2018-2019 Faculty Salary Compression Study

Full Report

In response to Faculty Senate Resolution #18-26 (approved on March 27, 2018), a faculty salary compression study was conducted in 2018-2019. The Resolution recommended that the Chancellor:

- add a Faculty Welfare Committee representative to the task force being established to develop salary predictors used in generating data for future faculty salary studies;
- support the efforts of the taskforce in both the data analysis and the methods by which the data is presented, including but not limited to, the use of established benchmark expectations for faculty salaries involving years of experience and rank;
- encourage public presentations on information gathered upon completion of each Division's faculty salary study;
- instruct the Office of Institutional Planning, Assessment and Research (IPAR) to provide academic unit heads the faculty salary data on faculty in their units who fall below the salary predictors, taking into account annual performance reviews, rank, and years of experience;
- encourage academic unit heads to provide respective Vice Chancellors with recommendations for faculty salary adjustments in accordance with data collected from the faculty salary studies;
- ensure that salary compensation will be a financial priority in the 2020-2021 ECU budget for those identified in the faculty salary studies who fall below the salary predictors.

In Fall 2018, two advisory groups were established with faculty and staff members representing the Divisions of Academic Affairs (AA) and Health Sciences (HS). Throughout the 2018-2019 academic year, the advisory groups met to discuss faculty salary compression concerns, review salary compression study methodologies, determine the faculty populations for analyses, discuss benchmark sources and factors impacting salary, and provide feedback to IPAR staff regarding initial results. In Fall 2019, the advisory groups reviewed the final output from IPAR's statistical analyses, discussed limitations of the study, provided input to the final report, and unanimously approved the final report for public distribution.

Individuals can provide comments or ask questions about the study by completing an online feedback form by March 1, 2020 at https://ecu.az1.qualtrics.com/jfe/form/SV_0wRZXavC2r0nkgZ. The Faculty Welfare Committee will review all feedback, taking appropriate action when possible and forwarding questions and issues more appropriately addressed by others. The responses are confidential unless a respondent chooses to leave the contact information at the end of the feedback form. Open forums will be hosted by university and Faculty Senate leadership to discuss results and communicate follow-up actions.

I. Advisory Group Structure

Advisory Group 1 – General Faculty Study
- Lisa Hudson: Associate Vice Chancellor, Health Sciences Human Resources Administration; Faculty Welfare Committee
- Lee Johnson: Associate Professor, Philosophy and Religious Studies, Harriot College of Arts and Sciences; Chair of Faculty Welfare Committee
- Beth Ketterman: Director, Laupus Library
- Brenda Killingsworth: Associate Professor, Management Information Systems, College of Business; Alternate Senator
- Amanda Klein: Associate Professor, English, Harriot College of Arts and Sciences; Secretary of the Faculty
- Meghan Millea: Professor, Economics, Harriot College of Arts and Sciences
- Annette Peery: Associate Professor and Associate Dean for Academic Affairs, College of Nursing
- Jeff Popke: Professor, Geography, Harriot College of Arts and Sciences; Chair of the Faculty
- Wendy Sergeant: Assistant Vice Chancellor, Academic Affairs Personnel & Resources; Faculty Welfare Committee
- Heather Harris Wright: Professor and Associate Dean for Research, College of Allied Health Sciences
- Karin Zipf: Professor, History, Harriot College of Arts and Sciences

Advisory Group 2 – Brody School of Medicine and School of Dental Medicine
- Paula Daughtry: Manager of Faculty Employment, Health Sciences Human Resources Administration
- Lisa Hudson: Associate Vice Chancellor, Health Sciences Human Resources Administration; Faculty Welfare Committee
- Jason Higginson: Chair of Pediatrics, Brody School of Medicine; Faculty Senator
- Anne Jenkins: Executive Director of Business and Financial Affairs, School of Dental Medicine
- Paul Lindauer: Endodontology, School of Dental Medicine; Chair of Faculty Council
- Leigh Patterson: Interim Chair of Emergency Medicine; Associate Dean for Faculty Development, Brody School of Medicine
- Pete Schmidt: Vice Dean, Brody School of Medicine

IPAR Staff
- Danny Barreiro-Talbert: Research Associate for External Reporting
- Nicole Cox: Business Intelligence Analyst
- Beverly King: Director of Institutional Research
- Hanyan Wang: Data Analyst
- Ying Zhou: Associate Provost for Institutional Planning, Assessment and Research

II.   Definitions of Faculty and Salary

Definition of Faculty Included in the Study

The study included full-time faculty only, identified as such by their employee classifications in Banner. A faculty roster was pulled from the Fall 2018 Personnel Data File (PDF), as submitted to the UNC System on October 31, 2018. The advisory groups further determined the faculty populations to be included in the study as follows:

General Faculty Subgroups
1) Colleges in Academic Affairs (AA): tenured and tenure-track faculty only, N=729
2) Joyner and Laupus Libraries: fixed-term, tenured and tenure-track faculty, Joyner N=30 and Laupus N=11
3) College of Allied Health Sciences (CAHS), N=88
4) College of Nursing (CON), N=90

Brody School of Medicine and School of Dental Medicine
5) School of Dental Medicine (SoDM), N=45
6) Brody School of Medicine, clinical faculty (with professional practice doctoral degree) in clinical departments, N=314
7) Brody School of Medicine, basic science faculty and non-clinical faculty (with Ph.D.) in clinical departments, N=92

Table 1 presents the seven groups of faculty by academic rank for tenured/tenure track faculty and academic title for fixed-term faculty.

Types of Compensations Included in the Study

General Faculty Salary Study
The study focused on **the base salary,** which represents the "permanent, recurring salary" of an individual. Stipends for administrative or other additional duties were not included. In the analyses, 9-month, 11-month or 12-month salaries were converted to a common scale as needed.

Brody and SoDM Faculty Salary Study
For SoDM faculty, the study examined 12-month base salary, base salary plus stipend(s), base salary plus incentive pay, and total compensation (base salary plus stipend(s) plus incentive pay) separately.

For the non-clinical faculty at Brody (faculty in basic science departments and faculty with a PhD in clinical departments), the study examined 12-month base salary, base salary plus stipend(s), and base salary plus stipend(s) plus incentive pay separately. For the clinical faculty, the study examined 12-month base salary as well as the combined base salary with other types of compensation (i.e., stipend(s), incentive pay, and supplemental pay).

Table 1. Number of Faculty by Unit and Academic Rank/Title

Academic Rank or Title	AA		Libraries		CAHS		CON		SoDM		Brody-Clinical		Brody Non-Clinical		Total Faculty	
	N	%*	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Tenured/ Tenure Track	**729**		**24**		**54**		**30**		**8**		**119**		**71**		**1035**	
Assistant Professor	177	24%	1	2%	22	25%	14	16%	2	4%	36	12%	17	18%	269	19%
Associate Professor	341	47%	17	41%	17	19%	6	7%	5	11%	37	12%	27	29%	450	32%
Professor	211	29%	6	15%	15	17%	10	11%	1	2%	46	15%	27	29%	316	23%
Fixed-term	**NA**		**17**		**34**		**60**		**37**		**195**		**21**		**364**	
Instructor	NA	NA	0	0%	9	10%	12	13%	0	0%	2	0.6%	1	1%	24	2%
Assistant Professor	NA	NA	15	37%	18	20%	30	33%	32	71%	131	42%	10	11%	236	17%
Associate Professor	NA	NA	2	5%	5	6%	13	14%	5	11%	49	16%	8	9%	82	6%
Professor	NA	NA	0	0%	2	2%	5	6%	0	0%	13	4%	2	2%	22	2%
Total Faculty	**729**	**100%**	**41**	**100%**	**88**	**100%**	**90**	**100%**	**45**	**100%**	**314**	**100%**	**92**	**100%**	**1399**	**100%**

*Column percentages add up to 100%.

III.   Methodologies and Limitations of the Study

Context Related to the Study

The primary sources for faculty salary increases are legislative appropriations for that purpose (the Annual Raise Process (ARP)) and promotion raises. Legislative raises provide funds for across-the-board salary increases for all eligible employees, but they were infrequent and below the inflation rate between 2009 and 2018. In the same period, ECU and units within ECU had limited funds for raises due to budget cuts and other resource constraints. In addition, the Board of Governors (BOG) has imposed caps on annual salary increases. A brief summary of ARPs between 2009 and 2018 is provided below:

- 2009, 2010 and 2011:
    - No annual raise
- 2012:
    - 1.2% across-the-board raise
- 2013 and 2014:
    - No annual raise
- 2015:
    - Merit-based raise for up to 90% of the population
- 2016:
    - State appropriation:
        - 1.5% legislative increase for all eligible employees
        - Additional 0.5% one-time bonus for all state employees
        - Additional 1% one-time bonus merit based
    - ECU tuition revenues:
        - 2% permanent pool for EHRA employee merit increases – limited to 60% of EHRA employees
    - Total raise cannot exceed 10% of cumulative June 30 salary
- 2017:
    - Faculty with an evaluation of outstanding received $1,100 or more;
    - Faculty with an evaluation of Very Good received $1,000;
    - Faculty with an evaluation of Good received $800;
    - Faculty with an evaluation of Fair or Poor received zero;
    - Merit-based increase capped at 4.99% by BOG
- 2018:
    - No raise for faculty due to budgetary constraints

For tenure-track and tenured faculty, ECU did not have an institutional-wide standard rate for promotion in rank until 2015. Prior to 2015, the amount of promotional raises, determined locally, varied across colleges/departments. Between 2015 and 2018, the standard raise for promotion to associate professor was $4,000; and the rate for promotion to full professor was $6,000. Units had the flexibility to offer a higher promotional raise than the standard rate if funds were available.

In 2014, ECU retained Sparlin Law Office, PLLC to conduct a faculty salary equity study. As a result, 97 faculty members in Academic Affairs and 77 in Health Sciences were identified as low-end outliers for salary reviews. Most of these individuals received equity adjustments in 2016 and 2017 after taking consideration of their performance.

Methodology Overview

Faculty Senate resolution #18-26 directed the advisory groups to "develop salary predictors" and recommended the "use of established benchmark expectations for faculty salaries involving years of experience and rank." It further tasked IPAR to "provide academic unit heads the faculty salary data on faculty in their units who fall below the salary predictors, taking into account annual performance reviews, rank, and years of experience."

Through multiple discussions, the advisory groups concluded that the primary concern of the faculty was salary compression, i.e., some lower-ranked faculty (recent hires in particular) are paid at the current market rate, which is close to what higher-ranked faculty make. Therefore, the study was intentionally designed to be an internal analysis with the goal of identifying individuals whose salaries were lower than their similarly-situated colleagues within ECU, after taking into account rank, experience and other appropriate predictors of salaries. After a review of literature and methodologies utilized in ECU's 2014 Faculty Salary Equity Study, the advisory groups approved the use of multiple regression analyses to determine whether there were signs of systematic compression or inversion and identify low-end salary outliers. The regression analyses did not include numeric performance ratings as a predictor because personnel records containing these ratings are considered confidential. Because IPAR was not able to incorporate annual performance evaluation in the regression analyses, unit administrators should take annual performance reviews into account as they review the regression results and recommend salary adjustment for low-end salary outliers.

To address other faculty concerns, the advisory group further requested IPAR to conduct two analyses to provide additional information to the campus: 1) salary benchmark analyses to compare ECU faculty's salaries with their peers nationally; and 2) analyses of the impact of hire/promotion year on faculty salaries. The results of the analyses are presented in Appendices Two and Three.

