

Rules and Policies of the Department of Chemistry and Biochemistry

Table of Contents

I. APPENDIX: Rules of the Graduate Program	2
A. Preceptor Selection	2
B. Teaching Assistantships	3
C. Graduate Admissions	3
D. Oral Examinations.....	3
II. APPENDIX: Procedures and Priorities for Appointment of Teaching Associates	4
A. Procedures.....	4
B. Departmental GRA (dGRA) Awards.....	4
C. Limits on Assignment of GTAs to Individual Faculty	4
D. Priorities for additional TA allocation.....	5
E. Non-Students and Other Casuals.....	5
III. APPENDIX: Rules for Searching for a Department Chair	6
A. Internal Search	6
IV. APPENDIX: Rules regarding the Newman, Dow, Fox, and Kimberly Professorships and new professorships to be named.....	7
V. APPENDIX: Safety Policies	8
A. Safety Enforcement	8
1. Introduction.....	8
2. Inspections	9
3. The Enforcement Mechanism	9
4. Table of Incentives for Compliance with Fire, Safety and Chemical Hygiene Plan Requirements.....	9
5. Disposal Policy for Materials of Uncertain Composition (“Chemical Unknowns”)	11
6. Procedure	11
7. Instructions for Completing the Unknown Profile Form.....	11
VI. APPENDIX: Rules for Course Textbook Selection	13
VII. APPENDIX: Departmental Diversity Action Plan (last updated 2014-2015)	14
A. Introduction	14
1. Current Status of Department.....	14
B. Recognition of Bias	16
C. Faculty Distribution: Addressing Gender, Racial and Ethnic Inequities.....	16
D. Graduate Student Distribution: Gender, Racial and Ethnic Inequities	17
E. Undergraduate Diversity Initiatives	18
F. A welcoming and inclusive environment	19
G. Staff Diversity Initiatives	20
H. Support for Diversity Initiatives	21
I. Assessment and Implementation	21
J. References	21
VIII. APPENDIX: Research Support Services.....	23
A. Departmental Support of Instrumentation through the Research Support Services.....	23
B. Criteria for Departmental Instrumentation Acquisition	26

I. APPENDIX: Rules of the Graduate Program

A. Preceptor Selection

All faculty members will be invited to make a short presentation to first year graduate students during the first half of the Autumn term. First year students must attend a minimum of five full sessions, two within their major area of study and three others, in order to obtain a satisfactory grade in CHEM 6780. Waivers will only be granted to students for illness or other extraordinary circumstances by the Vice Chair for Graduate Studies (VCG). The faculty presentations will be scheduled by the graduate office. First year graduate students must also conduct a further exploration portion of the selection process. This is self-directed by each individual student and is ongoing throughout Autumn Semester. Students can participate in a variety of activities including, but not limited to, a short rotation in each advisor's group, attendance at group meetings, participating in lab tours, conducting interviews with the advisor and/or the advisor's group members, and reviewing publications and other pertinent data (funding, # of PhD graduates, # of GTAs vs. GRAs per semester, et al). After conducting these explorations students must obtain signatures verifying those activities from a minimum of four faculty members. These faculty members are selected by the graduate student and approved by the VCG. The VCG has the discretion to add additional faculty to the list or to remove faculty who cannot serve as an advisor, such as one who is not a faculty member (as defined in the POA document). A faculty member may choose to accept attendance at their presentation as satisfying the interview requirement.

First year graduate students who have attended the faculty presentations and interviews may submit their advisor preferences to the office of the VCG in mid-November, by the date announced by the Graduate Studies Office. The graduate office will communicate the student preferences to the Division Secretaries who will call a meeting of the divisions to discuss the student and faculty preferences. The result of the meeting will be communicated to the GSC who will make final preceptor assignments based on this information. The announcement of final preceptor assignments to students will be made by the Graduate Studies Office. These announcements should take place before winter break so that students may begin work in the research lab during this time.

Only members of the Chemistry and Biochemistry faculty (as defined in the POA document) may be assigned as an advisor to students in departmental graduate programs.

The GSC will appoint a new advisor of record for all students whose preceptors leave the active faculty as a result of retirement or resignation. Students in this category who remain in the Department when their preceptor retires or resigns will be required to finish their existing projects within 6-12 months unless they petition and receive an extension. If this work is insufficient for a complete thesis, they will begin a new project under the supervision of their newly appointed preceptor within six months of the appointment of the new preceptor. This policy will be waived for students who leave Columbus to finish their original projects with their preceptors at another institution.

Students may resign from a research group at any time. Faculty may resign as the advisor of any student at any time. In these cases, the GSC may appoint a new preceptor; choose to allow the student to use data previously generated by the student as the basis of a thesis; or if the student's progress is unsatisfactory, dismiss the student from the program. The student in this situation can make a copy of all of their own data and their notebooks but must return the original documents to the previous advisor in accordance with the Office of Research policy on Research Data. The previous advisor retains the right to publish any of this information. The student will not publish this data anywhere, except the thesis, without concurrence of the former preceptor.

B. Teaching Assistantships

Graduate students admitted to the Chemistry and Biochemistry Graduate Programs by the departmental Graduate Admissions Committee are offered a position as a Graduate Teaching Associate by the Vice Chair for Graduate Studies, with the assurance that all students who maintain good standing will receive support in the form of a Graduate Associate stipend for five years.

C. Graduate Admissions

Graduate program applicants are reviewed by the Graduate Admissions Committee (GAC). The Chair of the GAC will report to the VCG. The program does not require either Chemistry or Biochemistry Subject GRE. The department Chair will define the maximum number of standard international offers that can be made. Non-native speakers of English must, in general, have a minimum overall TOEFL score of 105 and a minimum score of 23 on the speaking section of the test. Direct admission of non-native English speakers is possible under special circumstances. A faculty member may petition the GAC, after obtaining permission from the department chair, to have non-native speakers of English accepted into the Department, and into their groups based on special needs in his/her research group. The admission of any additional students through this method will only be permitted if it does not result in an increase in the number of international offers above the maximum set by the chair. Once a direct admission to a research group has been granted, the particular student will need to be evaluated by the GAC. Only students whose academic performance and other criteria for admission fall within average or above those of typical students of the program will be granted admission. Faculty members who directly admit a student must guarantee support of the student as a Graduate Research Associate for at least one year. If the student chooses to switch to another group during this time or before he or she is English certified, the original advisor will still be financially responsible for the student, unless the new advisors agrees to support the student as a GRA. However, if a cost to the department is incurred in the form of a GTA or GAA appointment, the original advisor should make appropriate arrangements with the department chair for payment of the stipend and the tuition. All non-native graduate students who are not certified in English after two semesters in the program will not be supported by the Department as GTAs or GAAs.

