculties of Dental Medicine, Medicine, Nursing, and Public Health who are not eligible for tenure may nonetheless receive tenure of title. While those appointments are without stated term, they do not provide a guarantee of salary from the University.”) (emphasis added).

<sup>5</sup> See 2 U.S.C. § 2a(a) (2006); see also <http://www.census.gov/population/www/censusdata/apportionment/calculated.html>.

<sup>6</sup> In mathematical terms, the Method of Equal Proportions uses an inverse geometric mean to minimize relative differences in persons-per-Senator among constituencies with multiple seats. For a more rigorous explanation, see Laurence F. Schmeckebier, *The Method of Equal Proportions*, 17 LAW & CONTEMP. PROBS. 302, 304–10 (1952).

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Analysis and Recommendations. Based upon its analysis of the population data, application of relevant provisions of the Statutes and Elections Code, and use of the Method of Equal Proportions described above, the Commission recommends four one-seat adjustments to the current apportionment of tenured faculty seats, namely that:

1. The Faculty of Medicine receive one additional seat (for a total of 9 seats);
2. The Faculty of Public Health receive one additional seat (for a total of 2 seats);
3. The pure sciences disciplines of the Arts and Sciences receive one fewer seat (for a total of 5 seats); and
4. The Faculty of Law receive one fewer seat (for a total of 2 seats).

These changes substantially reduce the variation in persons-per-Senator among all constituencies with multiple seats in this category. The Commission's analysis and recommendations are presented in Appendix A.4.

### NON-TENURED OFFICERS OF INSTRUCTION —

The relevant language of the University Statutes reads as follows:

The fifteen memberships for officers of instruction with stated term [i.e., non-tenured] shall be apportioned by the University Senate every five years among the Faculties of the Columbia Corporation other than the Faculties of Arts and Sciences and Health Sciences. . . . For the purposes of this paragraph (2), apportionment and election of members from the faculties of the College, General Studies and the Graduate School of Arts and Sciences, treated as one group, shall be among the three disciplines of the Social Sciences, Humanities, and Pure Sciences, respectively. . . . [Section 21(a)(2)]

Current population data for this constituency were provided by the Provost's Office of Planning and Institutional Research. Historical data, used herein for comparison purposes, are available online at [http://www.columbia.edu/cu/opir/abstract/faculty\\_staff.html](http://www.columbia.edu/cu/opir/abstract/faculty_staff.html). These data are summarized in Appendix B.1.

During its analysis, the Commission encountered the following challenges: (1) ensuring that officers of instruction with multiple appointments were not double-counted and (2) reconciling the statutory number of non-tenured memberships and the number of faculties eligible for representation. Because the number of available non-tenured faculty seats is less than the number of eligible faculties, use of an apportionment formula was unnecessary. Had this not been the case, the Commission would have applied the same method as that for tenured faculty seats: the Method of Equal Proportions.

Double-counting. Only one non-tenured officer of instruction holds multiple appointments within the University.<sup>7</sup> This individual was counted in the constituency of his primary appointment as explained in *Tenured Officers of Instruction—Double-counting* above.

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<sup>7</sup> John H. Coatsworth serves as both Dean of the School of International and Public Affairs (an administration member) and Professor of International and Public Affairs and of History (a non-tenured officer of instruction). Dean Coatsworth is counted as an administration member: the constituency of his primary appointment.

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Dissimilar Number of Memberships and Faculties. The Statutes specify fifteen memberships for non-tenured officers on instruction “apportioned among the Faculties of the Columbia Corporation.” The Elections Code further provides “the word ‘Faculty’ shall have the same definition as in Chapter III, Section 30 of the University Statutes.”<sup>8</sup> Section 30, however, lists sixteen eligible faculties.<sup>9</sup> The inconsistency is likely due to the relatively recent creation of the School of Continuing Education and can be resolved by (1) expanding the number of non-tenured memberships or (2) disenfranchising at least one faculty at least part of the time. As explained below, the Commission recommends the former.<sup>10</sup>

Analysis and Recommendations. Based upon its analysis of the population data, and application of relevant provisions of the Statutes and Elections Code, the Commission recommends one one-seat adjustment to the current apportionment of non-tenured faculty seats, namely that:

- The Faculty of Continuing Education receive one additional seat (for a total of 1 seat).

The Commission believes the most appropriate way to reconcile the abovementioned discrepancy is to do so in favor of greater representation. Because this adjustment would increase the total number of non-tenured faculty seats to sixteen, the Commission further recommends that the Senate amend Sections 20(b)(2) and 21(a)(2) of the Statutes to provide for sixteen memberships for non-tenured officers of instruction.

The Commission’s reapportionment analysis and recommendations are presented in Appendix B.2.