Step 1 – Regression Modeling

Dependent Variable
A multiple regression analysis examines the extent to which a dependent variable, in this instance faculty salary (as of Oct. 31, 2018), is related to a series of independent variables (also called parameters or salary predictors in the report). Because of the diverse disciplinary backgrounds of ECU faculty, separate regression modeling was conducted for seven subgroups of faculty as shown in Table 1. For colleges in Academic Affairs and College of Nursing, 11-month and 12-month salaries were converted to 9-month in the regression analyses. For the Libraries, 12-month base salary was used. For Allied Health Sciences, all 9-month salaries were converted to 12-month. For the Brody School of Medicine and the School of Dental Medicine, a series of regression models were built to analyze 12-month base salaries, as well as base salary combined with additional types of compensation.

It is important to point out that for regression analyses, IPAR used ECU's internal salary conversion formula. For example, when an 11-month or 12-month salary is converted to 9-month, the formula is as follows: base salary (11-month or 12-month) divided by term of employment (11 or 12) and multiplied by 9. For benchmark analyses (Appendix B), IPAR used the conversion formula dictated by the benchmark organization, which is different from ECU's internal formula.

Independent Variables/Salary Predictors
The selection of salary predictors was informed by a literature review, ECU's Faculty Salary Equity Study conducted in 2014, and input from the advisory groups and unit administrators in Health Sciences and the Libraries. The Faculty Senate Resolution #18-26 requires that rank and years of experience be included in the study. Each academic rank/title (i.e., instructor, assistant professor, associate professor, and professor) was included in the regression analyses as a predictor. Years of experience can be measured as time in rank or years of service at ECU. Time in rank was included in each regression model except for the SoDM model, in which years of service at ECU was used. Because the SoDM is new, years of service was a much stronger predictor of faculty salary than was time in rank. In the analyses of AA, CAHS and SoDM, the faculty members' departments were included to control for different salary levels among departments. For Brody, the study controlled for different specialty areas of the faculty within a department. The regression analyses also included other predictors when appropriate for a specific subgroup; for example, tenure status for HS units, supervisory responsibilities for the Libraries, and specialties for CON.

Investigation of Outliers in the Modeling Process
In the modeling process, IPAR used Cook's Distance (Cook's D) to identify and investigate outliers that affected the regression model. Administrators from units and divisions also identified individuals who might be outliers. Unit input revealed that most of the high-end salary outliers identified by Cook's D fell into the following categories: former senior administrators who had retreated to faculty, former department chairs, distinguished professors, and special hires. In the end, high-end outliers (but not low-end outliers) identified by Cook's D were removed for all subgroups except for SoDM. Details about the SoDM regression model are presented in the Subgroup Results section below.

Model Evaluation and Selection
For each group of faculty, IPAR built multiple models. IPAR and the advisory groups evaluated the models based on the relevance of salary predictors and the r-squared of each model (i.e., the percent of variance in salaries that can be explained by the model). Unit administrators and HR staff also evaluated the appropriateness of the high-end outliers excluded from the model and the identified low-end salary outliers when applying the regression model to predict salaries (see Step 3 below). The selection of a final model is based on combined input from the appropriate advisory group and unit administrators. Final models with all the parameters and estimates are included in Appendix One.

Step 2 – Investigation of Compression/Inversion

Regression analyses can help identify potential signs of compression or inversion after controlling for other salary predictors included in the model. For this study, signs of a **systematic** salary compression or

inversion are defined as the following after controlling for other predictors of salary in regression modeling:

- the estimate for time in rank is negative and statistically significant: with each additional year in the same rank, the faculty were estimated to have earned less than they did in the year before.
- the estimate for time in rank is positive but not statistically significant: faculty in the same rank were estimated to have made similar salaries regardless of years of service.
- the estimates for associate professor and assistant professor are less than $4,000 apart: the institutional-wide promotional raise from assistant to associate professor was $4,000 in 2018. Some departments may have used internal funds to award a higher amount than the institutional standard rate.
- the estimates for associate and full professors are less than $6,000 apart: the institutional-wide promotional raise from associate to full professor was $6,000 in 2018. Some departments may have used internal funds to award a higher amount than the institutional standard rate.

When signs of compression or inversion were identified, they are reported in Section IV.

Step 3 – Outlier Analysis

If a final regression model built in Step 2 showed no signs of salary inversion, it was used to calculate predicted salaries for faculty. When a final model showed signs of inversion, IPAR built an alternative regression model to remove the negative impact of inversion. The alternative model was then used to calculate predicted salaries.

The difference between a person's actual salary and his or her predicted salary is called the ***residual***. Residuals for a group of faculty can be converted to *standardized residuals*. Conventionally, individuals are considered "outliers" when their standardized salary residuals are more than 2.0 or less than -2.0, indicating a salary more than two standard deviations removed from the level that would be predicted based on the factors considered in the model. For this study, the advisory groups defined "low-end outliers" as individuals whose actual salaries in Fall 2018 were **at least 0.75 standard deviation <u>below</u> predicted salary**.

It should be noted that a predicted salary, calculated by a statistical model, is not a recommended or target salary for any individual. A threshold of 0.75 standard deviation is one of the methods to identify low-end salary outliers in a unit. A predicted salary, residual, and standardized residual for each individual included in the regression modeling were included in a **Unit Faculty Salary Report** prepared for the Provost, the Vice Chancellor for Health Sciences, Deans, and Directors of the Libraries.

Limitations of the Study

The study is subject to several limitations. The regression analyses did not account for all factors that may affect salary decisions in individual cases, such as productivity and performance evaluation. Some regression models were built upon a small number of faculty in a specific group, e.g., the Libraries, SoDM, CAHS, and CON. Additionally, overall patterns do not always replicate themselves in individual

cases. A statistically significant finding for a group of faculty as a whole, either positive or negative, does not necessarily apply to every individual within the group. If a regression model showed signs of salary compression at a certain rank, this does not mean that every member of the disadvantaged rank was adversely affected. Likewise, if a regression model did not show a statistically significant impact of promotion year on faculty salary, it does not mean that no individual members or faculty subgroups were disadvantaged.

The regression analyses included in the report provide a unified approach to examining variance in faculty salaries. However, regression analysis should not be the only tool used by unit administrators to identify and address salary compression, inversion, and other equity issues. Unit administrators should consider faculty productivity, performance ratings, and other local context pertaining to faculty salaries when interpreting the results from the study and taking actions to address salary issues.

IV.   Summary of Regression Analyses

Overall Results

The selection of salary predictors was informed by a literature review, ECU's Faculty Salary Equity Study conducted in 2014, and input from the advisory groups and unit administrators in Health Sciences and Libraries. Academic rank and indicators of experience are included in regression modeling, as well as factors specific to a subgroup of faculty. As stated in the Methodology section of the report, signs of salary compression/inversion are defined as: 1) time in rank is negative and statistically significant; 2) time in rank is positive but not statistically significant; 3) the estimates for assistant and associate professors are <$4,000 apart; and 4) the estimates for associate and full professors are <$6,000 apart.

After controlling for all other variables in regression models, the study revealed the following results:
- There were no signs of a systematic salary compression/inversion issue in AA, the Libraries, or CAHS based on the criteria above. The estimate for time in rank is between $331 and $460 a year, which may reflect no broad-based salary increases for a number of years in the past decade. Because Libraries and CAHS have a small number of faculty, the models should be interpreted with caution.
- Due to the small number of faculty in CON, this model also should be interpreted with caution. The estimate for time in rank is $172, positive but not statistically significant. It suggests a possible salary compression issue. The estimates for tenure-track assistant professors and tenured associate professors are $5,501 apart, while the difference between fixed-term assistant and fixed-term associate professors is much smaller ($2,997). The estimated difference between tenured associate and full professors is $14,195, while the estimated difference between fixed-term associate and fixed-term full professors is $4,825. It should be noted that there is no institution-wide standard rate of promotional raises for fixed-term faculty.
- SoDM, as a young school, has a small faculty population with one professor, ten associate professors, and 34 assistant professors. The 12-month base salary model includes years since hire, department, and department chair indicator. While years since hire is a statistically

significant predictor of salaries, academic rank is not. The estimate for each additional year at ECU is $1,958, which appears to capture much of the salary differences associated with rank and time in rank. Given the small sample size, this regression model should be interpreted with caution.

- For Brody clinical faculty, the estimate for time in rank is negative but not statistically significant in the total compensation model. It suggests possible salary inversion or compression.
- Because Brody has a small number of basic science and non-clinical faculty, the model should be interpreted with caution. The estimate for time in rank is positive but not statistically significant in the base salary model, which suggests possible salary compression.

Regression models were used to calculated predicted salaries, residuals (i.e., difference between actual and predicted salaries), and standardized residuals. For this study, the advisory groups defined "low-end outliers" as individuals whose actual salaries in Fall 2018 were at least 0.75 standard deviation below predicted salary. Table 2 below provides a summary of the number of "low-end" salary outliers by academic rank. A predicted salary, residual, and standardized residual for each faculty member included in the regression analyses were included in the Unit Faculty Salary Report prepared for the Provost, the Vice Chancellor for Health Sciences, Deans, and Directors of the Libraries.

Table 2. Low-end Salary Outliers Identified through Regression Analyses

No. of Faculty Identified by Academic Rank/Title	Standardized Residual		
	Below -2 Standard Deviation	**Between -2 and -1 Standard Deviation**	**Between -1 and -.75 Standard Deviation**
Academic Affairs (including Joyner Library)			
Professor	5	42	6
Associate Professor	7	31	12
Assistant Professor	0	12	9
TOTAL	**12**	**85**	**27**
Health Sciences: Laupus, CAHS, CON and SoDM			
Professor	0	4	3
Associate Professor	1	9	2
Assistant Professor/Instructor	6	11	8
TOTAL	**7**	**24**	**13**
Health Sciences: Brody			
Professor	4	18	5
Associate Professor	3	10	9
Assistant Professor/ Instructor	1	4	8
TOTAL	**8**	**32**	**22**
University Total	**27**	**141**	**62**

Subgroup Results

The section below provides technical details and major findings for each subgroup of faculty. Appendix One presents regression model output, which includes number of observations, number of excluded observations, r-squared, as well as estimate, standard error, t value, and probability of each parameter (i.e., predictor) included in a model. Appendix One also includes instructions on how to calculate a predicted salary using model output.

Academic Affairs Colleges

Six Academic Affairs colleges were analyzed in one regression model: College of Business, College of Education, College of Engineering and Technology, College of Fine Arts and Communication, College of Health and Human Performance, and Harriot College of Arts and Sciences. Base salaries on 11-month or 12-month terms were converted to 9-month. Three variables were found to be significant predictors of faculty salary: rank, time in rank, and department affiliation. Using Cook's D, a total of 28 individuals were removed from the final model. Some of these individuals are distinguished professors; some are former administrators; and some are former chairs.

The final regression model (in Appendix One – I), with 701 individuals included, explains 88% of the variance in faculty salaries within Academic Affairs. After controlling for all other variables, the model estimates that each additional year in the same rank is associated with an increase of $388, which is positive and statistically significant. The estimated salary difference between assistant and associate professors is $5,090; and the estimated difference between associate and full professors is $16,733. The differences are above the $4,000 and $6,000 promotional raises for associate and full professors, respectively. The estimate for full professors may reflect their longer service at ECU compared to associate and assistant professors. Overall, the model does not suggest a systematic salary compression or inversion issue in AA based on the criteria set for the study. The low estimate for time in rank may reflect no broad-based salary increases for several years within the past decade.

The model was used to calculate a predicted salary and a standardized residual for each of the 701 individuals included in the analysis. A total of 11 faculty members were identified as under -2 standard deviations, 80 between -2 and -1 standard deviations, and 27 between -1 and -0.75 standard deviations. Overall, 118* (16%) of 729 individuals were identified for further salary review.

* After the regression model was finalized, it was brought to IPAR's attention that four tenured faculty members were left out of the study due to changes of duties but not faculty status in Fall 2018. After applying the regression model, one individual was found to be between -2 and -1 standard deviation. It brought the total number of identified faculty to 119.