D. Oral Examinations

All members of an oral examination committee must be present for an examination to be official. Non-members of the committee may attend an examination only with the approval of both the candidate and the Chair of the committee. If this permission to attend the examination is granted, non-members of the committee may not speak or ask questions of the candidate without permission from the committee Chair and may not be present when the committee is deliberating.

II. APPENDIX: Procedures and Priorities for Appointment of Teaching Associates

The Department of Chemistry and Biochemistry employs approximately 250 to 300 graduate and undergraduate students and a few non-students to assist in the instructional responsibilities of the Department. It is the purpose of this memorandum to describe the criteria used by the Vice Chair for Graduate Studies (VCG) to decide who will be employed in these positions.

Faculty must provide at least one-sixth (1/6) of the annual support of each GTA. Thus, one “year” of departmental TA support (a “TA slot”) amounts to 5/6 of the student’s annual stipend (plus benefits, tuition and fees).

A. Procedures

Each semester each member of the Chemistry and Biochemistry graduate faculty is asked to verify the Graduate Office records of those graduate students working in each group and asked to indicate whether they will be supported by fellowship, teaching associateship or research associateship during each term of the upcoming academic year. On the basis of this inquiry, a draft-teaching list is prepared and letters of appointment are drawn up for students who are to be supported by the Department.

Faculty must request TA support for graduate students by the deadlines set by the Graduate Studies Office of the semester for which the GTA service is to begin. In cases where an IGP student has an advisor in CBC, the request for a GTA position must be accompanied by evidence of English language certification. The student must also pass General Chemistry or Organic Chemistry proficiency exams. Typically GTA positions for IGP students whose advisor is not in CBC are not available.

B. Departmental GRA (dGRA) Awards

Coincident with the Graduate School rules on Semester, graduate students in the Department of Chemistry and Biochemistry are eligible for awards of a summer term *stipend* via a departmental Graduate Research Associate (dGRA) for every two semesters of satisfactory service as a Graduate Teaching Associate. These awards are granted to ensure that every graduate student in the department has the regular opportunity to devote full time to research leading to their graduate degree. dGRA stipends are the same as GTA stipends. The *stipend*, *tuition*, and *fees* are split (50:50) between the advisor and the department. Awards are conditional on good graduate standing, full-time enrollment (principally in Thesis Research), and resident attendance throughout the research semester. The dGRA support period is intended for educational activity only, and permission must be sought and granted by the VCG, for the student to be absent from the Department during that time.

C. Limits on Assignment of GTAs to Individual Faculty

Faculty must provide at least one-sixth (1/6) of the annual support of each TA. Thus, one “year” of departmental TA support (a “TA slot”) amounts to 5/6 of the student’s annual stipend (plus benefits, tuition and fees).

GTA allocation to research active faculty follows a “TA = RA + 2” formula. Thus, a faculty member supporting two (2) graduate students as GRAs may access up to four (2 + 2) TA slots, up to a maximum of 6 TA slots per faculty. Untenured assistant professors are not subject to this limit. Tenured faculty may recruit additional graduate students into their groups to the extent that they have other means of supporting them (e.g., via GRAs). In consideration of extraordinary teaching or service, this formula may be modified by the Chair, in consultation with the VCG and VCU.

D. Priorities for additional TA allocation

After allocating the base distribution of TAs to each faculty member, additional positions may be allocated based on the following priority schedule:

- 1st Students in the Department of Chemistry and Biochemistry Graduate Program
- 2nd Graduate Students Enrolled in Other Graduate Programs with Chemistry and Biochemistry Faculty Preceptors
- 3rd Undergraduate Student Instructional Aides (SIAs)

The duties of the SIAs are limited to ten hours per week, so two undergraduate Aides replace approximately one Graduate Teaching Associate.

The number of SIA positions funded each year may vary each year in order to balance the needs and obligations of the graduate teaching contributions. It would be unwise, however, to reduce the number to zero in any one year. A desirable number for program viability might be in the vicinity of 30–50 SIA positions in any one semester.

E. Non-Students and Other Casuals

Qualified and experienced applicants from the general community may be employed from time-to-time as casual teaching personnel. Their appointments are made as Instructional Assistants, with duties and stipend equivalent to a Graduate Teaching Associate. Instructional Assistant appointments are usually made on a semester-by-semester basis and do not carry tuition authorization or departmental GRA benefits.

III. APPENDIX: Rules for Searching for a Department Chair

The Chair will inform the faculty when 15 months remain in his/her term. At that time, the Chair will appoint a member of the Faculty Advisory Committee to call a meeting of the faculty to discuss the search for the next department Chair. The faculty will discuss the merits of an internal or external or a completely open search. The FAC will fashion a ballot after this meeting. The faculty will then vote their preference by anonymous mail ballot (double envelope-secret ballot) or electronic ballot. The results of the ballot will be reported to the Dean and to the faculty at large.

The Department will suggest to the Dean that he/she appoint the Faculty Advisory Committee to serve as the Search Committee for the new Chair. However, this committee should be expanded to include at least one assistant professor and, as non-voting members, two members of the permanent staff, and two graduate students. If the department Chair wishes to resign early (in the absence of a negative review), the department should be so informed at least 15 months before the contemplated resignation.

A. Internal Search

If the Dean agree to conduct an internal search for a department Chair, the following process will be followed.

The Dean will appoint a search committee and designate a Chair of that committee. That committee will develop a procedure, present it to the faculty for discussion, and amend it as necessary until ratified by the faculty.

As a guide, a sample procedure used in 1999 by the Department of Chemistry is provided:

Summary:

1. Eligibility is limited to full professors of the Department.
2. An initial (anonymous) ballot is taken to identify candidates with broad support among the faculty, including regional campuses
3. The search committee identifies which candidates have strong support based on numerical tally of the ballots; this list is made available, but not the number of preliminary votes
4. The Search committee meets with the candidates to determine their willingness to be considered for the position.
5. The committee develops methods to allow the nominees to address issues of concern to the faculty and staff
6. A ballot is taken to determine which candidate to recommend to the Dean; in the absence of a clear majority, an additional round of voting is carried out with the two top candidates from the previous round.

Notes:

The committee designed and implemented a balanced process to enable the candidates to share their views of the role of the Chair and their vision for the future with faculty and staff. In addition, the Chair of the search committee invited anonymous comments from the faculty to be conveyed to the prospective candidates. We found this was especially valuable in getting responses from the untenured junior faculty and others who are generally less vocal at public meetings. The Chair of the search committee compiled these comments and passed them on to the potential candidates for their consideration and for use as a framework for subsequent discussions with the faculty and staff.

(During the 1999 selection process, the candidates met with faculty and staff separately. The meeting with the faculty was moderated by the Chair of the search committee and the staff meeting was moderated by the department business manager.)