### STUDENTS —

The relevant language of the University Statutes reads as follows:

The twenty-four memberships for students shall be apportioned by the University Senate every five years as follows: twenty-two among the faculties of the Columbia Corporation; provided, however, that at least one student member shall be elected from each Faculty other than the Faculties of Arts and Sciences and Health Sciences; two additional student members shall be elected from the Faculty with the largest number of full-time students; one additional student member shall be elected from each of the Faculties with the next largest number of students; until the limit of twenty-two student seats for the Columbia Corporation is reached; one student member shall be elected from Barnard College; and one student member shall be elected from Teachers College. For the purposes of this subsection (b), the Faculty of the Graduate School of Arts and Sciences shall be treated as consisting of three separate faculties, comprised of the disciplines of the Social Sciences, Humanities, and Pure Sciences, respectively . . . [Section 21(b)]

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<sup>8</sup> University Senate Elections Code, § 6, available at [http://www.columbia.edu/cu/senate/topbar\\_pages/elections.html#elections\\_code](http://www.columbia.edu/cu/senate/topbar_pages/elections.html#elections_code).

<sup>9</sup> Section 30 lists twenty-three faculties in all. For various reasons, several of these are not eligible for non-tenured representation. The faculties of Arts and Sciences and Health Sciences are explicitly disqualified from representation; the faculties of Columbia College, General Studies and the Graduate School of Arts and Sciences are considered as one faculty consisting of three academic disciplines; the faculties of Barnard College and Teachers College are not among those of the Columbia Corporation; and the Faculty of Library Service is defunct.

<sup>10</sup> The Commission also considered recommending that the fifteenth seat rotate annually or biennially among the two or three smallest faculties. However, this was deemed highly inefficient. One-year rotating terms would impair institutional continuity and two-year rotating terms would create an irregular 2-2-1-year cycle between each five-year reapportionment.

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Most of the necessary current and historical population data for this constituency are available online at <http://www.columbia.edu/cu/opir/abstract/students.html>. Additional data on academic disciplines within the Graduate School of Arts and Sciences were provided by the Provost's Office of Planning and Institutional Research. These data are summarized in Appendix C.1.

During its analysis, the Commission encountered the following challenges: (1) reorganizing raw population data for reapportionment purposes and (2) determining which students (e.g., full-time and/or part-time) should be counted.

Reorganizing Student Population Data. Because the data provided by the Office of Planning and Institutional Research (OPIR) are organized differently than the Senate's constituencies, the Commission made several adjustments to these data for reapportionment purposes. For example, the OPIR data disaggregate undergraduate Engineering students from graduate Engineering students, though they compose a single Senate constituency; Nursing students are similarly treated. The Commission simply re-aggregated these numbers as needed.

To ensure that students were counted in the appropriate constituencies, the Commission made two additional adjustments. First, forty full-time Ph.D. candidates were removed from GSAS and counted within the professional schools administering their programs. Second, 148 full-time GSAS students enrolled in inter-departmental programs (e.g., East Asian Regional Studies) were assigned in equal number to the three academic disciplines.<sup>11</sup> The Commission made both adjustments with OPIR's assistance.

Finally, the Commission chose not to count forty-four full-time non-degree candidates and chose to aggregate thirty-one full-time students in the Office of Global Programs with students in the School of Continuing Education.

Except for re-aggregation of Engineering students, none of the above adjustments affected the outcome of apportionment. All adjustments are reflected in Appendix C.1.

Full-time Students versus Headcounts. The relevant statutory language is clear that only full-time students are counted in the "Faculty with the largest number of full-time students [e.g., Columbia College]." However, it is unclear what types of students are counted in "each of the Faculties with the next largest number of students." The absence of "full-time" might suggest that all students are to be counted (i.e., using a full-time plus part-time headcount). Alternatively, the presence of "next largest number" might suggest that the same full-time-only count be used.

How this point is resolved affects the number of student seats awarded to the School of Continuing Education and the Graduate School of Business. Since the last reapportionment, in 2004–05, the number of *all* students in Continuing Education has surpassed that of the Business School. However, the number of *full-time* students in Continuing Education remains well below that of the Business School. See Appendix C.2.

Upon consultation with Senate staff and the parliamentarian, the Commission chose to read the statutory language to require enumeration of only full-time students in each of the schools. This approach is consistent with past practice. Additionally, because the Statutes clearly require a full-time-only count in

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<sup>11</sup> As an alternative, the Commission considered assigning these students based upon their program's constituent departments (e.g., students in a Humanities and Social Sciences inter-departmental program would be assigned only to those two disciplines in equal number). The Commission opted for assignment to all three disciplines in equal number as a matter of convenience. Because the number of students enrolled in inter-departmental programs is small, no different assignment, no matter how skewed toward a particular discipline, would have affected the apportionment results.

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at least one school (that with “the largest number of full-time students”), this is the only approach that can treat all schools equally.

Analysis and Recommendations. Based upon its analysis of the population data, and application of relevant provisions of the Statutes and Elections Code, the Commission recommends no changes from the current apportionment of student seats.