Joyner and Laupus Libraries

In a joint analysis of Joyner Library (N=30) and Laupus Library (N=11), four variables were found to be significant predictors of 12-month base salary: rank, time in rank, supervision responsibilities, and library affiliation (Joyner vs. Laupus). Two individuals were removed from the final model based on Cook's D.

The final regression model (Appendix One – II), with 39 individuals included, explains 86% of the variance in salaries. After controlling for all other variables, the model estimates that each additional year in the same rank is associated with an increase of $331, which is positive and statistically significant. The estimated salary difference between assistant and associate professors is $8,189; and the estimated difference between associate and full professors is $22,322. The differences are above the $4,000 and $6,000 promotional raises for associate and full professors, respectively. The estimate for full professors may reflect their longer service at ECU compared to assistant and associate professors. Overall, the model does not suggest a systematic salary compression or inversion issue in the Libraries based on the criteria set for the study. The low estimate for time in rank may reflect no broad-based salary increases for several years within the past decade.

The model was used to calculate a predicted salary and a standardized residual for each of the 39 individuals. One person was identified as under -2 standard deviations, 5 between -2 and -1 standard deviations, and 2 between -1 and -0.75 standard deviations. Overall, eight (20%) were identified for further salary review out of 41 individuals.

College of Allied Health Sciences
Eighty-eight faculty members from nine departments were included in the study and four variables were found to be significant predictors of 12-month base salary: rank, time in rank, tenure status, and department affiliation. Six individuals were excluded, which included high-end outliers identified in Cook's D and phased retirees in 2018-19. The final regression model (Appendix One – III), based on 82 individuals, explains 88% of the variance in salaries. Due to the small sample size, the regression model should be interpreted with caution.

After controlling for all other variables, the model estimates that each additional year in the same rank is associated with an increase of $460, which is positive and statistically significant. The estimated salary difference between instructors/assistant professors and associate professors is $5,231; and the estimated difference between associate and full professors is $13,947. Overall the model does not suggest a systematic salary compression or inversion issue in CAHS based on the criteria set for the study. The model has a low estimate for time in rank, which is consistent with the AA and Libraries models.

The model was used to calculate a predicted salary and a standardized residual for each of the 82 individuals included in the analysis. No one was identified as under -2 standard deviations, 11 faculty were identified as between -2 and -1 standard deviations, and 3 between -1 and -0.75 standard deviations. Overall, 14 (16%) were identified for further salary review out of 88 individuals.

College of Nursing
Ninety faculty members were included in the study, and five variables were found to be significant predictors of 9-month base salary: tenure, rank, time in rank, hire year minus terminal degree year, and advanced licensure/specialty. Three individuals were removed from the regression modeling based on Cook's D, and another 3 individuals were removed because they were in a specialty area with a high market rate. The final model (Appendix One – IV), based on 84 individuals, explains 89% of the variance in salaries. Due to the small sample size, the regression model should be interpreted with caution.

After controlling for all other variables, the model estimates that each additional year in the same rank is associated with an increase of $172, which is positive but not statistically significant. It suggests a possible salary compression issue. The estimates for tenure-track assistant professors and tenured associate professors are $5,501 apart, while the difference between fixed-term assistant and fixed-term associate professors is much smaller ($2,997). The estimated difference between tenured associate and full professors is $14,195, while the estimated difference between fixed-term associate and fixed-term full professors is $4,825. It should be noted that there is no institution-wide standard rate of promotional raises for fixed-term faculty.

The final model was used to calculate a predicted salary and a standardized residual for each of the 84 individuals included in the model. Three individuals were identified as under -2 standard deviations, 10 between -2 and -1 standard deviations, and 5 between -1 and -0.75 standard deviations. Overall, 18 (20%) were identified for further salary review out of 90 individuals.

School of Dental Medicine
SoDM enrolled its first class of pre-doctoral students in 2011. In its early years, faculty were typically hired at assistant professor level regardless of years of experience. A total of 45 faculty members met the eligibility for the study: 1 professor, 10 associate professors, and 34 assistant professors. Four regression models were built to analyze 12-month base salary, base salary + stipend, base salary + incentive pay, and total compensation (i.e., base salary + stipend + incentive pay). IPAR tested multiple predictors, including rank, time in rank, years since hire, hire year minus terminal degree year, department affiliation, specialty area, department chair indicator, number of additional duties paid by stipend, etc. Based on an evaluation of r-squared and parameter estimates, the 12-month base salary model was deemed the most robust model because the dataset did not contain any quantitative measures that could reasonably be used to explain the amount of stipend or incentive pay.

The final base salary model (Appendix One – V), with 43 individuals, explains 69% of the variance in salaries using three variables: years since hire, department affiliation, and department chair indicator. While years since hire is a statistically significant predictor of salaries, academic rank is not. The estimate for each additional year at ECU is $1,958, which appears to have captured much of the salary differences associated with rank and time in rank. Given the small sample size, the regression model should be interpreted with caution.

Unlike the other regression models, the SoDM regression analyses excluded two low-end outliers based on input from the School. The final model was used to calculate a predicted salary and a standardized residual for all 45 individuals (including the low-end outliers excluded from the regression modeling). Four individuals were identified as under -2 standard deviations, 2 between -2 and -1 standard deviations, and 3 between -1 and -0.75 standard deviations. Overall, 9 (20%) were identified for further salary review out of 45 individuals.

Brody School of Medicine – Basic Science and Non-clinical Faculty
With a total of 92 faculty members in the dataset, a series of regression models were built to analyze 12-month base salary, base salary + stipend, and total compensation (i.e., base salary + stipend + incentive

pay). Of all models tested, the most significant predictor of faculty salary was AAMC benchmark salary, which captures specialty area, academic rank, terminal degree type (MD vs. Ph.D.), and certain administrative duties (e.g., department chair, chief, etc.) The AAMC benchmark reflects total compensation, not just 12-month base salary. Because AAMC benchmark captures academic rank, regression modeling is not able to estimate the salary difference between academic ranks.

The 12-month base salary model (Appendix One – VI) has the highest r-squared of all models tested. After removing six high-end outliers based on Cook's D, it explains 87% of the variance in base salaries using four variables: time in rank, hire year minus terminal degree year, tenure, and AAMC benchmark. After controlling for all other variables, the 12-month base salary model estimates that each additional year in the same rank is associated with an increase of $350, which is positive but not statistically significant. It suggests a possible salary compression issue.

The 12-month model was used to calculate a predicted salary and a standardized residual for each of the 86 individuals included in the analysis. Three individuals were identified as under -2 standard deviations, 10 between -2 and -1 standard deviations, and 4 between -1 and -0.75 standard deviations. Overall, 17 18%) were identified for further salary review out of 92 individuals.

Brody School of Medicine – Clinical Faculty
With a total of 314 faculty members in the dataset, a series of regression models were built to analyze 12-month base salary, base salary + stipend, base salary + stipend + incentive pay, and total compensation (i.e., base salary + stipend + incentive pay + supplemental pay). Of all models tested, the most significant predictor of faculty salary was AAMC benchmark salary, which captures specialty area, academic rank, terminal degree type (MD vs. Ph.D.), and certain administrative duties (e.g., department chair, chief, etc.) The AAMC benchmark reflects total compensation, not just 12-month base salary. Because AAMC benchmark captures academic rank, regression modeling is not able to estimate the salary difference between academic ranks.

Advisory Group 2 selected the total compensation model as the final model. After removing 11 high-end outliers based on Cook's D, it explains 79% of the variance using four variables: time in rank, hire year minus terminal degree year, tenure, and AAMC benchmark. Time in rank, with an estimated negative value of $615, is not statistically significant, which is a sign of salary compression.

Because time in rank is associated with a negative value in the model, IPAR removed the variable and built an alternative model to predict total compensation. The model identified 5 individuals under -2 standard deviations, 22 between -2 and -1 standard deviations, and 18 between -1 and -0.75 standard deviations. Overall, 45 (14%) were identified for further salary review out of 314 individuals.

Appendix One: Regression Models

I.	Regression Model – Academic Affairs

1. Final Regression Model Output

Total Faculty Included in Regression Model = 701
Total Faculty Excluded = 28 (3.8%)

Dependent Variable: 9-MONTH BASE SALARY

Source	DF	F Value	Pr > F
Model	44	109.74	<.0001

R-Square	Adj. R-Square	Root MSE	Mean 9-month base salary
0.88	0.87	7041	82866

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	63670	2228	28.58	<.0001
Time in Rank (Year)	388	45	8.60	<.0001
Professor	21823	806	27.08	<.0001
Associate Professor	5090	723	7.04	<.0001
Assistant Professor	0	.	.	.
Accounting	61998	2893	21.43	<.0001
Anthropology	-3227	3078	-1.05	0.2948
Biology	7094	2467	2.88	0.0042
CET Computer Science	28304	3082	9.18	<.0001
CET Construction Management	13289	3816	3.48	0.0005
CET Engineering	20653	2635	7.84	<.0001
CET Technology Systems	14101	2706	5.21	<.0001
COE Elem Ed Middle Grade Ed	3530	2907	1.21	0.2251
COE Interdisciplinary Profession	5799	2740	2.12	0.0347
COE Litrcy Stud Engl Ed Hist Ed	6322	3020	2.09	0.0367
COE Spec Ed Found and Research	8090	2738	2.95	0.0032
Chemistry	5800	2679	2.17	0.0307
Criminal Justice	-126	3591	-0.04	0.9719
Economics	22094	2849	7.76	<.0001
Educational Leadership	13732	3095	4.44	<.0001
English	-6714	2418	-2.78	0.0056
Finance	57998	3082	18.82	<.0001
Foreign Languages	-7798	2635	-2.96	0.0032
Geography	1977	2956	0.67	0.5038
Geology	5001	3283	1.52	0.1282
Health Education and Promotion	7795	2558	3.05	0.0024
History	-4034	2672	-1.51	0.1316

Human Develop and Family Science	5218	2641	1.98	0.0486
Interior Dsgn and Merchandising	4057	3590	1.13	0.2588
Kinesiology	11566	2593	4.46	<.0001
Management	44984	2816	15.97	<.0001
Management Information Systems	47927	2894	16.56	<.0001
Marketing and Supply Chain Mgmt	49895	2748	18.16	<.0001
Math	2551	2697	0.95	0.3447
Math Science and Instr Tech Edu	7636	2683	2.85	0.0046
Philosophy	-4289	2845	-1.51	0.1322
Physics	937	2841	0.33	0.7418
Political Science	394	2944	0.13	0.8934
Psychology	7367	2611	2.82	0.0049
Recreation and Leisure Studies	7361	2856	2.58	0.0102
School of Art	-5354	2427	-2.21	0.0277
School of Communication	-6454	2715	-2.38	0.0177
School of Hospitality Ldrshp	17249	3588	4.81	<.0001
School of Music	-6139	2424	-2.53	0.0115
School of Social Work	2714	2899	0.94	0.3495
School of Theatre and Dance	-5978	2687	-2.23	0.0264
Sociology	0	.	.	.

2. **How to Calculate a Predicted Salary**

Example 1: Assistant Professor in Accounting with 3 years in rank:

Base	$63,670
+ Rank (Assistant Professor)	+$0
+ Time in Rank ($388 per year * 3 Year)	+$1164
+ Discipline (Accounting)	+$61,998
= Total Predicted Salary	**=$126,832**

Example 2: Associate Professor in Biology with 20 years in rank:

Base	$63,670
+ Rank (Associate Professor)	+$5,090
+ Time in Rank ($388 per year * 20 Years)	+$7,760
+ Discipline (Biology)	+$7,094
= Total Predicted Salary	**=$83,614**

II.   Regression Model: Libraries

1. Final Regression Model Output

Total Faculty Included in Regression Model = 39
Total Faculty Excluded = 2 (4.9%)

Dependent Variable: 12-MONTH BASE SALARY

Source	DF	F Value	Pr > F
Model	6	33.73	<.0001

R-Square	Adj. R-Square	Root MSE	Mean 12-month base salary
0.86	0.82	4926	65666

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	50370	1815	27.75	<.0001
Time in Rank (Year)	331	135	2.45	0.0200
Professor	30511	2884	10.58	<.0001
Associate Professor	8189	2215	3.70	0.0008
Assistant Professor	0	.	.	.
Supervisor: Yes – high level	11041	2636	4.19	0.0002
Supervisor: Yes – mid-level	5394	1983	2.72	0.0105
Supervisor: No	0	.	.	.
Health Sciences Library	5324	2355	2.26	0.0307
Academic Library Services	0	.	.	.