IV. APPENDIX: Rules regarding the Newman, Dow, Fox, and Kimberly Professorships and new professorships to be named.

The following rules for the naming of Chaired professorships will apply as the Dow, Fox, Kimberly, and Newman professorships are vacated by their current occupants. These four Chaired professorships are referred to below as departmental Chairs.

The funded term of each Chair is five years and can be renewed; however, consecutive terms cannot be served. The department Chair will announce vacancies in the Newman, Dow, Fox, and Kimberly Chairs as they develop and solicit votes from all eligible members of the faculty. All full professors and associate professors are eligible for election except those holding Chaired professorships which currently provide financial support. Faculty may also vote for an external candidate if they wish to use the named professorship to recruit a senior colleague to the University.

Confidential votes of the Chemistry and Biochemistry faculty will be counted and examined by a committee consisting of the current Chairs Advisory Committee (elected by the faculty). If one or more of the members of the committee are amongst the possible candidates based on the vote by the faculty, then the Chair will replace them with a member from the corresponding division. This committee will decide the next recipient of the Chair in question, based on the vote of the entire faculty, internal discussion, and comments from the department Chair.

Members of the faculty may not hold two funded departmental professorships simultaneously. Once the five year funded term of a professorship elapses, the holder is eligible for other departmental professorships.

V. APPENDIX: Safety Policies

A. Safety Enforcement

1. Introduction

The Chair, faculty and staff of the Department of Chemistry and Biochemistry recognize that we must comply with a variety of State and Federal mandates including those issued by the Environmental Protection Agency (EPA), the Occupational Health and Safety Administration (OSHA) and the State of Ohio (Administrative, Building, and Fire Codes). Each employee of the Department, therefore, has an obligation to understand and comply with applicable environmental, health and safety regulations as well as those policies established by the University, the Office of Environmental Health and Safety (EHS), the College of Arts and Sciences, and the Department of Chemistry and Biochemistry.

All faculty, emeritus faculty, staff, graduate students, visitors and guests must:

1. Promote a culture of safety.
2. Read the Building Emergency Action Plan (BEAP) specific to their work place (this may involve more than one building/plan). (<http://chemistry.osu.edu/safety/chp>)
3. Observe health and safety related signs, warning signals, and directions.
4. Complete appropriate health and safety training. (Department /EHS safety course or online course) (<http://chemistry.osu.edu/safety/safety> or <http://ehs.osu.edu/Training/Default.aspx>)
5. Follow all standard operating procedures (SOPs).
6. Warn coworkers about defective equipment or unsafe conditions and notify appropriate personnel.
7. Use personal protective equipment (PPE) and safety engineering equipment appropriate to their work.
8. Dispose of hazardous materials in an environmentally sound manner and in compliance with all applicable regulations.
9. Not remove hazardous materials from the department without permission from their supervisor.
10. Stop work that poses imminent danger to health and safety and notify appropriate personnel.
11. Participate in laboratory inspection and monitoring activities.
12. Report unsafe conditions to a supervisor or the Department Safety Committee.

All supervisors, Principal Investigators, and Managers are responsible for the safe operation of their laboratories or areas. They are required to:

13. Promote a culture of safety.
14. Designate a Laboratory Safety Officer for their research group.
15. Train employees to identify and mitigate potential hazards (specifically those hazards that are unique to their labs).
16. Review the OSHA Laboratory Standard and develop and implement a Chemical Hygiene Plan (CHP) through the EHS Online system (<http://ehs.osu.edu/ResBioSafety/ChemHP.aspx>)
17. Maintain and update a chemical inventory as required by the CHP and report DHS Appendix A chemicals to EHS every 30 days for Chemicals of Interest (<http://ehs.osu.edu/ChemSecurity/cfat.aspx>).
18. Ensure that all chemical containers are properly labeled. To dispose of any unlabeled materials, refer to “Disposal Policy for Materials of Uncertain Composition” later in this document.
19. Develop and implement standard operating procedures and safe work practices as required by their CHP’s.
20. Analyze work procedures for hazard identification and then establish appropriate engineering controls, administrative controls, and PPE to eliminate or mitigate workplace hazards.
21. Ensure periodic self-assessment inspections to review and correct deficiencies.

- 22. Encourage prompt employee reporting of health and safety problems without fear of reprisal.
- 23. Stop any work that poses imminent danger.

The Chair of the Department Safety Committee should:

- 24. Promote a culture of safety.
- 25. Within the resources available, ensure that all environmental, health and safety obligations are fulfilled.
- 26. Communicate the importance of establishing a working environment that promotes the health and safety of all employees.

2. Inspections

The Chair, the Director of Operations, the Chemical Hygiene Officer (Safety Coordinator) and all members of the Safety Committee will have authority to:

- 27. Conduct random and/or periodic inspections anywhere within the Department to monitor compliance.
- 28. Issue verbal and written warnings based on above inspections. The written warnings will be addressed to the individual in violation of the policies, with copies to the individual's supervisor and the Safety Committee.
- 29. Stop or curtail any work or process that is immediately or imminently dangerous to life and health until the issue can be resolved.

Lab Supervisors or their LSO's are required to be available for inspections carried out by EHS. Lab Supervisors must make corrections to the EHS inspection violations within 15 days of notification. Violations of any fire safety inspection must also be corrected within 15 days of notification.

3. The Enforcement Mechanism

Violations of accepted policies may be discovered by casual observation, inspection by a member of the Department Safety Committee or Chemical Hygiene Officer (Safety Coordinator), inspection by State Fire Marshall or University Environmental Health and Safety Division, OSHA inspection or reported accident, or formal complaint. The attached table provides the type of measures that can be applied for a given violation. Under normal circumstances, a first incident will result in actions taken at the first level (top of table).

Increasing incentive levels may be reached by continuing noncompliance for a single violation. If the violation is egregious in nature, it is also possible to reach higher incentive levels for a single violation. The incentives listed for each level are options that may be applied individually or in combination to achieve compliance with safety requirements.

The Department of Chemistry and Biochemistry will not assess fines as an incentive for compliance. Furthermore, if penalties or charges for remedial services are applied by agencies outside of the Department or University, individual liability for direct costs and fines should not exceed \$1,000 for students and/or staff or \$5,000 for faculty members of the Department at the highest level of severity. Progressively lower limits should be applied for incidents of lesser severity. These limits of liability should be viewed as guidelines and do not imply a level of financial responsibility.