Nonetheless, the Commission appreciates that a decision not to count part-time students adversely impacts schools with large numbers of such students (e.g., Continuing Education, General Studies and Engineering); that it is inconsistent with many part-time students’ ability to run and vote in University Senate elections; and that it finds no stronger justification than part-time students’ lighter course loads. For these reasons, the Commission also recommends that the Senate study whether part-time students should be counted for apportionment purposes.<sup>12</sup>

The Commission’s reapportionment analysis and recommendations are presented in Appendix C.3.

**SUMMARY OF RECOMMENDATIONS**

In this quinquennial reapportionment report, the Elections Commission has offered recommendations concerning both apportionment of University Senate seats and apportionment-related provisions of the University Statutes. A draft resolution implementing the latter is presented as Appendix D and a summary of all recommendations appears below.

**Commission Recommendations Concerning  
Apportionment of University Senate Seats**

Tenured Officers of Instruction	Non-tenured Officers of Instruction	Students
Medicine + 1 seat	Continuing Education + 1 seat	all constituencies <i>no change</i>
Public Health + 1 seat	all other constituencies <i>no change</i>	
A&S – Pure Sciences – 1 seat		
Law – 1 seat		
all other constituencies <i>no change</i>		

**Commission Recommendations Concerning  
Apportionment-related Provisions of the University Statutes**

Sections 20(b)(1) and 21(a)(1) Tenured Officers of Instruction	Sections 20(b)(2) and 21(a)(2) Non-tenured Officers of Instruction	Sections 20(c) and 21(b) Students
<i>no changes</i>	Amend to provide for sixteen memberships for non-tenured officers of instruction.	Study whether part-time students should be counted for apportionment purposes.

<sup>12</sup> If the Senate deems it appropriate to count part-time students, there are several ways to do so, including (1) a headcount metric that counts full-time and part-time students equally, (2) a full-time equivalency metric that counts part-time students at a fixed rate (OPIR now uses this method, counting 3 part-time students as 1 full-time equivalency) and (3) an ad hoc metric that counts part-time students variably, based upon an objective criterion such as the number of academic credits carried.



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Jennifer J. Bell <i>Special Lecturer</i> <i>Pediatrics</i>	Benjamin Brickner, chair <i>Student</i> <i>School of Law</i>
Paul F. Duby <i>Professor</i> <i>Earth &amp; Environmental Engineering</i>	Raluca Marian <i>Administrator</i> <i>Health Policy &amp; Management</i>

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## Appendix A.1

### Tenured Faculty Counts for Reapportionment\*

	Fall 2004			Fall 2009		
	Tenure	Tenure of Title**	Total Tenured	Tenure	Tenure of Title**	Total Tenured
<b>ARTS AND SCIENCES</b>						
Columbia College, General Studies and GSAS	349	0	349	397	0	397
--Social Sciences	116	0	116	119	0	119
--Humanities	102	0	102	140	0	140
--Pure Sciences	131	0	131	138	0	138
International and Public Affairs***	0	0	0	10	0	10
Arts	8	0	8	10	0	10
Continuing Education***	0	0	0	0	0	0
<b>MORNINGSIDE PROFESSIONAL SCHOOLS</b>						
Architecture, Planning, and Preservation	10	0	10	13	0	13
Business	56	0	56	69	0	69
Engineering and Applied Science	85	0	85	105	0	105
Journalism	12	0	12	17	0	17
Law	52	0	52	63	0	63
Social Work	16	0	16	21	0	21
<b>MEDICAL CENTER PROFESSIONAL SCHOOLS</b>						
Dental Medicine	2	11	13	7	8	15
Medicine	189	50	239	202	44	246
Nursing	3	0	3	5	0	5
Public Health	26	0	26	36	1	37
<b>UNIVERSITY TOTAL</b>	<b>808</b>	<b>61</b>	<b>869</b>	<b>955</b>	<b>53</b>	<b>1,008</b>

**NOTES**

*Shaded rows indicate Senate constituencies*

Source Fall 2004: Office of the Vice Provost for Academic Administration, [http://www.columbia.edu/cu/opir/abstract/faculty\\_rank\\_2004.html](http://www.columbia.edu/cu/opir/abstract/faculty_rank_2004.html)

Source Fall 2009: Office of the Vice Provost for Academic Administration

\* Only officers with primary academic appointments are included. Those with secondary appointments (e.g., deans who are also professors) are included in the constituency of their primary appointment (e.g., administration members). Likewise, officers with multiple academic appointments are included in the constituency of their primary appointment.

\*\* According to the Faculty Handbook, "[c]ertain full-time officers of instruction in the Faculties of Dental Medicine, Medicine, Nursing, and Public Health who are not eligible for tenure may nonetheless receive tenure of title. While those appointments are without stated term, they do not provide a guarantee of salary from the University" (emphasis added). See <http://www.columbia.edu/cu/vpaa/handbook/instruction.html#tenureoftitle>.

\*\*\* The faculties of Continuing Education (in 2004 and 2009) and International and Public Affairs (in 2004 only) consist entirely of joint appointments counted elsewhere.