2. How to Calculate a Predicted Salary

Example 1: Assistant Professor at Joyner with 2 years in rank and no supervision responsibilities:

Base	$50,370
+ Rank (Assistant Professor)	+$0
+ Time in Rank ($331 per year * 2 Years)	+$662
Supervisor (NO)	+$0
+ Department (Academic Library Services)	+$0
= Total Predicted Salary	**=$51,032**

Example 2: Associate Professor at Laupus with 5 years in rank and serving as a mid-level supervisor:

Base	$50,370
+ Rank (Associate Professor)	+$8,198
+ Time in Rank ($331 per year * 5 Years)	+$1,655
Supervisor (Mid-level)	+$5,394
+ Department (Laupus)	+$5,324
= Total Predicted Salary	**=$70,932**

III.   Regression Model: Allied Health Sciences

1. Final Regression Model Output

Total Faculty Included in Regression Model = 82
Total Faculty Excluded = 6 (6.8%)

Dependent Variable: 12-MONTH BASE SALARY

Source	DF	F Value	Pr > F
Model	10	54	<.0001

R-Square	Adj R-Square	Root MSE	Mean 12-month base salary
0.88	0.87	5478	89950

Parameter	Estimate	Standard Error	t Value	Pr >|t|
(Intercept)	64760	2067	31.33	<.0001
Time in Rank (Year)	460	134	3.44	0.0010
Professor	19178	2756	6.96	<.0001
Associate Professor	5231	2748	1.90	0.0610
Assistant Professor/Instructor	0	.	.	.
Tenured	17053	2820	6.05	<.0001
Not Tenured but on Tenure Track	10181	1851	5.50	<.0001
Not on Tenure Track	0	.	.	.
Addictions and Rehabilitation Studies	3083	2397	1.29	0.2025
Clinical Lab Science	6946	3796	1.83	0.0715
Occupational Therapy	4619	3008	1.54	0.1291
Physician Assistant Studies	30429	3063	9.93	<.0001
Other AHS Departments*	10378	1913	5.43	<.0001
Health Services & Information Management	0	.	.	.

*Including Nutrition Science, Biostatistics, Communication Sciences & Disorders, and Physical Therapy.

2. How to Calculate a Predicted Salary

<u>Example 1: Fixed-term Assistant Professor in Biostatistics with 1 year in rank:</u>

Base	$64,760
+ Rank (Assistant Professor)	+$0
+ Time in Rank ($460 per year * 1 Year)	+$460
Tenure Status (Not on Tenure Track)	+$0
+ Department (Biostatistics)	+$10,378
= Total Predicted Salary	**=$75,598**

<u>Example 2: Tenured Professor in Occupational Therapy with 10 years in rank:</u>

Base	$64,760
+ Rank (Professor)	+$19,178
+ Time in Rank ($460 per year * 10 Year)	+$4,600
Tenure Status (Tenured)	+$17,053
+ Department (Occupational Therapy)	+$4,619
= Total Predicted Salary	**=$110,210**

IV.   Regression Model: College of Nursing

1. Regression Model Output

Total Faculty Included in Regression Model = 84
Total Faculty Excluded = 6 (6.7%)

Dependent Variable: 9-MONTH BASE SALARY

Source	DF	F Value	Pr > F
Model	9	64	<.0001

R-Square	Adj R-Square	Root MSE	Mean 9-month base salary
0.89	0.87	4022	73185

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	62257	1199	51.92	<.0001
Fixed-term Instructor	0	.	.	.
Fixed-term Assistant Professor	4483	1432	3.13	0.0025
Fixed-term Associate Professor	7480	1671	4.48	<.0001
Fixed-term Professor	12305	2285	5.39	<.0001
Tenure Track Assistant Professor	13372	1586	8.43	<.0001
Tenured Associate Professor	18873	2259	8.36	<.0001
Tenured Professor	33068	2351	14.07	<.0001
Time in Rank (Year)	172	93	1.85	0.0682
Hire Year – Terminal Degree Year *	295	68	4.31	<.0001
Nurse Midwife (CNM) or Nurse Practitioner (NP): Yes	5750	1128	5.10	<.0001
CNM or NP: No	0	.	.	.

* Terminal degree includes PhD and DNP. If a faculty member received a terminal degree three years before being hired by ECU, the "Hire Year – Terminal Degree Year" would be a positive three. If a faculty member received a terminal degree three years after being hired by ECU, the "Hire Year – Terminal Degree Year" would be a negative three.

2. How to Calculate a Predicted Salary

<u>Example 1: Fixed-term Assistant Professor without a terminal degree or CNM/NP licensure, hired in August 2016 at the rank of assistant professor:</u>

Base	$62,257
+ Rank (Fixed-term Assistant Professor)	+$4,483
+ Time in Rank ($172 per year * 2.2 Years)	+$378
Hire Year – Terminal Degree Year ($295 * (-2.2) years)	-$649
+ CNM/NP (No)	+$0
= Total Predicted Salary	**=$66,469**

Example 2: Tenured Professor with a terminal degree for 25 years and a CNM/NP licensure, hired by ECU 20 years ago and promoted to professor 3 years ago:

Base	$62,257
+ Rank (Tenured Professor)	+$33,068
+ Time in Rank ($172 per year * 3 years)	+$516
Hire Year – Terminal Degree Year ($295 * (25-20) years)	+$1,475
+ CNM/NP (Yes)	+$5,750
= Total Predicted Salary	**=$103,066**

V. Regression Model: School of Dental Medicine

1. Regression Model Output

Total Faculty Included in Regression Model = 43
Total Faculty Excluded = 2 (4.4%)

Dependent Variable: 12-MONTH BASE SALARY

Source	DF	F Value	Pr > F
Model	6	13	<.0001

R-Square	Adj R-Square	Root MSE	Mean 12-month base salary
0.69	0.64	11010	164657

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	137790	5382	25.60	<.0001
Years Since Hire	1958	708	2.76	0.0090
Department Foundational Sciences	0	.	.	.
Community Service Learning Center	31424	6293	4.99	<.0001
Department General Dentistry	8238	5794	1.42	0.1637
Department of Pediatric Dentistry and Orthodontics and Dentofacial Orthopedics	18679	6680	2.80	0.0082
Department Surgical Sciences	31819	6707	4.74	<.0001
Chair: No	0	.	.	.
Chair: Yes	30126	5979	5.04	<.0001

2. How to Calculate a Predicted Salary

Example: A faculty member in the Department of Foundational Sciences with 4 years of service at ECU:

Base	$137,790
+ Department (Foundational Sciences)	+$0
+ Years Since Hire ($1,958 per year * 4 Years)	+$7,832
+ Department Chair (No)	+$0
= Total Predicted Salary	**=$145,622**

VI.   Regression Model: Brody Basic Science and Other Non-Clinical Faculty

1.   **Regression Model Output - Dependent Variable: 12-MONTH BASE SALARY**

Total Faculty Included in Regression Model = 86
Total Faculty Excluded = 6 (6.5%)

Source	DF	F Value	Pr > F
Model	4	137.96	<.0001

R-Square	Adj R-Square	Root MSE	12-Month Base Salary Mean
0.87	0.86	14086	115802

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	11640	4979	2.34	0.0219
Time in Rank (Year)	350	229	1.53	0.1297
Hire Year – Terminal Degree Year	667	216	3.09	0.0027
Tenured/Tenure Track	9269	3931	2.36	0.0208
Fixed-term	0	.	.	.
AAMC Benchmark Salary	0.65	0.04	17.74	<.0001

2.   **How to Calculate a Predicted Salary**

How to calculate 12-base salary

<u>Example: With an AAMC Benchmark Salary of $132,000, a Tenured faculty member hired 16 years after obtaining his/her terminal degree with 8 years of service at ECU:</u>

Base	$11,640
+ Time in Rank ($350 per year * 8 years)	+$2,800
+ Terminal Deg to Hire Year ($667 per year * 16 years)	+$10,672
+ Tenure/Tenure Track (Yes)	+$9269
+ AAMC Benchmark Salary ($132,000 * 0.65)	$85,800
= Total Predicted Salary	**=$120,181**

VII.   Regression Model: Brody Clinical Faculty

1. **Regression Model Output – Total Compensation** (including 12-month base salary, stipend(s), incentive pay and supplemental pay)

WITH TIME IN RANK – Used to Identify Compression/Inversion
Total Faculty Included in Regression Model = 303
Total Faculty Excluded = 11 (3.5%)

Source	DF	F Value	Pr > F
Model	4	276.97	<.0001

R-Square	Adj R-Square	Root MSE	Mean Total Compensation
0.79	0.79	50419	257348

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	43532	7415	5.87	<.0001
Time in Rank (Year)	-615	595	-1.03	0.3023
Hire Year – Terminal Degree Year	44	389	0.11	0.9102
Tenured/Tenure Track	8482	6722	1.26	0.2080
Fixed-term	0	.	.	.
AAMC Benchmark Salary	0.78	0.03	28.35	<.0001

WITHOUT TIME IN RANK – Used to Calculate Predicted Salary
Total Faculty Included in Regression Model = 303
Total Faculty Excluded = 11 (3.5%)

Source	DF	F Value	Pr > F
Model	3	370.63	<.0001

R-Square	Adj R-Square	Root MSE	Mean Total Compensation
0.79	0.79	50584	257728

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	40880	7293	5.61	<.0001
Hire Year – Terminal Degree Year	53	390	0.14	0.8926
Tenured/Tenure Track	6592	6534	1.01	0.3139
Fixed-term	0	.	.	.
AAMC Benchmark Salary	0.79	0.03	28.35	<.0001

2. **How to Calculate a Predicted Total Compensation**

Example 1: An assistant professor in the Department of Internal Medicine with Specialty in Pulmonary, received MD in 2010 and hired by ECU in 2014 in a tenure-track position:

Base	$40,880
+ Hire Year – Terminal Degree Year ($53 per year*4 years)	+$212
+ Tenured/Tenure Track	+$6,592
+AAMC Benchmark $234,000 * 0.79	+$184,860
= Total Predicted Salary	**=$232,544**

Appendix Two: Salary Benchmark Analyses

Benchmark Sources and Limitations

At the request of the advisory groups, a national benchmark analysis was conducted to provide an external perspective on ECU faculty salaries. No single source of benchmarks was available due to the diversity of disciplines and departments at ECU. Because of wide variations in methodology used by different organizations, the selection of benchmark sources and comparison groups incorporated input from divisional HR offices and units in Health Sciences. Benchmark data for SoDM were not available; for all other units, one benchmark source was identified as the only or primary source in order to maintain consistency of the analyses. The benchmark sources approved by the advisory groups are listed below:

- **Academic Affairs Colleges, Joyner Library, and College of Allied Health Sciences**
  - College and University Professional Association for Human Resources (CUPA-HR)
- **Laupus Library**
  - Association of Academic Health Sciences Libraries (AAHSL)
- **College of Nursing**
  - American Association of Colleges of Nursing (AACN)
- **Brody School of Medicine**
  - Association of American Medical Colleges (AAMC)
- **School of Dental Medicine**
  - No reliable source was identified. The American Dental Education Association (ADEA) has recently changed its methodology to collect and report dental school faculty salaries. Comparable salary benchmark information will be available in 2020.