4. Table of Incentives for Compliance with Fire, Safety and Chemical Hygiene Plan Requirements.

Compliance Incentive Level	Students	Staff	Faculty
1 Laboratory Supervisor or CHO	Verbal Reprimand by Supervisor Document Incident	Verbal Reprimand by Supervisor Document Incident	Document Incident
2 Safety Committee	Written Reprimand Review Pertinent MSDS's and SOP's Safety Refresher Reduce Laboratory Privileges	Written Reprimand Review Pertinent MSDS's and SOP's Counseling Session for Employee and Supervisor Safety Refresher	Written Reprimand Review Pertinent MSDS's and SOP's Appear before Safety Committee
3 Chair	Remove Lab Privileges until Safety Course Successfully Repeated	Initiate Disciplinary Action through Office of Human Resources	Initiate Disciplinary Action Remove Dept. subsidies for Support Services
4 Chair's Faculty Advisory Committee	Removal of Departmental Subsidies for Tuition and Fees Removal of GTA or GRA Status Revoke Laboratory Privileges until re-instated by Chairman Postpone Graduation	Continue Disciplinary Actions through Office of Human Resources which may result in: -Unpaid Leave of Absence -Possible Reassignment -Reduction in Grade	Suspend ability to recruit students Reduce Lab Space Padlock lab until compliance met Notify OSURF/Granting Agencies of Non-compliance
5 OSU Administration	Request Dismissal hearing through the Graduate School Initiate Judicial Proceedings	Continue Disciplinary Action which may lead to Dismissal Initiate Judicial Proceedings	Initiate Proceedings under Faculty Rule 3335-5-04 which may lead to dismissal Initiate Judicial Proceedings

5. **Disposal Policy for Materials of Uncertain Composition (“Chemical Unknowns”)**

(<http://chemistry.osu.edu/files/page/3035/Chemical%20Unknowns%20Policy%20and%20Form.pdf>)

Disposal of hazardous waste is dangerous and expensive even when the contents of the waste are known. Fortunately, most of the chemical waste produced by the Department is identifiable. However, when the contents of a reagent bottle, reaction flask or gas cylinder are not known, the process of disposal is much more dangerous, expensive and difficult. Without mitigating information, all unknown materials have to be treated as if they were potentially lethal and hazardous. In all cases, chemical unknowns cannot be disposed of until a general profile of the unknown has been generated. Even then, the cost of disposal is a premium. Additionally, there is a constant threat of personal injury or death to the individuals required to handle these potentially dangerous materials.

The goal of the Department is to reduce the number of “unknowns” to as close to zero as possible by following the Chemical Hygiene Plan and the Hazard Communication protocols. Labeling all chemical containers; disposing of all old, outdated and questionable chemicals and samples; recycling unneeded chemical reagents; maintaining separate waste containers for different classes of chemical wastes; and keeping a running log of the amounts and quantities of all wastes placed into disposal containers will reduce the number of unknowns and should be considered standard laboratory practice. This policy details the procedures that should be followed when an “unknown” is discovered and a request for disposal is to be generated.

6. **Procedure**

It is the responsibility of the generator to identify each “unknown” sample as completely as possible before submitting it to the Safety Office. The generator is defined as the Principal Investigator (PI) or Laboratory Supervisor initiating the disposal request.

The three steps to be followed by the generator are:

1. Complete an UNKNOWN PROFILE FORM, available from the Safety Office.
2. Attach the sheet to the material being submitted for disposal.
3. Call the Safety Office at 679-1820 or 679-1820.

7. **Instructions for Completing the Unknown Profile Form**

1. Generator Knowledge.

If the Lab Supervisor has adequate knowledge of the material, then “Generator Knowledge” can be a substitute for analytical tests and can greatly simplify the process of dealing with the “unknown” sample. Provide a physical description to include the appearance, odor and quantity of the unknown; the source and/or history of the unknown; and, especially, a listing of potential elements for inorganic waste or compounds for organic waste, even if the percentages or absolute amounts are not known. The presence of specific hazard classes of chemicals should be indicated with a “Y” when known. If the presence of a material is

likely (but not certain), indicate with a “?”. When compounds or classes of compounds are known to be absent, a “N” should be placed in the appropriate blanks.

2. Analytical Tests

In the absence of generator knowledge, the results of screening tests should be provided by the Laboratory Supervisor to provide an indication of the major components present. Suggested screening tests include a determination of the pH and a general qualitative analysis. If radioactive contamination is suspected, the Office of Radiation Safety must be contacted to schedule an accurate test for Alpha and Beta emissions. Specific additional tests that will assist the Safety Office in disposing the materials are strongly recommended, but are at the discretion of the Laboratory Supervisor. Use of Departmental instrumentation to test unknowns in preparation for disposal will not be charged to the Laboratory Supervisor.

3. Signature

Each sample must be accompanied by a signature of the PI or Laboratory Supervisor or designated individual certifying the above information.

4. Notice

Individuals who dispose of hazardous wastes in an inappropriate manner will face disciplinary action as outlined in the Departmental Enforcement Policy.

VI. APPENDIX: Rules for Course Textbook Selection

The selection of textbooks used for courses taught in the Department of Chemistry and Biochemistry shall be made with due regard for the objectives of the course, the needs of students taking the course, and the recommended procedures of the University. For courses which are offered in multiple sections or which are within a sequence, efforts shall be made to accommodate the expectations of everyone teaching the related courses.

In those cases where an OSU faculty or staff member is an author or co-author of a textbook under consideration, it is important that they notify the relevant Vice Chair of the potential conflict of interest. For small enrollment classes, the Vice Chair may endorse a book selection or may appoint a faculty committee to review the selection of text. For large enrollment classes, the potential conflict is managed by appointment of a selection committee with the author/coauthor excluded from its membership.

Textbook selections for large enrollment course sequences will be made by a committee appointed by the Vice Chair for Undergraduate Studies after consultation with the faculty teaching these courses. A committee shall include, if possible, faculty who have taught the courses within recent semesters and faculty from the Regional Campuses. Experienced lecturers and Graduate Teaching Associates are eligible to serve on such a committee. The committee shall be responsible for screening all appropriate textbooks, soliciting recommendations from all faculty and lecturers, and recommending to the Vice Chair no less than two and no more than three books for the course sequence. The Vice Chair will then negotiate with the publishers to obtain the best possible price. The committee will then make a final recommendation that incorporates the potential cost to students for the text under consideration. The Vice Chair shall serve *ex officio* as a non-voting member of all selection committees.

VII. APPENDIX: Departmental Diversity Action Plan (last updated 2014-2015)

A. Introduction

The representation of women, African Americans, Hispanics and Native Americans among Ph.D. chemists and biochemists is far below their representation within the population as a whole. The goal of this plan is to correct these imbalances within the Department of Chemistry and Biochemistry or, in other words, make our department more diverse.¹

Not only is diversity a moral imperative, but it has been shown to increase overall organizational performance as a whole.^{2,3} Reports from two National Science Foundation workshops vigorously defend the position that greater levels of diversity can be achieved while maintaining high standards for excellence.^{4,5} Since workers with STEM (Science, Technology, Engineering, Mathematics) backgrounds tend to earn more than those with non-STEM education,⁶ increasing the representation of women and minorities in STEM fields is one way to correct long-standing inequities in our society. With this background, the OSU Chemistry and Biochemistry (CBC) Diversity Committee has developed a plan specific to our department with an emphasis on the aforementioned goal.