Data as of early December

## Appendix A.2

### Comparison of Apportionment Results Using the Methods of (1) Largest Remainder, (2) Modified Rounding and (3) Equal Proportions

Faculty or Academic Division (descending order of 2009 population)	2004 Tenured Faculty	2005 (Current) Seats	2009 Tenured Faculty	(1) Largest Remainder		(2) Modified Rounding		(3) Equal Proportions	
				2010 Seats	Change From 2005 (Current) Seats	2010 Seats	Change From 2005 (Current) Seats	2010 Seats	Change From 2005 (Current) Seats
Medicine	239	8	246	10	+ 2	6	- 2	9	+ 1
A&S – Humanities	102	5	140	5	no change	6	+ 1	5	no change
A&S – Pure Sciences	131	6	138	5	- 1	6	no change	5	- 1
A&S – Social Sciences	116	5	119	5	no change	5	no change	5	no change
Engineering and Applied Science	85	4	105	4	no change	4	no change	4	no change
Business	56	3	69	3	no change	3	no change	3	no change
Law	52	3	63	2	- 1	3	no change	2	- 1
Public Health	26	1	37	1	no change	2	+ 1	2	+ 1
Social Work	16	1	21	1	no change	1	no change	1	no change
Journalism	12	1	17	1	no change	1	no change	1	no change
Dental Medicine	13	1	15	1	no change	1	no change	1	no change
Architecture, Planning, and Preservation	10	1	13	1	no change	1	no change	1	no change
Arts	8	1	10	1	no change	1	no change	1	no change
International and Public Affairs	0	1	10	1	no change	1	no change	1	no change
Nursing	3	1	5	1	no change	1	no change	1	no change
Continuing Education*	0	0	0	0	no change	0	no change	0	no change
<b>UNIVERSITY SENATE TOTAL</b>	<b>869</b>	<b>42</b>	<b>1,008</b>	<b>42</b>		<b>42</b>		<b>42</b>	

#### NOTES

The Largest Remainder Method allocates seats in two steps. First, the minimum number of seats for each constituency is determined by dividing the constituency's total population by the statutory number of seats available (this is the ideal number of persons-per-Senator), rounded down to the nearest integer, with all constituencies receiving at least one seat. Second, additional seats, up to the statutory number of seats available, are awarded to constituencies with the largest remainders created during the first step, excluding those with populations less than the ideal number of persons-per-Senator. The Largest Remainder Method was used by the U.S. government from 1850 until 1910 to reapportion congressional seats among the states. See [http://en.wikipedia.org/wiki/Largest\\_remainder\\_method](http://en.wikipedia.org/wiki/Largest_remainder_method). Despite its intuitiveness, this method suffers from several serious deficiencies, leading the Commission to reject its use. See <http://www.cut-the-knot.org/Curriculum/SocialScience/AHamilton.shtml>.

The Method of Modified Rounding was used by the University Senate in 2005 and allocates seats in three steps. First, the minimum number of seats for each constituency is determined by dividing the total population by the statutory number of seats available (this is the ideal number of persons-per-Senator), rounded down to the nearest integer, with all constituencies receiving at least one seat. However, the Faculty of Medicine is awarded zero seats in this step. Second, constituencies with remainders greater than or equal to 0.5 are awarded one additional seat. Finally, all remaining seats, up to the statutory number of seats available, are awarded to the Faculty of Medicine. Though this method was used previously by the Senate, it can lead to arbitrarily large deviations from proportional representation. For example, the Faculty of Medicine, with a population of 246, would receive the same number of seats as the humanities and pure sciences disciplines of the Arts and Sciences, with populations of only 140 and 138, respectively. For this reason, the Commission rejects this method.

The Method of Equal Proportions determines the priority ranking of additional seats for each constituency. Because each of 15 constituencies is entitled to at least one seat, priority rankings begin at 16. Additional seats from 16th to 42nd (the statutory number of tenured faculty seats) are then prioritized by multiplying a constituency's population by a multiplier that decreases in the number of seats already awarded to the constituency. The products are then ordered highest to lowest and constituency seats up to the 42nd are awarded. The "multiplier" is mathematically derived to minimize the variation in persons-per-Senator among constituencies with multiple seats.

\* The Faculty of Continuing Education, having zero tenured officers of instruction, has previously not received representation in this category. But see Appendix B.2 for non-tenured representation.