It is important to point out that the above organizations apply different definitions for faculty and compensation and use different methodologies in reporting benchmarks. For example, CUPA benchmarks for faculty are based on 9-month base salary, while AAMC benchmarks include compensation of any type. AACN benchmarks differentiate faculty with and without doctoral degrees, while CUPA does not. AAMC benchmarks reflect specialty areas, but those from AACN do not. These differences, documented in the section below, need to be considered when interpreting the benchmark comparison results.

In addition to variances in methodology, benchmark analyses are subject to the limitations below:
- Benchmarks do not capture time in rank or years of experience in the field.
- Occasionally, benchmarks of a field reflect nation-wide salary compression or inversion. For example, the CUPA-HR benchmark for associate professors in accounting is lower than that for assistant professors.
- Salary benchmark is not always available for all faculty in all ranks due to data confidentiality constraints, specialty area, or nature of the position.
- Because CUPA-HR benchmarks are identified based on four-digit departmental CIP codes, sub-disciplines within a department were not considered in the study.

- Health Sciences faculty tend to have expertise in various specialized fields with widely differing market values. For CON, salary benchmarks for specialty areas (e.g., anesthesia, midwifery, etc.) were not available in the data source used for the analysis.

Definition of National Median Salary

The benchmark analyses were conducted at the individual faculty level, comparing a faculty's salary to a national median. Based on availability of data and characteristics of ECU, the advisory groups selected the following comparison groups for benchmark analyses:

- For CUPA-HR data, the national median is defined as the median salary of all <u>public and private institutions</u> that are classified as "Doctoral Institution: Highest Research Activities (R1)" OR "Doctoral Institution: Higher Research Activities (R2)" (the 2015 Carnegie Classification of Higher Education Institutions). All R1 and R2 institutions submitted faculty salary data to CUPA in 2018. A list of participating institutions is provided at the end of the appendix.

  ECU was classified as a R2 institution in the 2015 Carnegie Classification. By combining R1 and R2 institutions, IPAR was able to retrieve more benchmarks by four-digit department CIP code than using the R2 group only. The 2018-19 CUPA Salary Comparison reports (based on Fall 2018 data) are available on IPAR's website at: http://www.ecu.edu/cs-acad/ipar/reports.cfm.

  The CUPA-HR salary benchmarks are based on an employment term of 9 months. For 11-month and 12-month salaries, it is important to note that CUPA's conversion formula is different from ECU's internal formula as described on Page 7 of this report (under regression methodology). For example, for a 12-month salary of $120,000, ECU's formula would convert it to a 9-month salary of $90,000 whereas CUPA's formula would convert it to $98,400 (i.e., 9-month base salary = 11-month or 12-month base salary multiplied by 0.82). In order to maintain the consistency of the comparisons, IPAR used CUPA's conversion formula for benchmark analyses.

- For other sources, the national median is defined as the median salary of <u>all institutions that provided salary data</u> to the reporting organization.

IPAR retrieved CUPA-HR benchmarks and validated benchmarks provided by CON. Other benchmarks included in the study were retrieved by the unit. After the national median salaries were identified, IPAR calculated the following statistics:

- the difference between each individual's actual salary and the national median: these differences are included in Unit Faculty Salary Reports prepared for the Provost, the Vice Chancellor for Health Sciences, Deans, and Directors of the Libraries.
- the percentage of the national median the actual salary represented: IPAR summarized, by academic rank and unit, the percentage of faculty who were paid under 75% of the national median, under 80% of the national median, and under the national median. Aggregate results are presented below.

Overall Benchmark Analyses Results

After excluding SoDM and individuals without an available benchmark, the analyses revealed that majority of the remaining ECU faculty were paid under the national median. In all units except for Libraries, more professors were paid under 80% of the national median than were associate professors and assistant professors. Eighty-two percent of AA faculty and 69% of HS faculty included in the study were paid under the national median as of Fall 2018; raising all faculty to the national median would require more than $18 million. A summary for each division is included in Table 1 and Table 2 below.

Table 1. Division of Academic Affairs Benchmark Comparison Results (N=757*)

Academic Rank	Total Count	Under 75% of National Median		Under 80% of National Median		Under National Median	
		Count	%	Count	%	Count	%
Assistant Professor	175	3	2%	9	5%	140	80%
Associate Professor	358	8	2%	36	10%	311	87%
Professor	224	38	17%	76	34%	171	76%
All Ranks	757	49	6%	121	16%	622	82%

*Benchmark was not available for two individuals in the Division of Academic Affairs.

Table 2. Division of Health Sciences Benchmark Comparison Results (N=595*)

Academic Rank or Title	Total Count	Under 75% of National Median		Under 80% of National Median		Under National Median	
		Count	%	Count	%	Count	%
Instructor	24	3	13%	3	13%	9	38%
Assistant Professor	287	11	4%	18	6%	188	66%
Associate Professor	164	19	12%	31	19%	117	71%
Professor	120	27	23%	42	35%	94	78%
All Ranks/Titles	595	60	10%	94	16%	408	69%

*Benchmark was not available for SoDM faculty.

The difference between each individual's actual salary and the national median was included in Unit Faculty Salary Reports prepared for the Provost, the Vice Chancellor for Health Sciences, Deans, and Directors of the Libraries. The section below provides more technical details pertaining to each sub-group of faculty.

Subgroup Results

Departments in Academic Affairs (excluding Joyner Library)
Four-digit departmental CIP codes were used by IPAR to retrieve national median salaries by discipline and academic rank from the CUPA-HR database. All 11- and 12-month salaries were converted to 9-month equivalents using the CUPA-HR conversion formula (i.e., original base salary multiply by 0.82). Of the 729 full-time tenured and tenure-track faculty in Academic Affairs, salary benchmarks were

identified for 682 individuals. Of these individuals, 17% were paid under 80% of the national median, which includes 38% of professors, 10% of associate professors, and 4% of assistant professors. Due to data confidentiality constraints, four-digit CUPA-HR benchmark data were not available for the following departments/ranks: Construction Management (all ranks), Technology Systems (all ranks), Interdisciplinary Professions (Assistant and Associate Professor), Recreation and Leisure Studies (Assistant Professor and Professor), and Hospitality Leadership (Assistant Professor). Using two-digit CIP code matches, benchmarks were retrieved for all but two individuals. Of these faculty, one individual was found to be paid under 80% of the national median. Overall, 83% of AA faculty included in the analyses were paid under the national median.

Joyner and Laupus Libraries

For the Joyner Library (n=30), IPAR retrieved benchmark data from the CUPA-HR Professional Staff database. Benchmark matching was based on job title with input from the unit. For the Laupus Library (n=11), benchmark retrieval and matching were conducted by the unit. Seventeen percent of the faculty in the Libraries were paid under 80% of the national median. Overall, 66% of them were paid under the national median.

College of Allied Health Sciences

Departmental CIP code was used by IPAR to retrieve national median salaries by discipline and academic rank from the CUPA-HR database. All 12-month salaries were converted to 9-month equivalents using the CUPA-HR conversion formula. Of the 88 full-time fixed-term and tenured/tenure-track faculty in CAHS, salary benchmarks were identified for 64 individuals using four-digit departmental CIP code match. For Physician Assistant Studies (Associate and Assistant Professors), Communication Sciences & Disorders (Professor), Rehabilitation Studies (all ranks), Clinical Lab Science (Assistant Professors), and Nutrition Science (Assistant Professors), 2-digit CIP code match was used. One third of CAHS faculty were paid under 80% of the national median. Overall, 85% of them were paid under the national median.

College of Nursing

The AACN provides benchmark data by rank, terminal degree (doctoral and non-doctoral), and faculty type (clinical faculty vs tenured/tenure-track faculty); however, the benchmarks do not reflect specialties or advanced certification. CON and IPAR worked closely to match the faculty with appropriate benchmarks. All 12-month salaries were converted to 9-month using AACN's conversion method. The result showed that 7% of CON faculty were paid under 80% of the national median. Overall, 59% of CON faculty were paid under the national median.

Brody School of Medicine

The AAMC provides benchmark data by specialty area, rank, terminal degree type (MD vs. Ph.D.), and certain administrative duties (e.g., department chair, chief, etc.). Benchmark retrieval and matching were conducted by Health Sciences Human Resources Administration, which relied on Brody departments to provide accurate information on the specialty area of each faculty member. Based on total compensation, 11% of Brody clinical faculty and 25% of basic science/non-clinical faculty were paid under 80% of the national median. Overall, 65% of clinical faculty and 74% of basic science/non-clinical faculty were paid under the national median.

Institutions Participating in 2018-19 CUPA-HR

American University (Washington, DC)
Arizona State University (Tempe, AZ)
Auburn University (Auburn, AL)
Augusta University (Augusta, GA)
Ball State University (Muncie, IN)
Baylor University (Waco, TX)
Boston College (Chestnut Hill, MA)
Boston University (Boston, MA)
Bowling Green State University (Bowling Green, OH)
Brandeis University (Waltham, MA)
Brigham Young University (Provo, UT)
Brown University (Providence, RI)
California Institute of Technology (Pasadena, CA)
Carnegie Mellon University (Pittsburgh, PA)
Case Western Reserve University (Cleveland, OH)
Central Michigan University (Mount Pleasant, MI)
City University of New York Graduate Center (New York, NY)
Claremont Graduate University (Claremont, CA)
Clark Atlanta University (Atlanta, GA)
Clemson University (Clemson, SC)
Cleveland State University (Cleveland, OH)
College of William & Mary (Williamsburg, VA)
Colorado School of Mines (Golden, CO)
Colorado State University (Fort Collins, CO)
Columbia University in the City of New York (New York, NY)
Cornell University (Ithaca, NY)
Dartmouth College (Hanover, NH)
Drexel University (Philadelphia, PA)
Duke University (Durham, NC)
Duquesne University (Pittsburgh, PA)
East Carolina University (Greenville, NC)
Emory University (Atlanta, GA)
Florida Agricultural and Mechanical University (Tallahassee, FL)
Florida Atlantic University (Boca Raton, FL)
Florida Institute of Technology (Melbourne, FL)
Florida International University (Miami, FL)
Florida State University (Tallahassee, FL)
Fordham University (Bronx, NY)
George Mason University (Fairfax, VA)
Georgetown University (Washington, DC)
Georgia Institute of Technology (Atlanta, GA)
Georgia State University (Atlanta, GA)
Harvard University (Cambridge, MA)

Howard University (Washington, DC)
Illinois Institute of Technology (Chicago, IL)
Illinois State University (Normal, IL)
Indiana University (Bloomington, IN)
Indiana University-Purdue University Indianapolis (Indianapolis, IN)
Iowa State University (Ames, IA)
Jackson State University (Jackson, MS)
Johns Hopkins University (Baltimore, MD)
Kansas State University (Manhattan, KS)
Kent State University Main Campus (Kent, OH)
Lehigh University (Bethlehem, PA)
Louisiana State University and Agricultural and Mechanical College - Baton Rouge (Baton Rouge, LA)
Loyola University Chicago (Chicago, IL)
Marquette University (Milwaukee, WI)
Massachusetts Institute of Technology (Cambridge, MA)
Miami University (Oxford, OH)
Michigan State University (East Lansing, MI)
Michigan Technological University (Houghton, MI)
Mississippi State University (Mississippi State, MS)
Missouri University of Science & Technology (Rolla, MO)
Montana State University (Bozeman, MT)
New Jersey Institute of Technology (Newark, NJ)
New Mexico State University Main Campus (Las Cruces, NM)
New York University (New York, NY)
North Carolina Agricultural and Technical State University (Greensboro, NC)
North Carolina State University (Raleigh, NC)
North Dakota State University Main Campus (Fargo, ND)
Northeastern University (Boston, MA)
Northern Arizona University (Flagstaff, AZ)
Northern Illinois University (De Kalb, IL)
Northwestern University (Evanston, IL)
Nova Southeastern University (Fort Lauderdale, FL)
Ohio University (Athens, OH)
Oklahoma State University (Stillwater, OK)
Old Dominion University (Norfolk, VA)
Oregon State University (Corvallis, OR)
Pennsylvania State University (University Park, PA)
Portland State University (Portland, OR)
Princeton University (Princeton, NJ)
Purdue University Main Campus (West Lafayette, IN)
Rensselaer Polytechnic Institute (Troy, NY)
Rice University (Houston, TX)
Rockefeller University (New York, NY)
Rutgers the State University of New Jersey Newark Campus (Newark, NJ)
Rutgers the State University of New Jersey New Brunswick Campus (New Brunswick, NJ)