1. Current Status of Department

The current status of the department and our progress since 2008 with regard to gender and ethnic distribution of faculty and graduate students is summarized in Table 1. The representation of women and minorities in our faculty and graduate student population is far below the population as a whole, indicating that continued efforts toward diversity are needed. The data in Table 1 do exhibit signs of recent progress. In April of 2014, C&E News reported that in the 2012-2013 academic year, women held 18% of faculty positions at the top 50 research universities. In that year, women held 25% of faculty positions in CBC at Ohio State, where that number now stands. As noted in the C&E News article, this put Ohio State at the top of the nation with regard to number of female faculty, and 6th among the top 50 departments in terms of percent women. With respect to underrepresented minority (URM) faculty, until recently OSU Chemistry and Biochemistry had one Hispanic and no African American faculty members. In the past year, one African-American, one African and one Hispanic assistant professor have joined the faculty.

The fraction of female graduate students has not changed since 2008, comprising roughly 30% of domestic students and 36% of the overall population. Also, the number of Hispanic students has not improved since 2008. The fractions of African-American domestic students and African international students have risen dramatically, but the numbers are so small it is difficult to declare this is a trend and certainly remains an area in which improvement is needed.

In summary, recent data show that our faculty and student populations lack sufficient diversity, but progress is possible with continued efforts.

Table 1: Gender and Ethnicity of Chemistry and Biochemistry Faculty and Graduate Students (2008-2014)

Category	year	Men		Women		Black		Hispanic		Native American		total number
		number	%	number	%	number	%	number	%	number	%	
Faculty (>50%)*	2008	30	85.7	5	14.3	0	0.0	1	2.9	1	2.9	35
	2012	36	80.0	9	20.0	0	0.0	1	2.2	1	2.2	45
	2014	33	75.0	11	25.0	2	4.5	2	4.5	0	0.0	44
Faculty (<50%)**	2008	4	80.0	1	20.0	0	0.0	0	0.0	0	0.0	5
	2012	7	87.5	1	12.5	0	0.0	0	0.0	0	0.0	8
	2014	3	75.0	1	25.0	0	0.0	1	25.0	0	0.0	4
Faculty (Regional)	2008	4	66.7	2	33.3	0	0.0	2	33.3	0	0.0	6
	2012	2	66.7	1	33.3	0	0.0	1	33.3	0	0.0	3
	2014	3	60.0	2	40.0	0	0.0	1	20.0	0	0.0	5
Faculty (Total)	2008	38	82.6	8	17.4	0	0.0	3	6.5	1	2.2	46
	2012	45	80.4	11	19.6	0	0.0	2	3.6	1	1.8	56
	2014	39	73.6	14	26.4	2	3.8	4	7.5	0	0.0	53
Students (domestic)	2008	87	69.6	38	30.4	4	3.2	3	2.4	1	0.8	125
	2014	112	70.9	46	29.1	8	5.1	3	1.9	1	0.6	158
Students (international)	2008	54	56.3	42	43.8	2	2.1	1	1.0	0	0.0	96
	2014	81	55.9	64	44.1	10	6.9	1	0.7	0	0.0	145
Students (total)	2008	141	63.8	80	36.2	6	2.7	4	1.8	1	0.5	221
	2014	193	63.7	110	36.3	18	5.9	4	1.3	1	0.3	303

* 50% or greater appointment in Chemistry and Biochemistry

** Less than 50% appointment in Chemistry and Biochemistry

The Applicant Pool

Much has been written about the significant drop in the percentage of women and underrepresented minority individuals at each step of the progression from Ph.D. to postdoc to faculty applicant. The committee believes that this is one reason for the current inequities in gender and ethnic distribution on the faculty. Thus, the focal point of most of this plan will be initiatives for increasing the fraction of women and underrepresented minorities (URMs) in our applicant pool. Several strategies will be adopted: (1) increase the number of women/URMs interested in faculty positions who apply to in our department by making our commitment to diversity apparent, (2) identify promising female/URM scientists early in their careers and encourage them to join our faculty, (3) promote a welcoming environment and mentor students and faculty from underrepresented groups to boost retention and insure success, and (4) encourage our own female students to pursue academic careers. Specific steps are recommended in this document.

B. Recognition of Bias

A second factor that can influence gender and ethnic inequities is bias. It is important to recognize

that we all have biases in regard to one segment of the population or another. Biases cannot be allowed to detrimentally affect our attempts to diversify the department, and should be detected and countered when possible. We must do this as individuals and collectively. The committee suggests that all faculty read about this issue in the NSF workshop reports with an eye on how the suggestions contained therein (and their own ideas) can be used positively as we try to diversify our faculty.^{4,5}

Specific recommendations are given below to raise awareness of inherent bias.

C. Faculty Distribution: Addressing Gender, Racial and Ethnic Inequities

Goals: By the end of 2016 increase the number of women and URM faculty in the Chemistry and Biochemistry Department at the Columbus campus by attracting a diverse pool of applicants, with the goal of including women as 50% of new hires in the department and adding at least one more URM faculty member. The more the better.

The importance of increasing diversity of our faculty – new hires and retaining current faculty – cannot be overstated. With regard to gender equity, a 2006 National Academy of Sciences study suggests that “if the number of women in a department grows to about 20%, a social tipping point occurs and women start to perceive their common interests and join together to press for improvements in policies relevant to their needs”⁷. We have achieved that level with respect to gender distribution, but we are still lagging with respect to racial and ethnic distribution. We expect that if we achieve a “critical mass” in all faculty distribution diversity measures, improvements in other areas (recruitment of women and minority graduate students, work environment being conducive to success, and overcoming biases of which we may be unaware) will follow. The assistant professor hires will begin to address the aforementioned “pipeline” problem.

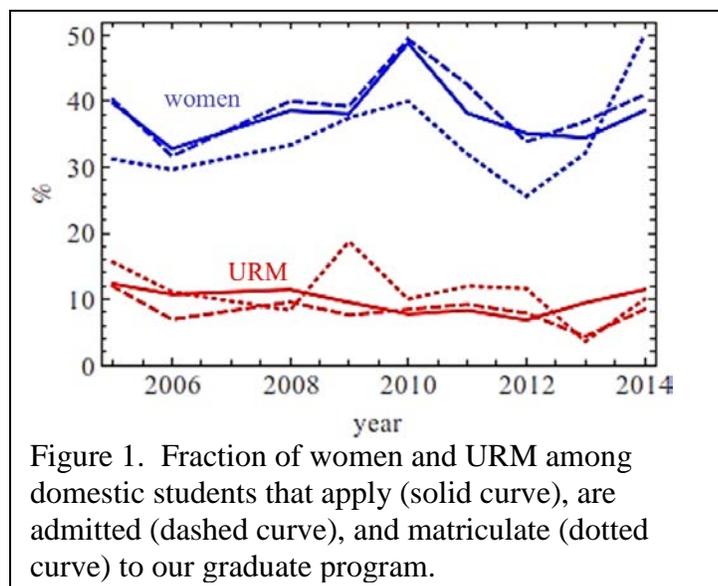
To achieve the diversity goals stated above, the following steps are recommended.