## Appendix A.3

### Ranking of Priority Values for Next Senate Seats in Each Constituency Using the Method of Equal Proportions

Seat	Faculty or Division ( <i>descending order of priority value</i> )	Next Seat	Priority Value	=	Population	x	Multiplier*
16	Medicine	2	173.9	=	246	x	0.7071
17	Medicine	3	100.4	=	246	x	0.4082
18	A&S – Humanities	2	98.99	=	140	x	0.7071
19	A&S – Pure Sciences	2	97.58	=	138	x	0.7071
20	A&S – Social Sciences	2	84.15	=	119	x	0.7071
21	Engineering and Applied Science	2	74.25	=	105	x	0.7071
22	Medicine	4	71.01	=	246	x	0.2887
23	A&S – Humanities	3	57.15	=	140	x	0.4082
24	A&S – Pure Sciences	3	56.34	=	138	x	0.4082
25	Medicine	5	55.01	=	246	x	0.2236
26	Business	2	48.79	=	69	x	0.7071
27	A&S – Social Sciences	3	48.58	=	119	x	0.4082
29	Medicine	6	44.91	=	246	x	0.1826
28	Law	2	44.55	=	63	x	0.7071
30	Engineering and Applied Science	3	42.87	=	105	x	0.4082
31	A&S – Humanities	4	40.41	=	140	x	0.2887
32	A&S – Pure Sciences	4	39.84	=	138	x	0.2887
33	Medicine	7	37.96	=	246	x	0.1543
34	A&S – Social Sciences	4	34.35	=	119	x	0.2887
35	Medicine	8	32.87	=	246	x	0.1336
36	A&S – Humanities	5	31.30	=	140	x	0.2236
37	A&S – Pure Sciences	5	30.86	=	138	x	0.2236
38	Engineering and Applied Science	4	30.31	=	105	x	0.2887
39	Medicine	9	28.99	=	246	x	0.1179
40	Business	3	28.17	=	69	x	0.4082
41	A&S – Social Sciences	5	26.61	=	119	x	0.2236
42	Public Health	2	26.16	=	37	x	0.7071
43	Medicine	10	25.93	=	246	x	0.1054
44	Law	3	25.72	=	63	x	0.4082
45	A&S – Humanities	6	25.56	=	140	x	0.1826
46	A&S – Pure Sciences	6	25.20	=	138	x	0.1826
48	Engineering and Applied Science	5	23.48	=	105	x	0.2236
47	Medicine	11	23.46	=	246	x	0.0953
49	AS/Social Sciences	6	21.73	=	119	x	0.1826
50	A&S – Humanities	7	21.60	=	140	x	0.1543

#### NOTES

*Unshaded areas indicate seats actually awarded*

The Method of Equal Proportions determines the priority ranking of additional seats for each constituency. Because each of 15 constituencies is entitled to at least one seat, priority rankings begin at 16. Additional seats from 16th to 42nd (the statutory number of tenured faculty seats) are then prioritized by multiplying a constituency's population by a factor ("multiplier" above) that decreases in the number of seats already awarded to the constituency. The products are then ordered highest to lowest and constituency seats up to the 42nd are awarded. For example, the 42nd seat above is awarded to the Faculty of Public Health (its second seat). If the statutory number of tenured officer of instruction seats were increased to 43, the Faculty of Medicine would be awarded an additional seat (its tenth).

The Method of Equal Proportions has been used by the U.S. since 1950 to reapportion the House of Representatives. See 2 U.S.C. § 2a(a) (2006); see also [http://en.wikipedia.org/wiki/Huntington-Hill\\_method](http://en.wikipedia.org/wiki/Huntington-Hill_method). This method minimizes the percentage differences in the number of persons-per-Senator among all constituencies with multiple seats.

\* "Multiplier" is the inverse geometric mean of a constituency's current number of seats and its next additional seat. That is,  $1/\sqrt{(n*(n-1))}$  where  $n$  = the next additional seat. This minimizes variation in persons-per-Senator among constituencies with multiple seats. See Laurence F. Schmeckebier, *The Method of Equal Proportions*, 17 Law & Contemp. Probs. 302, 304-10 (1952).

## Appendix A.4

### Recommended Reapportionment of Tenured Faculty Seats for the 2010–15 Sessions of the University Senate

Faculty or Academic Division (descending order of 2009 population)	2004 Tenured Faculty	2009 Tenured Faculty	2005 (Current) Seats	2010 Seats	Change From 2005 (Current) Seats
Medicine	239	246	8	9	+ 1
A&S – Humanities	102	140	5	5	no change
A&S – Pure Sciences	131	138	6	5	– 1
A&S – Social Sciences	116	119	5	5	no change
Engineering and Applied Science	85	105	4	4	no change
Business	56	69	3	3	no change
Law	52	63	3	2	– 1
Public Health	26	37	1	2	+ 1
Social Work	16	21	1	1	no change
Journalism	12	17	1	1	no change
Dental Medicine	13	15	1	1	no change
Architecture, Planning, and Preservation	10	13	1	1	no change
Arts	8	10	1	1	no change
International and Public Affairs	0	10	1	1	no change
Nursing	3	5	1	1	no change
Continuing Education*	0	0	0	0	no change
UNIVERSITY SENATE TOTAL	869	1,008	42	42	

#### NOTES

Pursuant to the University Statutes, Section 21(a)(1), "[t]he forty-two memberships for officers of instruction having an appointment without stated term as professor or associate professor as defined in Sections 60 or 61 shall be apportioned by the University Senate every five years among the Faculties of the Columbia Corporation in proportion to the number of such officers of instruction; provided, however, that each such faculty, other than the Faculties of Arts and Sciences and Health Sciences, which shall not be entitled to elect any members, shall be entitled to elect at least one member; and for the purposes of this paragraph (1), apportionment and election of members from the Faculties of the College, General Studies and the Graduate School of Arts and Sciences, treated as one group, shall be among the three disciplines of the Social Sciences, Humanities, and Pure Sciences, respectively, as specified in Section 153 of the Statutes." (emphasis added)

As explained in the reapportionment report, these calculations are made using the Method of Equal Proportions, employed by the U.S. Census Bureau since 1950 to reapportion congressional seats among the several states. See 2 U.S.C. § 2a(a) (2006); see also [http://en.wikipedia.org/wiki/Huntington-Hill\\_method](http://en.wikipedia.org/wiki/Huntington-Hill_method). This method minimizes the percentage differences in the number of persons-per-Senator among all constituencies with multiple seats.