Saint Louis University (Saint Louis, MO)
San Diego State University (San Diego, CA)
South Dakota State University (Brookings, SD)
Southern Illinois University Carbondale (Carbondale, IL)
Southern Methodist University (Dallas, TX)
Stanford University (Palo Alto, CA)
State University of New York At Albany (Albany, NY)
State University of New York at Binghamton (Binghamton, NY)
Stevens Institute of Technology (Hoboken, NJ)
Stony Brook University (Stony Brook, NY)
Syracuse University (Syracuse, NY)
Teachers College, Columbia University (New York, NY)
Temple University (Phila., PA)
Texas A & M University (College Station, TX)
Texas A&M University - Commerce (Commerce, TX)
Texas Christian University (Fort Worth, TX)
Texas State University (San Marcos, TX)
Texas Tech University (Lubbock, TX)
The Catholic University of America (Washington, DC)
The George Washington University (Washington, DC)
The New School (New York, NY)
The Ohio State University (Columbus, OH)
The University of Akron, Main Campus (Akron, OH)
The University of Alabama (Tuscaloosa, AL)
The University of Arizona (Tucson, AZ)
The University of Memphis (Memphis, TN)
The University of South Dakota (Vermillion, SD)
The University of Texas at Arlington (Arlington, TX)
The University of Texas at Dallas (Richardson, TX)
The University of Utah (Salt Lake City, UT)
Tufts University (Medford, MA)
Tulane University (New Orleans, LA)
University At Buffalo, State University of New York (Buffalo, NY)
University of Alabama at Birmingham (Birmingham, AL)
University of Alabama in Huntsville (Huntsville, AL)
University of Alaska Fairbanks (Fairbanks, AK)
University of Arkansas Main Campus (Fayetteville, AR)
University of California-Berkeley (Berkeley, CA)
University of California-Davis (Davis, CA)
University of California-Irvine (Irvine, CA)
University of California-Los Angeles (Los Angeles, CA)
University of California-Merced (Merced, CA)
University of California-Riverside (Riverside, CA)
University of California-San Diego (La Jolla, CA)
University of California-Santa Barbara (Santa Barbara, CA)

University of California-Santa Cruz (Santa Cruz, CA)
University of Central Florida (Orlando, FL)
University of Chicago (Chicago, IL)
University of Cincinnati Main Campus (Cincinnati, OH)
University of Cincinnati System Summary (Cincinnati, OH)
University of Colorado Boulder (Boulder, CO)
University of Colorado Denver (Denver, CO)
University of Connecticut (Storrs, CT)
University of Dayton (Dayton, OH)
University of Delaware (Newark, DE)
University of Denver (Denver, CO)
University of Florida (Gainesville, FL)
University of Georgia (Athens, GA)
University of Hawaii at Manoa (Honolulu, HI)
University of Houston (Houston, TX)
University of Idaho (Moscow, ID)
University of Illinois at Chicago (Chicago, IL)
University of Illinois at Urbana-Champaign (Champaign, IL)
University of Iowa (Iowa City, IA)
University of Kansas Main Campus (Lawrence, KS)
University of Kentucky (Lexington, KY)
University of Louisiana at Lafayette (Lafayette, LA)
University of Louisville (Louisville, KY)
University of Maine (Orono, ME)
University of Maryland Baltimore County (Baltimore, MD)
University of Maryland College Park (College Park, MD)
University of Massachusetts (Amherst, MA)
University of Massachusetts Boston (Boston, MA)
University of Massachusetts Dartmouth (North Dartmouth, MA)
University of Massachusetts Lowell (Lowell, MA)
University of Miami (Coral Gables, FL)
University of Michigan-Ann Arbor (Ann Arbor, MI)
University of Minnesota-Twin Cities (Minneapolis, MN)
University of Mississippi (University, MS)
University of Missouri - Columbia (Columbia, MO)
University of Missouri - Kansas City (Kansas City, MO)
University of Missouri - Saint Louis (Saint Louis, MO)
University of Montana - Missoula (Missoula, MT)
University of Nebraska - Lincoln (Lincoln, NE)
University of Nevada, Las Vegas (Las Vegas, NV)
University of Nevada, Reno (Reno, NV)
University of New Hampshire (Durham, NH)
University of New Mexico Main Campus (Albuquerque, NM)
University of New Orleans (New Orleans, LA)
University of North Carolina at Chapel Hill (Chapel Hill, NC)

University of North Carolina at Charlotte (Charlotte, NC)
University of North Carolina at Greensboro (Greensboro, NC)
University of North Dakota (Grand Forks, ND)
University of Northern Colorado (Greeley, CO)
University of North Texas Denton Campus (Denton, TX)
University of Notre Dame (Notre Dame, IN)
University of Oklahoma Norman Campus (Norman, OK)
University of Oregon (Eugene, OR)
University of Pennsylvania (Philadelphia, PA)
University of Pittsburgh (Pittsburgh, PA)
University of Puerto Rico-Rio Piedras Campus (Rio Piedras, PR)
University of Rhode Island (Kingston, RI)
University of Rochester (Rochester, NY)
University of South Alabama (Mobile, AL)
University of South Carolina Columbia (Columbia, SC)
University of Southern California (Los Angeles, CA)
University of Southern Mississippi (Hattiesburg, MS)
University of South Florida Tampa (Tampa, FL)
University of Tennessee, Knoxville (Knoxville, TN)
University of Texas at Austin (Austin, TX)
University of Texas at El Paso (El Paso, TX)
University of Texas at San Antonio (San Antonio, TX)
University of Toledo (Toledo, OH)
University of Tulsa (Tulsa, OK)
University of Vermont (Burlington, VT)
University of Virginia (Charlottesville, VA)
University of Washington (Seattle, WA)
University of Wisconsin-Madison (Madison, WI)
University of Wisconsin-Milwaukee (Milwaukee, WI)
University of Wyoming (Laramie, WY)
Utah State University (Logan, UT)
Vanderbilt University (Nashville, TN)
Virginia Commonwealth University (Richmond, VA)
Virginia Tech (Blacksburg, VA)
Wake Forest University (Winston-Salem, NC)
Washington State University (Pullman, WA)
Washington University in St. Louis (Saint Louis, MO)
Wayne State University (Detroit, MI)
Western Michigan University (Kalamazoo, MI)
West Virginia University (Morgantown, WV)
Wichita State University (Wichita, KS)
Worcester Polytechnic Institute (Worcester, MA)
Yale University (New Haven, CT)
Yeshiva University (New York, NY)

Appendix Three: Hire/Promotion Year and Salary

Methodology

Upon the request of the advisory groups, the study further examined the impact of budget cuts and lack of institutional funds for promotional raises during the most recent economic downturn. IPAR examined the correlation between base salary and year of hire as well as between base salary and year of promotion. For the purpose of the study, the size of the absolute value of a correlation coefficient is interpreted as follows:

- <0.1: negligible
- 0.1 to 0.3: small
- 0.3 to 0.5: moderate
- Above 0.5: strong

The study examined individual hire years, as well as a collection of years. Due to the low number of new hires or promotions in a specific year, the single year correlation coefficients need to be interpreted with caution.

Results

Analyses of Hire Year and Salary
The correlation analyses included all individuals in a subgroup of faculty. For AA, Libraries, CAHS, CON and SoDM, salary was defined as the base salary; and for Brody, both base salary and total compensation were tested. In the correlation matrixes presented in Section I below, grayed-out cells with no values indicate that the dataset did not contain a new hire in a specific year.

Most coefficients in these matrixes are small, which indicates no need for further analyses. Strong correlations between hire year and salary were found in SoDM only, showing recent hire years associated with lower pay while earlier hire years associated with higher pay. This is not an indicator of salary compression or inversion. A similar pattern was seen in Libraries and CAHS with moderate correlations.

When a correlation coefficient between a hire year range and salary was above 0.2 or below -0.2, the variable was added to the associated final regression model to test the impact of the variable. Of all models tested, the hire year range was not statistically significant.

Analyses of Promotion Year and Salary
IPAR examined the relationship between promotion year and salary for tenured associate professors and professors in all units except SoDM and Brody clinical departments. The distribution of tenured faculty is presented in the table below. Year of promotion in this study represents a faculty member's most recent promotion; years in which promotions occurred ranged from 1976 to 2018. Correlations testing promotion to associate professor and promotion to full professor were conducted separately. The correlation matrixes presented in Section II below include AA faculty only. The correlation matrixes

presented in Section III include associate and full professors in all the units except SoDM and Brody clinical departments. All correlation coefficients were small, indicating no need for further analysis.

Distribution of Tenured Faculty

	Total	AA	ALHS	Brody Non-Clinical	Library	Nursing
Full dataset	1041	729	88	92	41	90
Tenured Associate Professor & Professor	597	496	27	41	22	11
Associate Professor	381	325	14	21	16	5
Professor	216	171	13	20	6	6

Correlation Matrixes

Section One: Hire Year and Salary by Unit

1.1 Academic Affairs (9-month Base Salary)   **1.2 Joyner and Laupus (12-month Base Salary)**
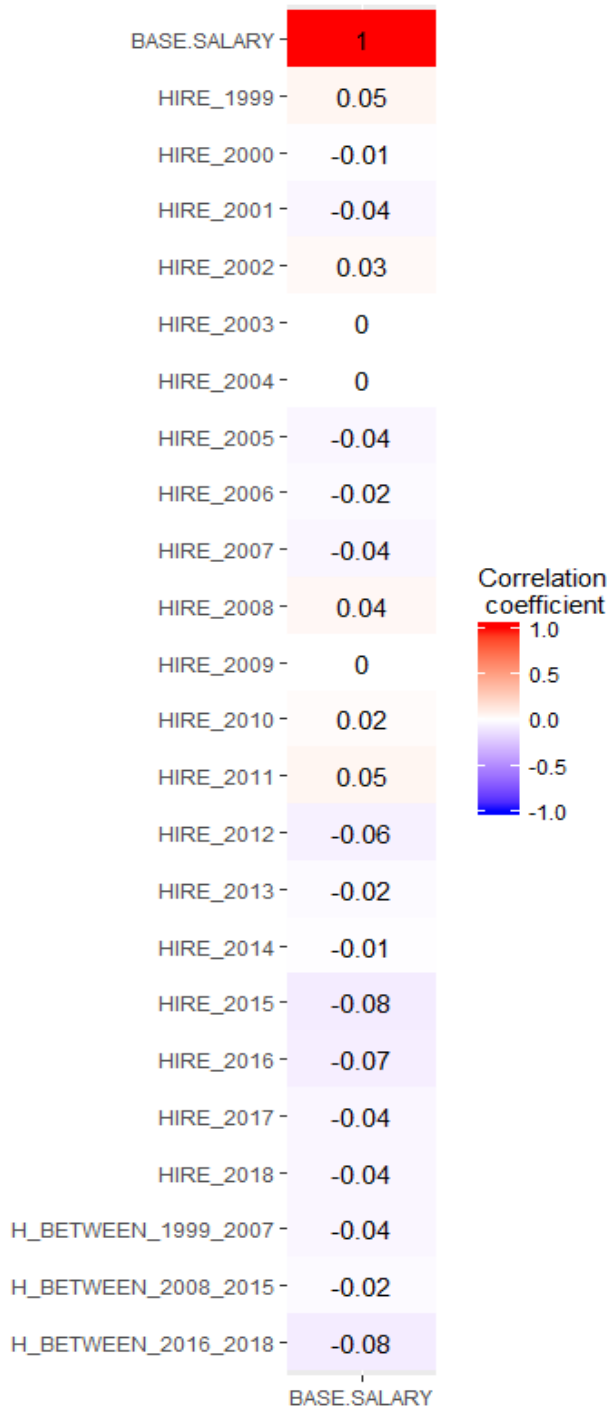
	BASE.SALARY
BASE.SALARY	1
HIRE_1999	0.05
HIRE_2000	-0.01
HIRE_2001	-0.04
HIRE_2002	0.03
HIRE_2003	0
HIRE_2004	0
HIRE_2005	-0.04
HIRE_2006	-0.02
HIRE_2007	-0.04
HIRE_2008	0.04
HIRE_2009	0
HIRE_2010	0.02
HIRE_2011	0.05
HIRE_2012	-0.06
HIRE_2013	-0.02
HIRE_2014	-0.01
HIRE_2015	-0.08
HIRE_2016	-0.07
HIRE_2017	-0.04
HIRE_2018	-0.04
H_BETWEEN_1999_2007	-0.04
H_BETWEEN_2008_2015	-0.02
H_BETWEEN_2016_2018	-0.08