1. When a position is advertised, each committee will be charged with writing to prominent faculty members at top-50 research universities and soliciting applications and *nominations* of candidates with a focus on women (and URMs—see below). We will also solicit nominations from graduates of our program.
2. Search available databases for female and URM job candidates. When a faculty position opens, send an announcement of the position and a statement of our commitment to diversity to academic job seekers with chemistry and biochemistry backgrounds. For the purpose of getting the word out to the right community, we can cast a wide net here and let potential applicants decide if they have the required background or whether to encourage one of their colleagues to apply. Relevant databases include Future Faculty Database⁸, CIC Doctoral Directory⁹, Faculty for the Future¹⁰, Ford Foundation Fellows¹¹, National Registry of Diverse and Strategic Faculty¹², SREB Compact for Faculty Diversity¹³, Minority Faculty Applicant Database¹⁴, and Minority Postdoc Diverse Scholar Directory¹⁵. Use of most of these resources is free. The ASC Recruitment and Diversity Services has purchased subscriptions to some of the ones that are not free. Most will allow free posting of open job positions. We will also advertise new positions in the emails regularly sent out by the national NOBCChE organization.

3. We will develop lists of women and URM who have been awarded prestigious graduate and postdoctoral fellowships (NIH, NSF and others) and will contact them regarding career opportunities at OSU. Department staff will be assigned to provide support for this initiative.
4. We will use faculty as “talent scouts” at meetings (ACS, SACNAS, NOBCCHE, ABRCMS) for potential junior and senior faculty applicants.
5. We will include women and URM on search committees when feasible. We will continue our practice of having a diversity advocate appointed to each search committee. The duties of the advocate will include monitoring the search to make sure it begins with a diverse pool of applicants, calling into question whether or not the search should proceed if the application pool is not sufficiently diverse and ensuring that applications are considered without a gender or racial bias.
6. Later in this document we suggest ways to make our department more welcoming and supportive to underrepresented groups at all levels, from undergraduates to faculty. Genuine efforts in this direction will give us an advantage in recruiting women and URM who may have other competing offers. Studies indicate these groups tend to place higher value on the societal value of their professional activity.^{16,17}

D. Graduate Student Distribution: Gender, Racial and Ethnic Inequities

Goals: By 2016, to (1) increase the number of women in our graduate program to 40% (with an emphasis on domestic students), (2) increase the number of URM in our graduate program to 10% and (3) achieve equal PhD graduate percentages across all sectors of our graduate student population (gender, race and ethnicity).



These are the same goals put forward in our 2008 diversity plan with an achievement date of 2013, and reaffirmed in every plan since then. As shown in Table 1, we have made no progress increasing the fraction of female graduate students. We have achieved about one-third of our goal of increasing the number of URM students. From 2008 to 2014, the total Black/Hispanic/Native American representation in our domestic grad student cohort increased from 6.4% to 7.6%. However, the numbers are so small it is difficult to claim any real progress.

To reach the goals stated above, we must consider the recruitment and retention of female and URM students. Specific recommendations regarding

recruitment are listed below. It is also hoped that our improving faculty diversity will soon translate to better recruitment of female and URM students.

In Figure 1, the fraction of female and URM graduate students that apply to, are admitted, and accept our offers are given for the years 2005-2014. Our department has admitted and recruited female and URM students in numbers roughly proportional to their fraction of the applicant pool. The group of entering students during the period 2005-2012 is 33% female and 11% URM. Comparing these numbers with those of Table 1, which indicate the % of female graduate students among current the

graduate student population as a whole, we conclude that attrition of female students is comparable to the attrition rate observed for the entire graduate population. However, attrition of URM students appears to be somewhat higher. Given the small samples and the fact that 2013 and 2014 were atypical for both groups, we do not wish to push the data further than warranted, other to suggest that there is room to improve the diversity of our graduate student population by intensifying retention efforts.

A number of other activities that should help with URM student recruitment and retention are recommended below:

1. Cultivate relationships with URM graduates of our department. Maintain regular contact with these individuals, be they in academia or industry, and encourage them to send students to our program. This is an ongoing activity that needs to be formally maintained.
2. Send current URM students to their home institutions to recruit. Send faculty-student recruiting teams to these institutions. Send current URM students and faculty as “talent scouts” to meetings (ACS, SACNAS, NOBCChE, ABRCMS) to search for potential URM graduate students.
3. Establish partnerships with universities with high URM enrollments. We should have a goal of establishing “partnerships” with at least one university with high African-American, Hispanic American and Native American enrollments (each) by the end of 2016.¹⁸ We should invite students and faculty from these institutions to present seminars at OSU. We should make arrangements such that faculty from these partner institutions can use instrumentation at OSU of value to their research programs and students. Such use of instrumentation can be local or can be via cyber-enabling our cutting-edge equipment. The department should create incentives for faculty that encourage them to establish the aforementioned partnerships.
4. Continue the initiative of providing a first-semester fellowship to all entering URM graduate students. This initiative would not only help recruiting efforts, but might contribute to the goal of improving female and URM retention.
5. Strong mentoring of URM students, as implemented by the Vice-Chair for Graduate Studies. The department has implemented this step beginning 2011. From that point until the present, only one URM student has left the program without a Ph.D.
6. Offer incentives for our faculty to spend a semester teaching at the nation’s top HBCUs. This has been a strategy used by a few other institutions to attract high quality URM graduate students.
7. One of the problems encountered by URM is the lack of a peer group with which to study and interact. In this regard the department should support our local student affiliate of the National Organization of Black Chemists and Chemical Engineers (NOBCChE). The department should encourage this organization to serve as the focal point for developing mentor programs for incoming URM students. We recommend that advisors of URM students be required to develop a mentoring plan with the student, and discuss the plan with the Graduate Studies Office. Faculty serving as advisors to URM should be encouraged to obtain support for these students on supplemental fellowships (NSF, NIH, DOE) whenever possible.

E. Undergraduate Diversity Initiatives

Diversification of the undergraduate student body is a constant effort by the Undergraduate Admissions effort of the University. While faculty and staff can be involved in aiding in the effective recruitment of gender and URM diversified undergraduate students, the department is limited in our efforts for this population. However, scholarship monies can be used to ensure that our qualified gender and URM Chemistry and Biochemistry majors are successful in their undergraduate endeavors. Faculty and staff can be heavily involved in the successful recruitment of prospective undergraduate majors. Also, collaborations with universities and community colleges

in Ohio, including Columbus State, provide an opportunity to recruit gender and URM populations to OSU. Collaborations with high school teachers with URM representation (research experiences for teachers, RET, or summer internship efforts) can be effective in bringing attention to URM students about being at the University.