\* The Faculty of Continuing Education, having zero tenured officers of instruction, has previously not received representation in this category. But see Appendix B.2 for non-tenured representation.

## Appendix B.1

### Non-tenured Faculty Counts for Reapportionment\*

	Fall 2004			Fall 2009		
	Tenure Eligible	Non-tenure Eligible	Total Non-tenured	Tenure Eligible	Non-tenure Eligible	Total Non-tenured
<b>ARTS AND SCIENCES</b>						
Columbia College, General Studies and GSAS	197	111	308	184	135	319
--Social Sciences	70	26	96	50	12	62
--Humanities	73	73	146	68	105	173
--Pure Sciences	54	12	66	66	18	84
International and Public Affairs**	0	0	0	16	27	43
Arts	10	34	44	7	46	53
Continuing Education	0	17	17	0	24	24
<b>MORNINGSIDE PROFESSIONAL SCHOOLS</b>						
Architecture, Planning, and Preservation	7	0	7	11	0	11
Business	65	10	75	66	14	80
Engineering and Applied Science	56	2	58	52	4	56
Journalism	6	8	14	8	12	20
Law	8	19	27	17	10	27
Social Work	19	8	27	19	3	22
<b>MEDICAL CENTER PROFESSIONAL SCHOOLS</b>						
Dental Medicine	3	60	63	4	54	58
Medicine	308	1,214	1,522	204	1,488	1,692
Nursing	2	52	54	5	65	70
Public Health	48	95	143	45	86	131
<b>UNIVERSITY TOTAL</b>	<b>729</b>	<b>1,630</b>	<b>2,359</b>	<b>638</b>	<b>1,968</b>	<b>2,606</b>

**NOTES**

*Shaded rows indicate Senate constituencies*

Source Fall 2004: Office of the Vice Provost for Academic Administration, [http://www.columbia.edu/cu/opir/abstract/faculty\\_rank\\_2004.html](http://www.columbia.edu/cu/opir/abstract/faculty_rank_2004.html)

Source Fall 2009: Office of the Vice Provost for Academic Administration

\* Only officers with primary academic appointments are included. Those with secondary appointments (e.g., deans who are also professors) are included in the constituency of their primary appointment (e.g., administration members). Likewise, officers with multiple academic appointments are included in the constituency of their primary appointment.

\*\* In 2004, the Faculty of International and Public Affairs consisted entirely of joint appointments and was counted elsewhere.

*Data as of early December*

## Appendix B.2

### Recommended Reapportionment of Non-tenured Faculty Seats for the 2010–15 Sessions of the University Senate

Faculty or Academic Division (descending order of 2009 population)	2004 Non-tenured Faculty	2009 Non-tenured Faculty	2005 (Current) Seats	2010 Seats	Change From 2005 (Current) Seats
Medicine	1,522	1,692	1	1	<i>no change</i>
A&S – Humanities	146	173	1	1	<i>no change</i>
Public Health	143	131	1	1	<i>no change</i>
A&S – Pure Sciences	66	84	1	1	<i>no change</i>
Business	75	80	1	1	<i>no change</i>
Nursing	54	70	1	1	<i>no change</i>
A&S – Social Sciences	96	62	1	1	<i>no change</i>
Dental Medicine	63	58	1	1	<i>no change</i>
Engineering and Applied Science	58	56	1	1	<i>no change</i>
Arts	44	53	1	1	<i>no change</i>
International and Public Affairs	0	43	1	1	<i>no change</i>
Law	27	27	1	1	<i>no change</i>
Continuing Education*	17	24	0	1	+ 1
Social Work	27	22	1	1	<i>no change</i>
Journalism	14	20	1	1	<i>no change</i>
Architecture, Planning, and Preservation	7	11	1	1	<i>no change</i>
UNIVERSITY SENATE TOTAL	2,359	2,606	15	16	

#### Notes

Pursuant to the University Statutes, Section 21(a)(2), "The fifteen memberships for officers of instruction with stated term shall be apportioned by the University Senate every five years among the Faculties of the Columbia Corporation other than the Faculties of Arts and Sciences and Health Sciences. All such officers of instruction having an appointment as preceptor, associate, lecturer, instructor, and assistant professor, regardless of whether all such officers are full time or part time, shall be entitled to vote. Officers of instruction having an appointment with a stated term above that of assistant professor also shall be entitled to vote in this category. For the purposes of this paragraph (2), apportionment and election of members from the faculties of the College, General Studies and the Graduate School of Arts and Sciences, treated as one group, shall be among the three disciplines of the Social Sciences, Humanities, and Pure Sciences, respectively, as specified in Section 153 of the Statutes."