Correlation coefficient: 1.0, 0.5, 0.0, -0.5, -1.0

	BASE.SALARY
BASE.SALARY	1
HIRE_1999	0.14
HIRE_2000	0.24
HIRE_2001	0.23
HIRE_2002	-0.07
HIRE_2003	
HIRE_2004	-0.08
HIRE_2005	0.2
HIRE_2006	
HIRE_2007	
HIRE_2008	0.14
HIRE_2009	-0.01
HIRE_2010	-0.16
HIRE_2011	-0.04
HIRE_2012	
HIRE_2013	-0.27
HIRE_2014	-0.08
HIRE_2015	-0.02
HIRE_2016	-0.22
HIRE_2017	-0.31
HIRE_2018	-0.18
H_BETWEEN_1999_2007	0.36
H_BETWEEN_2008_2015	-0.2
H_BETWEEN_2016_2018	-0.4

1.3 Allied Health Sciences (12-month Base Salary)   1.4 Nursing (9-month Base Salary)

Allied Health Sciences	
BASE.SALARY	1
HIRE_1999	0.05
HIRE_2000	
HIRE_2001	
HIRE_2002	0.04
HIRE_2003	0.13
HIRE_2004	0.23
HIRE_2005	0.15
HIRE_2006	
HIRE_2007	-0.04
HIRE_2008	0.12
HIRE_2009	
HIRE_2010	-0.04
HIRE_2011	0.03
HIRE_2012	0.24
HIRE_2013	-0.04
HIRE_2014	-0.11
HIRE_2015	-0.25
HIRE_2016	-0.15
HIRE_2017	-0.35
HIRE_2018	-0.13
H_BETWEEN_1999_2007	0.22
H_BETWEEN_2008_2015	-0.07
H_BETWEEN_2016_2018	-0.4
	BASE.SALARY

Nursing	
BASE.SALARY	1
HIRE_1999	
HIRE_2000	0
HIRE_2001	-0.04
HIRE_2002	0.23
HIRE_2003	-0.06
HIRE_2004	-0.08
HIRE_2005	0.1
HIRE_2006	0.07
HIRE_2007	-0.07
HIRE_2008	-0.12
HIRE_2009	-0.01
HIRE_2010	0.06
HIRE_2011	-0.09
HIRE_2012	0.09
HIRE_2013	-0.12
HIRE_2014	0.05
HIRE_2015	-0.17
HIRE_2016	0.01
HIRE_2017	-0.14
HIRE_2018	0.03
H_BETWEEN_1999_2007	0.08
H_BETWEEN_2008_2015	-0.15
H_BETWEEN_2016_2018	-0.09
	BASE.SALARY

1.5 School of Dental Medicine (12-month Base Salary)

	BASE.SALARY
BASE.SALARY	1
HIRE_1999	
HIRE_2000	
HIRE_2001	
HIRE_2002	
HIRE_2003	
HIRE_2004	
HIRE_2005	
HIRE_2006	0.03
HIRE_2007	
HIRE_2008	
HIRE_2009	
HIRE_2010	0.21
HIRE_2011	
HIRE_2012	0.06
HIRE_2013	0.13
HIRE_2014	0.25
HIRE_2015	0.23
HIRE_2016	-0.44
HIRE_2017	-0.25
HIRE_2018	0.05
H_BETWEEN_1999_2007	0.03
H_BETWEEN_2008_2015	0.5
H_BETWEEN_2016_2018	-0.51
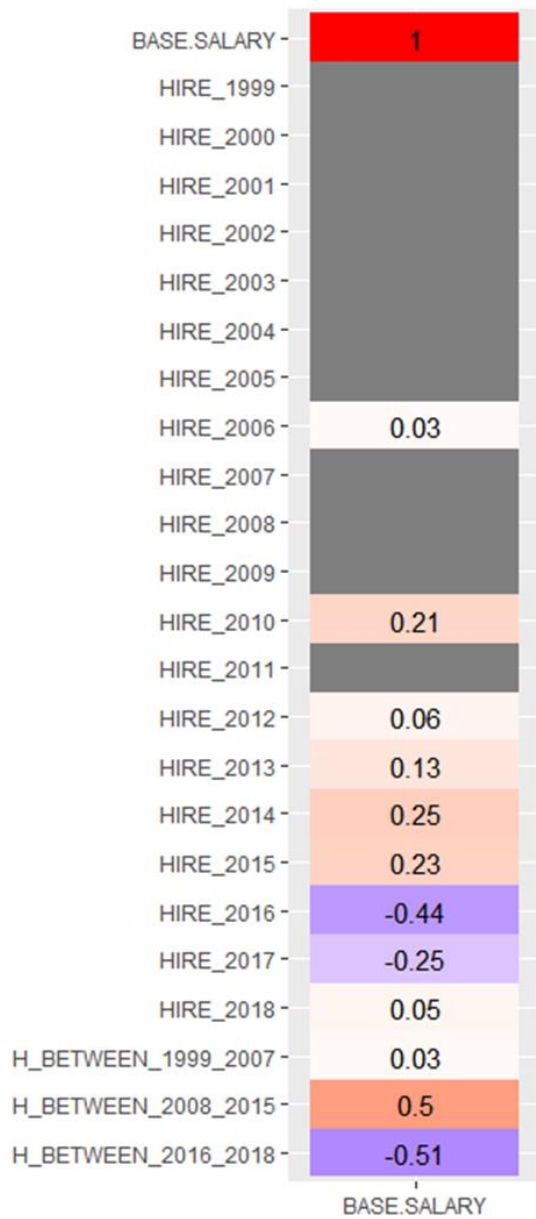
BASE.SALARY

1.6 Brody Basic Science and Non-clinical Faculty (12-month Base Salary and Total Compensation)
Note: Total Compensation includes 12-month base salary, stipend(s) and incentive pay.

	BASE.SALARY	TOTAL.COMPENSATION
HIRE_1999	-0.06	-0.07
HIRE_2000	-0.01	0.01
HIRE_2001	0.22	0.23
HIRE_2002	-0.03	-0.04
HIRE_2003	-0.06	-0.06
HIRE_2004	0	-0.01
HIRE_2005	-0.06	-0.04
HIRE_2006	0.24	0.21
HIRE_2007	-0.05	-0.06
HIRE_2008	-0.05	-0.05
HIRE_2009		
HIRE_2010	-0.08	-0.05
HIRE_2011	-0.13	-0.12
HIRE_2012	-0.11	-0.11
HIRE_2013	-0.04	-0.03
HIRE_2014	-0.11	-0.11
HIRE_2015	-0.09	-0.08
HIRE_2016	0.12	0.1
HIRE_2017	-0.13	-0.14
HIRE_2018	-0.06	-0.08
H_BETWEEN_1999_2007	0.1	0.09
H_BETWEEN_2008_2015	-0.26	-0.24
H_BETWEEN_2016_2018	-0.07	-0.1

Correlation coefficient

- 1.0
- 0.5
- 0.0
- -0.5
- -1.0

1.7 Brody Clinical Faculty (12-month Base Salary and Total Compensation)
Note: Total Compensation includes 12-month base salary, stipend(s), incentive pay, and supplemental pay.

	BASE.SALARY	TOTAL.COMPENSATION
HIRE_1999	0.01	0
HIRE_2000	0.03	0.06
HIRE_2001	0.11	0.11
HIRE_2002	0.02	0.01
HIRE_2003	0.01	0.02
HIRE_2004	0.02	0.03
HIRE_2005	0.01	0.04
HIRE_2006	-0.02	0
HIRE_2007	-0.02	-0.01
HIRE_2008	-0.07	-0.03
HIRE_2009	-0.04	-0.01
HIRE_2010	0	0.02
HIRE_2011	0	0.03
HIRE_2012	0.01	0.02
HIRE_2013	0.03	0.04
HIRE_2014	0.04	0.05
HIRE_2015	-0.05	-0.05
HIRE_2016	0.03	0.02
HIRE_2017	-0.08	-0.13
HIRE_2018	-0.06	-0.13
H_BETWEEN_1999_2007	0.06	0.1
H_BETWEEN_2008_2015	-0.02	0.04
H_BETWEEN_2016_2018	-0.07	-0.17

Correlation coefficient

1.0
0.5
0.0
-0.5
-1.0

Section II: Promotion Year and Salary for Tenured Associate and Full Professors in Academic Affairs

2.1 Correlation Matrix of 9-month Base Salary and Promotion Year – AA Tenured <u>Associate Professors</u> (Including five colleges in Academic Affairs, N=325)

Promotion year	N of Faculty
Before 2000	28
2000 & 2001	8
2002	5
2003	6
2004	8
2005	6
2006	7
2007	11
2008	13
2009	23
2010	16
2011	23
2012	27
2013	27
2014	33
2015	20
2016	17
2017	20
2018	27

	Base.Salary.9.Month
Base.Salary.9.Month	1
PROMOTION_YEAR_ Before 2000	0.19
PROMOTION_YEAR_2000	-0.04
PROMOTION_YEAR_2001	0.02
PROMOTION_YEAR_2002	-0.02
PROMOTION_YEAR_2003	-0.01
PROMOTION_YEAR_2004	-0.04
PROMOTION_YEAR_2005	0.04
PROMOTION_YEAR_2006	-0.07
PROMOTION_YEAR_2007	-0.06
PROMOTION_YEAR_2008	-0.04
PROMOTION_YEAR_2009	0.04
PROMOTION_YEAR_2010	-0.07
PROMOTION_YEAR_2011	-0.01
PROMOTION_YEAR_2012	-0.08
PROMOTION_YEAR_2013	-0.11
PROMOTION_YEAR_2014	0.06
PROMOTION_YEAR_2015	-0.03
PROMOTION_YEAR_2016	-0.04
PROMOTION_YEAR_2017	0.14
PROMOTION_YEAR_2018	0.03
P_BETWEEN_2008_2009	0.01
P_BETWEEN_2008_2010	-0.03
P_BETWEEN_2008_2011	-0.03
P_BETWEEN_2008_2012	-0.08
P_BETWEEN_2008_2013	-0.14
P_BETWEEN_2008_2014	-0.1
P_BETWEEN_2008_2015	-0.11

Correlation coefficient
1.0
0.5
0.0
-0.5
-1.0

2.2 Correlation Matrix of 9-month Base Salary and Promotion Year – AA Tenured <u>Full Professors</u> (Including five colleges in Academic Affairs, N=171)