These are specific recommendations for enhancing undergraduate diversity.

1. Participate in, or initiate STEM exploration programs to attract underrepresented groups to STEM majors in general, and chemistry and biochemistry in particular. These may include programs modeled after Bio Sci Day, which introduces the major to high school seniors who have been admitted to Ohio State.
2. Advertising our major in campus publications and on campus busses.
3. Make undergraduates aware of organizations like NOBCCChE. (See following section.)
4. Explore a “Bridge to Baccalaureate” program with institutions like Columbus State Community College (CSCC) as a means to attract underrepresented groups to STEM careers.
5. Continue efforts to inform all undergraduates of summer research opportunities, and underrepresented students about REU and SROP opportunities.

F. A welcoming and inclusive environment

No one is free of bias. However, information and awareness can help promote a culture of inclusiveness in the work place and in classes. We recommend the following measures, which will raise diversity issues more frequently in the department. The goal is to make inclusive behavior second nature by reminding faculty, staff and students of expectations and goals at regular intervals.

1. Set aside a portion of a faculty meeting each year in early autumn for diversity training. The content should be varied from year to year. The training may consist of a presentation about inherent bias by University or ASC experts in the field. Alternatively, through live, interactive theater OSU’s InterACT program¹⁹ can raise awareness of several issues relating to diversity. The early autumn time frame is chosen because that is the start of the season for faculty searches. Attendance should be mandatory.
2. Currently we require that all syllabi include information about disability accommodations and services. The department should further require a statement of a zero-tolerance policy toward hateful speech and actions on the basis of race, gender, religion, sexual orientation, or national origin. This may appear as part of the syllabus, or in a prominent location on the main page of the course Carmen page, and designated as required reading. Students, TAs and faculty should be informed that incidents should be reports to the University’s Bias Assessment and Response Team (BART, <http://studentaffairs.osu.edu/bias/>). The “national origin” part is included because some of our international grad students feel unfairly treated by students and faculty.
3. Continuing in the vein of the previous item but on a positive side, syllabi or Carmen sites should make students aware they can participate in various stem organizations (see <http://artsandsciences.osu.edu/stem-organizations>), specifically mentioning NOBCCChE for Black and Hispanic students, oSTEM for LGBT students, AWIS and WIMS for women in science.
4. Information similar to items (1-3) should be provided to all entering graduate students.
5. Staff should receive diversity training similar to item (1).

6. The department should have a link for diversity efforts on the main page. It should be in a place where it can be found by all prospective students and faculty. (The Purdue chemistry department, which has been very successful in their diversity efforts, has a link to diversity in their “about us” pull-down menu.) This link and, of course, the value of the information it provides, will show prospective students that we value diversity, and remind us of its importance. The link should lead a visitor to a statement by our chairperson about our commitment to diversity, the diversity plan, and relevant student organizations such as NOBCChE.

G. Staff Diversity Initiatives

Goals: To improve the current gender distribution in the areas of Teaching Staff and Shop Staff. To increase the percentage of URM occupying staff positions in the department.

Table 2 indicates that whereas hiring of women seems equitable, the number of URM on the staff is low, both with respect to the entire university and the US population.

Table 2: Gender and Ethnicity of Chemistry and Biochemistry Staff (December 2014)

Category	number	FTE	men	women	Black	Hispanic	Native American
Instructional staff, non-tenure track faculty	32	21	21	11	1	2	0
Unclassified (Instructional lab supervisor, program assistant, instrument maker, human resources associate, ...)	48	46	24	24	2	2	0
Classified civil service	24	23	7	17	4	1	0
Total	104	90	52	52	7	5	0

The department will take the following steps to achieve the goals. We will include at least one woman on every staff search. We will assign a diversity advocate to each staff search when feasible. The duties of the advocate will include monitoring the search to make sure it begins with a diverse pool of applicants, calling into question whether or not the search should proceed if the application pool is not sufficiently diverse, and making sure that applications are considered without a gender bias.

H. Support for Diversity Initiatives

Efforts to increase diversity of the faculty and graduate student body must be a high priority item for the department. There are several ways in which the department can support the aforementioned initiatives: (1) Staff support must be provided to keep track of ongoing initiatives and to help with searches (such as identifying and contacting women and URM fellowship awardees). This support should not be diffuse. It should be in the hands of one individual assigned to work with the Chair of the Diversity Committee. (2) Funds should be allocated for the aforementioned student and faculty travel, for “matching” programs that might accompany establishing partnerships, and for seminars associated with pursuing targets of opportunity and establishing long-term relationships with potential students or faculty members.

I. Assessment and Implementation

The key to the success of this diversity plan lies in its effective implementation and the collective efforts of individuals toward promoting its success. To this end we propose that each year, near the end of the summer, the Diversity Committee should assess progress toward the aforementioned goals and prepare a “diversity calendar” listing steps needed to implement the recommendations of this plan in the coming academic year. The timing is chosen to be shortly before the start of faculty searches, graduate student recruiting, and the start of autumn semester classes. The Diversity Committee will meet with the department chair and vice-chairs to review progress toward the diversity goals, and discuss implementation of the diversity plan in the coming year. Progress toward diversity goals will also be reported at faculty meetings.

J. References

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17. “Biomedical Science Ph.D. Career Interest Patterns by Race/Ethnicity and Gender”, Kenneth D. Gibbs Jr., John McGready, Jessica C. Bennett, Kimberly Griffin, *PLoS ONE* 9(12): e114736.
18. Here are two examples of how this might work. (1) Jim Coe served as PhD thesis advisor to Kenneth Rodriguez. Dr. Rodriguez is now teaching at California State-Dominguez Hills. Our department is now establishing a partnership with CSDH (and their NIH- sponsored USTAR program) that involves supporting at least two undergraduate students in summer research at OSU. Largely because of efforts of Jim and Ken, we now have another graduate student from CSDH in our program. (2) Kaarina Lokko was a graduate student with George Wang. Kaarina received her BS from Oakwood University (an HBCU) and was a GK-12 (program under for which Susan Olesik serves as PI). Susan set up a collaboration with Oakwood that would funded one of their faculty members to do undergraduate research with the OSU Nanoscience and Engineering Center (NSEC). Hopefully initiatives of this type will increase the number of URM applicants to our department.
19. <http://ucats.osu.edu/InterACT>

VIII APPENDIX: Research Support Services

A. Departmental Support of Instrumentation through the Research Support Services

The Department of Chemistry and Biochemistry teaching and research missions are supported by several core facilities – the Research Support Services (RSS). The mission of the RSS is to provide management and maintenance of departmental shared instrumentation and production facilities to support excellence in the teaching, research and service missions of the Department of Chemistry and Biochemistry. These facilities are available to all departmental researchers – graduate students, post-docs, research associates, and undergraduate chemistry majors. Examples of services available include surface analysis by XPS, AFM, SEM; nuclear magnetic resonance; mass spectrometry; Raman spectroscopy; femtosecond laser spectroscopy; high-precision machining; electronic diagnostics and design; scientific glassblowing; X-ray crystallography; and various other techniques.