\* Sections 20(b)(2) and 21(a)(2) of the University Statutes limit non-tenured officer of instruction seats to fifteen, to be apportioned among the "Faculties of the Columbia Corporation." However, Section 30 ("Faculties"), lists Continuing Education as a sixteenth among these faculties. As explained in the reapportionment report, it is the Commission's recommendation that this discrepancy be reconciled in favor of greater representation by expanding the number of non-tenured officer of instruction seats to sixteen.

## Appendix C.1

### Full-time Student Enrollment Counts for Reapportionment

	Fall 2004 Full-time Enrollment	Fall 2009 Full-time Enrollment
<b>ARTS AND SCIENCES</b>		
Columbia College	4,121	4,363
Graduate School of Arts and Sciences	2,479	2,552
---- <i>Social Sciences**</i>	679	638
---- <i>Humanities**</i>	894	846
---- <i>Pure Sciences**</i>	801	984
--PhD	2,000	1,794
--Other Programs	479	758
---- <i>Interdepartmental Programs</i>	54	148
School of General Studies	609	826
--BA/BS	594	816
--Pre-med/Post baccalaureate	15	10
School of International and Public Affairs	976	1,164
--PhD* ( <i>figures include students in GSAS</i> )	6	27
--Other Programs		1,137
School of the Arts	811	871
--PhD* ( <i>figures include students in GSAS</i> )	14	11
--Other Programs		860
School of Continuing Education and Special Programs	340	404
--School of Continuing Education	309	353
---- <i>School of Continuing Education</i>	48	167
---- <i>American Language Program</i>	261	186
--Global Programs	31	51
<b>MORNINGSIDE PROFESSIONAL SCHOOLS</b>		
Graduate School of Architecture, Planning, and Preservation	642	738
--PhD*		52
--Other Programs		686
Graduate School of Business	1,851	2,012
--PhD*		89
--Other Programs		1,923
School of Engineering and Applied Science	2,190	2,682
--Undergraduate	1,383	1,429
--PhD*		502
--Other Degrees	807	751
Graduate School of Journalism	242	344
--PhD*		27
--Other Programs		317
School of Law	1,508	1,612
School of Social Work	859	813
--PhD*		64
--Other Programs		749



## Appendix C.1

### Full-time Student Enrollment Counts for Reapportionment

	Fall 2004 Full-time Enrollment	Fall 2009 Full-time Enrollment
<b>MEDICAL CENTER PROFESSIONAL SCHOOLS</b>		
College of Dental Medicine	427	395
--Dental and Oral Surgery	341	314
--Post-Graduate Dental	86	79
--PhD* (figures include students in GSAS)	0	2
College of Physicians and Surgeons	1,280	1,378
--Medicine	629	366
--Biomedical PhD*	407	647
--Institute of Human Nutrition	25	63
--Occupational Therapy	115	124
--Psychoanalytic Training and Research	31	29
--Physical Therapy	73	149
School of Nursing	251	398
--Undergraduate	157	193
--Graduate	94	205
School of Public Health	456	669
--PhD*		94
--Other Programs		575
<b>NON-DEGREE STUDENTS</b>	43	44
<b>UNIVERSITY TOTAL</b>	<b>18,980</b>	<b>21,181</b>

#### NOTES

Shaded rows indicate Senate constituencies

Source Fall 2004: Student Information Systems, [http://www.columbia.edu/cu/opir/abstract/enrollment\\_fte\\_school\\_2001-2004.htm](http://www.columbia.edu/cu/opir/abstract/enrollment_fte_school_2001-2004.htm)

Source Fall 2009: Student Information Systems, [http://www.columbia.edu/cu/opir/abstract/enrollment\\_fte\\_school\\_all.htm](http://www.columbia.edu/cu/opir/abstract/enrollment_fte_school_all.htm)

\* Ph.D. students are reported in the schools that administer their programs.

\*\* GSAS figures 2009 figures include students enrolled in inter-departmental programs and exclude Ph.D. students whose programs are administered by other graduate schools.