Promotion year	N of Faculty
Before 2000	14
2000 & 2001	3
2002	7
2003	5
2004	5
2005	7
2006	9
2007	8
2008	6
2009	3
2010	6
2011	6
2012	11
2013	10
2014	11
2015	13
2016	22
2017	16
2018	9

	Base.Salary.9.Month
Base.Salary.9.Month	1
PROMOTION_YEAR_ Before 2000	0.13
PROMOTION_YEAR_2000	-0.02
PROMOTION_YEAR_2001	0.03
PROMOTION_YEAR_2002	0.05
PROMOTION_YEAR_2003	0.18
PROMOTION_YEAR_2004	0.09
PROMOTION_YEAR_2005	0.07
PROMOTION_YEAR_2006	-0.12
PROMOTION_YEAR_2007	-0.01
PROMOTION_YEAR_2008	-0.08
PROMOTION_YEAR_2009	-0.01
PROMOTION_YEAR_2010	0.01
PROMOTION_YEAR_2011	-0.02
PROMOTION_YEAR_2012	-0.05
PROMOTION_YEAR_2013	0.01
PROMOTION_YEAR_2014	-0.01
PROMOTION_YEAR_2015	-0.01
PROMOTION_YEAR_2016	-0.01
PROMOTION_YEAR_2017	-0.16
PROMOTION_YEAR_2018	0.05
P_BETWEEN_2008_2009	-0.07
P_BETWEEN_2008_2010	-0.05
P_BETWEEN_2008_2011	-0.06
P_BETWEEN_2008_2012	-0.08
P_BETWEEN_2008_2013	-0.07
P_BETWEEN_2008_2014	-0.07
P_BETWEEN_2008_2015	-0.07

Correlation coefficient: 1.0, 0.5, 0.0, -0.5, -1.0
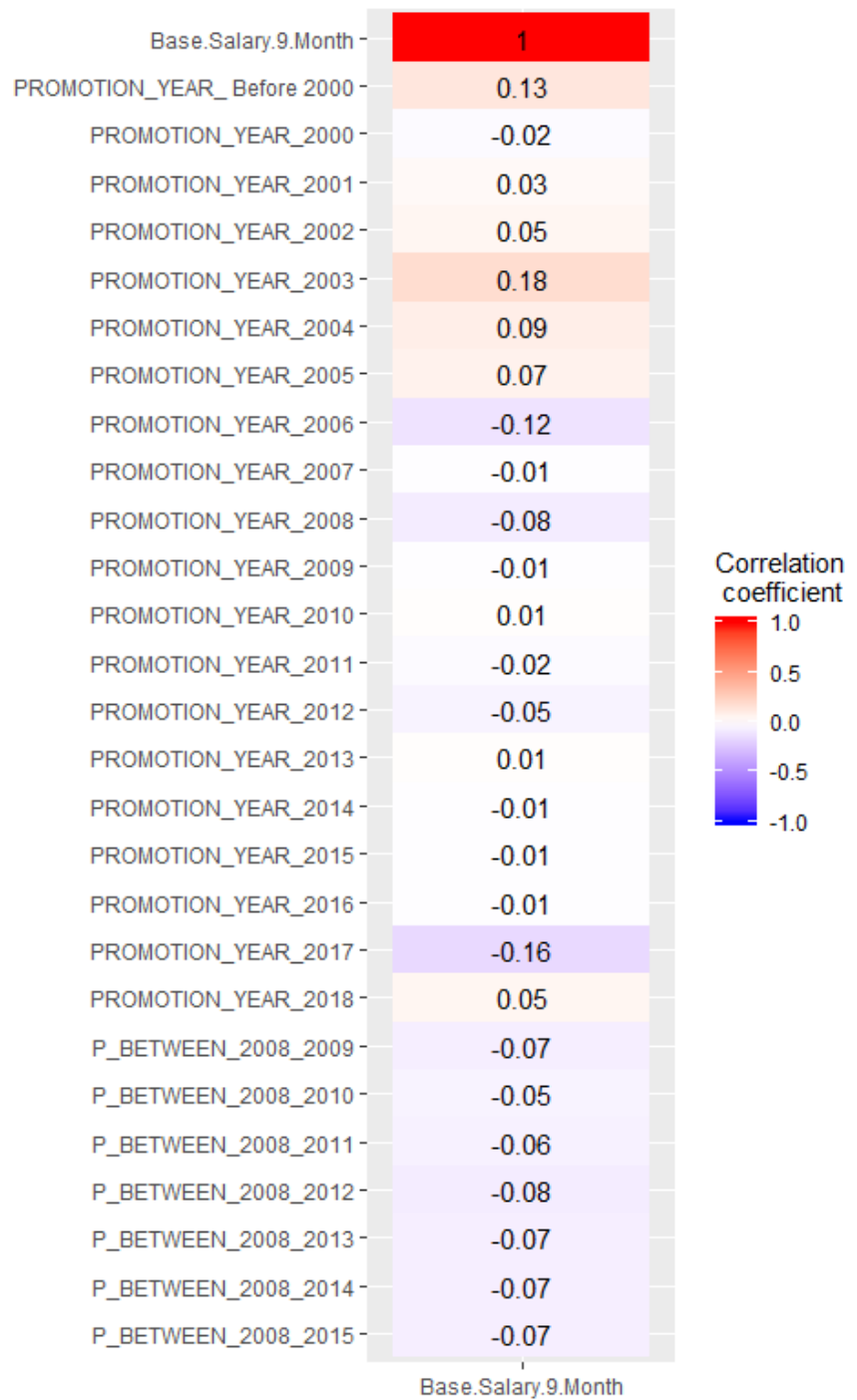
Section III: Promotion Year and Salary for Tenured AA and HS Faculty (Excluding SoDM and Brody Clinical Departments)

3.1 Correlation Matrix of 9-month Base Salary and Promotion Year – <u>Associate Professors</u>
(AA Colleges, Libraries, CAHS, CON, and Brody Basic Sciences and Non-clinical Faculty, N=381)

Promotion year	N of Faculty
Before 2000	28
2000 & 2001	9
2002	7
2003	6
2004	11
2005	8
2006	8
2007	14
2008	14
2009	26
2010	24
2011	25
2012	31
2013	29
2014	40
2015	25
2016	21
2017	24
2018	31
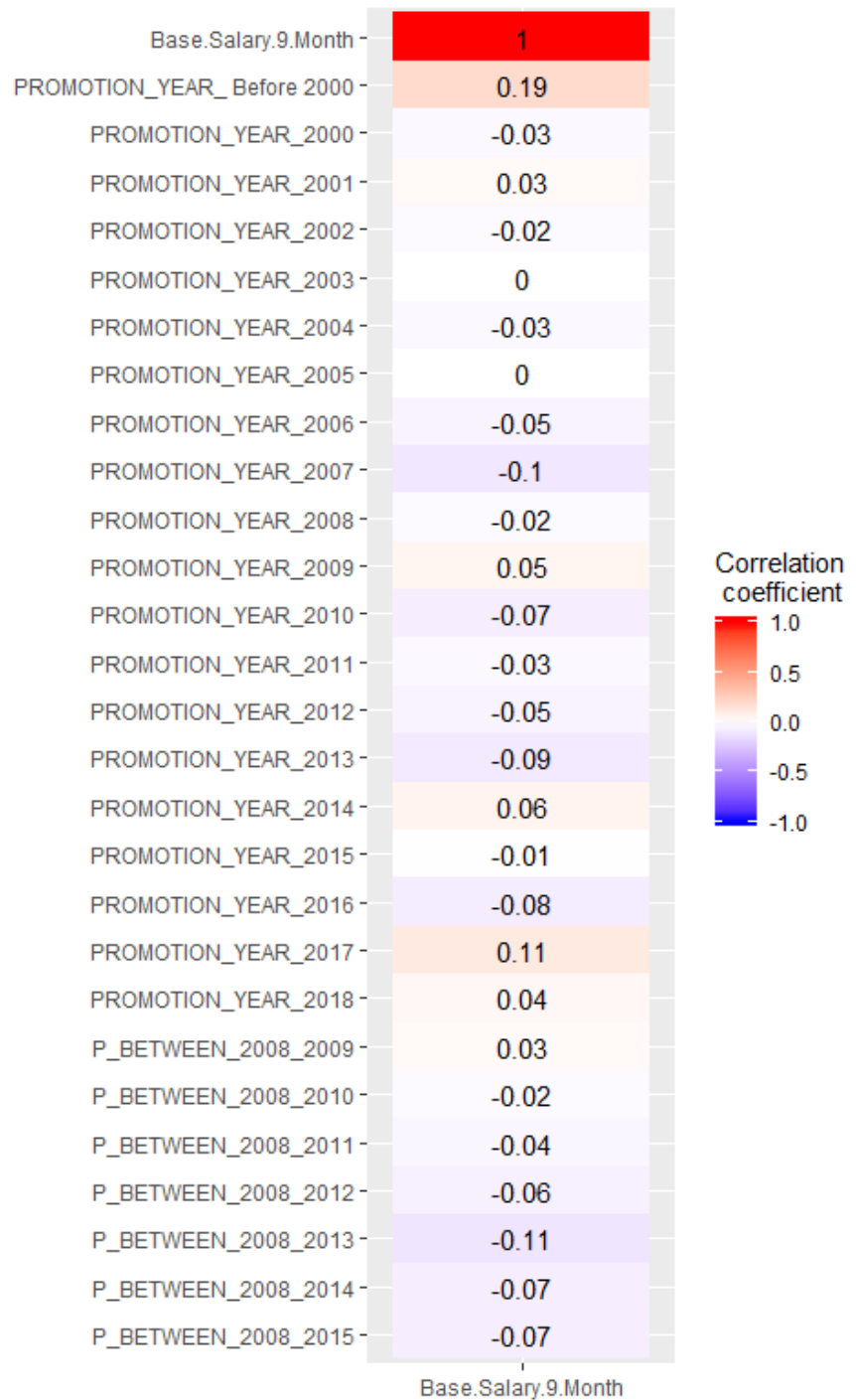
3.2 Correlation Matrix of 9-month Base Salary and Promotion Year – <u>Full Professors</u>
(AA Colleges, Libraries, CAHS, CON, and Brody Basic Sciences and Non-clinical Faculty, N=216)

Promotion year	N of Faculty
Before 2000	26
2000 & 2001	6
2002	9
2003	6
2004	6
2005	8
2006	11
2007	8
2008	6
2009	5
2010	6
2011	7
2012	13
2013	11
2014	14
2015	14
2016	25
2017	22
2018	13

	Base.Salary.9.Month
Base.Salary.9.Month	1
PROMOTION_YEAR_ Before 2000	0.17
PROMOTION_YEAR_2000	-0.06
PROMOTION_YEAR_2001	0.05
PROMOTION_YEAR_2002	0.02
PROMOTION_YEAR_2003	0.16
PROMOTION_YEAR_2004	0.14
PROMOTION_YEAR_2005	0.04
PROMOTION_YEAR_2006	-0.03
PROMOTION_YEAR_2007	0
PROMOTION_YEAR_2008	-0.07
PROMOTION_YEAR_2009	0.06
PROMOTION_YEAR_2010	0.01
PROMOTION_YEAR_2011	-0.04
PROMOTION_YEAR_2012	-0.07
PROMOTION_YEAR_2013	-0.03
PROMOTION_YEAR_2014	-0.03
PROMOTION_YEAR_2015	-0.01
PROMOTION_YEAR_2016	-0.04
PROMOTION_YEAR_2017	-0.17
PROMOTION_YEAR_2018	0
P_BETWEEN_2008_2009	-0.01
P_BETWEEN_2008_2010	0
P_BETWEEN_2008_2011	-0.03
P_BETWEEN_2008_2012	-0.06
P_BETWEEN_2008_2013	-0.07
P_BETWEEN_2008_2014	-0.08
P_BETWEEN_2008_2015	-0.08

Correlation coefficient
1.0
0.5
0.0
-0.5
-1.0