Data as of mid-October

## Appendix C.2

### Full-time versus Headcount Student Enrollment in the School of Continuing Education and the Graduate School of Business

	Fall 2004 Full-time Enrollment	Fall 2004 Headcount	Fall 2009 Full-time Enrollment	Fall 2009 Headcount
School of Continuing Education and Special Programs	340	1,697	404	2,095
Graduate School of Business	1,851	1,925	2,012	2,079
DIFFERENCE	-1,511	-228	-1,608	16

#### NOTES

Source Fall 2004: Student Information Systems, [http://www.columbia.edu/cu/opir/abstract/enrollment\\_fte\\_school\\_2001-2004.htm](http://www.columbia.edu/cu/opir/abstract/enrollment_fte_school_2001-2004.htm)

Source Fall 2009: Student Information Systems, [http://www.columbia.edu/cu/opir/abstract/enrollment\\_fte\\_school\\_all.htm](http://www.columbia.edu/cu/opir/abstract/enrollment_fte_school_all.htm)

*Enrollment as of mid-October*

## Appendix C.3

### Recommended Reapportionment of Student Seats for the 2010–15 Sessions of the University Senate

School or Academic Division (descending order of 2009 full-time enrollment)	2004 Full-time Enrollment	2009 Full-time Enrollment	2005 (Current) Seats	2010 Seats	Change From 2005 (Current) Seats
Columbia College	4,121	4,363	3	3	<i>no change</i>
School of Engineering and Applied Science	2,190	2,682	2	2	<i>no change</i>
Graduate School of Business	1,851	2,012	2	2	<i>no change</i>
School of Law	1,508	1,612	1	1	<i>no change</i>
College of Physicians and Surgeons	1,280	1,378	1	1	<i>no change</i>
School of International and Public Affairs	976	1,164	1	1	<i>no change</i>
GSAS – Pure Sciences	801	984	1	1	<i>no change</i>
School of the Arts	811	871	1	1	<i>no change</i>
GSAS – Humanities	894	846	1	1	<i>no change</i>
School of General Studies	609	826	1	1	<i>no change</i>
School of Social Work	859	813	1	1	<i>no change</i>
Graduate School of Architecture, Planning, and Pres.	642	738	1	1	<i>no change</i>
School of Public Health	456	669	1	1	<i>no change</i>
GSAS – Social Sciences	679	638	1	1	<i>no change</i>
School of Continuing Education	340	404	1	1	<i>no change</i>
School of Nursing	251	398	1	1	<i>no change</i>
College of Dental Medicine	427	395	1	1	<i>no change</i>
Graduate School of Journalism	242	344	1	1	<i>no change</i>
<i>Non-Degree Students</i>	43	44	--	--	<i>n/a</i>
Columbia Corporation Total	18,980	21,181	22	22	
Barnard College			1	1	<i>no change</i>
Teachers College			1	1	<i>no change</i>
Affiliated Institution Total*			2	2	
UNIVERSITY SENATE TOTAL			24	24	

#### NOTES

Pursuant to the University Statutes, Section 21(b), "[t]he twenty-four memberships for students shall be apportioned by the University Senate every five years as follows: twenty-two among the faculties of the Columbia Corporation; provided, however, that at least one student member shall be elected from each Faculty other than the Faculties of Arts and Sciences and Health Sciences; two additional student members shall be elected from the Faculty with the largest number of full-time students; one additional student member shall be elected from each of the Faculties with the next largest number of students; until the limit of twenty-two student seats for the Columbia Corporation is reached; one student member shall be elected from Barnard College; and one student member shall be elected from Teachers College. For the purposes of this subsection (b), the Faculty of the Graduate School of Arts and Sciences shall be treated as consisting of three separate faculties, comprised of the disciplines of the Social Sciences, Humanities, and Pure Sciences, respectively, as specified in Section 153 of the Statutes."

\* Pursuant to the Senate By-Laws, Section 1(g), the Union Theological Seminary may elect one non-voting student observer who enjoys a limited role in Senate deliberations.

**Appendix D**  
**Draft Resolution to Increase to Sixteen the Number**  
**of Senate Memberships for Non-tenured Faculty**

COLUMBIA UNIVERSITY SENATE

Proposed: February 26, 2010

Adopted: \_\_\_\_\_, 2010

RESOLUTION TO INCREASE TO SIXTEEN THE NUMBER  
OF SENATE MEMBERSHIPS FOR NON-TENURED FACULTY

WHEREAS sections 20(b)(2) and 21(a)(2) of the University Statutes provide for fifteen Senate memberships for non-tenured officers of instruction;

WHEREAS there are presently sixteen faculties eligible to receive Senate membership for non-tenured officers of instruction; and

WHEREAS the University Senate desires that there be a sufficient number of non-tenured Senate memberships so that every eligible faculty can receive non-tenured representation.

THEREFORE, BE IT RESOLVED that the University Senate respectfully requests the Trustees to amend the University Statutes as follows (additions indicated thus; deletions indicated ~~thus~~):

Chapter II — The University Senate

§ 20. Membership. [ . . . ]

b. *Faculty Members*

[ . . . ]

2. ~~Fifteen~~Sixteen officers of instruction having an appointment for a stated term as defined in Sections 60 and 61 to be elected from and by such officers of instruction, subject to the provisions of Section 21

[ . . . ]

§ 21. Elections, eligibility, recall, and term of office.

a. *Election of faculty members*

[ . . . ]

2. The ~~fifteen~~sixteen memberships for officers of instruction with stated term shall be apportioned by the University Senate every five years among the Faculties of the Columbia Corporation other than the Faculties of Arts and Sciences and Health Sciences. [ . . . ]

Proponent: Committee on Structure and Operations