1. **Function of RSS Supported Laboratories** - RSS Spectroscopic laboratories support shared departmental instrumentation purchased for the department through shared instrument grants or internal (state or university) funding.
 - a. **Criteria for RSS inclusion (Section VIII.B):** The instrumentation supported are placed in shared departmental space and overseen by department staff.
 - b. **Management:** The RSS staff scientists (Senior Research Associates or similar) are the administrators and managers of the instrumentation in the RSS facility assigned. They are the primary source of expertise in the maintenance of scientific equipment and in the operation of the instruments they supervise. Graduate Teaching Assistant appointments for support of management must be approved by the RSS Director and Chair if the need arises.
 - c. **Maintenance and Repair:** The RSS facility manager provides routine instrument calibrations, maintenance, and needed repairs to retain high-quality data on shared equipment. The continuity of these services is essential for avoiding extended down-times and costly repairs. The use of Production Shops in lieu of service contracts for repairs and designs when appropriate is recommended due to cost savings.
 - d. **Training and Research Collaboration:** In a multi-user environment, the RSS facility manager provides quality control of proper procedures for best data output while at the same time training the users for operation without damaging delicate components. The manager can provide general or advanced mentoring in experiment design, sample preparation, sample handling, data acquisition, data reduction, and data interpretation. The ability to discuss the application of the instrument to new problems is essential for prospective clients who may have no prior experience with the instrument and its capabilities.
 - e. **Educational tool:** The multi-user instrumentation is available primarily to researchers as hands-on experiences to enhance the educational exposure to instrument methods and development. In cases in which sample preparation, instrument operation, data collection and/or data interpretation are complicated and require extensive experience and knowledge, the manager may be the primary operator. Full data analysis service is generally not provided unless special arrangements are made with the RSS manager and director.

- f. Prioritization of usage: Policies for usage per instrument are determined by the RSS manager for damage avoidance, continuity of instrument quality, and fairness of access to each instrument.
2. **Function of RSS Supported Production Shops** - RSS production facilities provide design, fabrication, modification, repair and maintenance of the Department's instrumentation and glassware for local access to detailed machining, scientific instrument design, electronic repair, and scientific glassblowing.
 - a. Maintenance and repair: The RSS facilities provide the first response in maintenance and needed repairs for all instrumentation and glassware in the department. The physical proximity with iterative process requirements provide continuity of maintenance essential for avoiding extended down-times and costly repairs. The use of Production Shops in lieu of service contracts for repairs and designs when appropriate can save funds.
 - b. Collaborative design and production: The RSS facilities may provide custom fabrication in collaboration with research groups. These services may involve blue prints, sketches, or custom design ideas requiring substantial artistic and technical creativity.
 - c. Training: In some cases the customer may be trained to utilize the available facilities.
 - d. Prioritization of services: The Department customers maintain priority in completion of work. The RSS manager determines the best efficiency models which provide the best quality of work in the most reasonable time.
 - e. Management: Production Shop Manager (Instrument Maker, Research Associate). These staff members are experts in the skills necessary for instrument design and repair including machining, glass blowing, or electronics. They are leaders in their areas of expertise, train and share their knowledge and skills with facility users while providing proactive, timely, and responsive services.
 3. **Note on Non-RSS Departmental Instrument Management**
 - a. If instrumentation is purchased by the department in the past as a shared instrument with the intention of the department paying for all costs, all repairs and maintenance will be paid for by the department. Prior approval by the Chair is required for inclusion in this support.
 - b. Other shared: Instruments that are cost shared between two or more groups that do not meet criteria or not approved by the Chair for inclusion in RSS management should have arrangements for cost recovery of repairs, replacement among the users. The Production Shops are available for these repairs. Detailed logs of usage and issues should be maintained by these groups.
 4. **Budget Model for Cost Recovery of in Earning Units:** The RSS facilities, earnings units, adhere to the policies of OMB Circular 21 (http://www.whitehouse.gov/omb/circulars_a021_2004) and of the University (http://www.rpia.ohio-state.edu/efb/docs/Guidelines_for_Earnings_ops.pdf) as well as University Purchasing policies.
 - a. Facility Rates – Cost recovery processes for all facilities as listed below; lowest rate possible; competitive with other institutions; and compatible with grant funds available. All rates are approved annually by the departmental faculty. All budget costs and revenues are reviewed annually.

- i. Rate Calculation: Facility rates (as charged to all federal grants) are calculated based on the indirect costs incurred by the facilities divided by the number of hours used or billable hours.
 1. Indirect costs include routine maintenance, parts, repair, office supplies, graduate assistant salary and benefit, manager continuing education and one conference per year. Costs do not include direct costs passed onto the customer (parts for work).
 2. The hours of usage are complete available hours, but are averaged over the past three years to reflect the actual usage of the equipment.
 3. Billable labor hours are determined by the average of three years of actual billed labor hours.
 - ii. RSS Manager salary recovery
 1. The salary and benefits of the RSS Managers are included in the departmental general funds as available.
 - a. These salaries are not calculated as part of the rate in the case of the spectroscopic facilities; ie the salaries are not calculated as part of the cost of the facility.
 - b. Due to the labor services provided by the production shops a percentage of the salaries may be included as a cost and recovered by the rates of the facility.
 2. The department may transfer excess earnings units funds of the facility to reimburse the general funds of the salary and benefits.
 3. The RSS Managers are 100% FTE appointments. However, the RSS Manager may have a joint appointment as Research Scientist or Post-Doc under the advisement of a faculty member or university center. These arrangements will be in case there are not funds available for a staff position.
- b. Department does not use general funds to cover expenses of RSS Facility unless necessary and approved by the Chair.
- c. General billing guidelines
- i. The university requires approvals for all transactions for these earnings units. The production shops are utilizing eRequest for all projects. The spectroscopy shops are utilizing the OSU-customized facility online manager (FOM) for this purpose.
 - ii. Co-authors of departmental instrumentation grants can be subsidized up to 50% of the usage rate for that instrument. The Chair will determine the total amount of the subsidy as a percentage of the amount of the grant and will determine the allocation between the co-authors. Each subsidy will last for the period of the grant or until the allocation for the co-author is expended, whichever comes first.
 - iii. The user of the RSS facility must provide correct and valid accounting information for billing. When incorrect or invalid accounting information is provided, the requestor may be charged \$50.00 for the monthly billing cycle to cover the costs of determining the valid, correct accounting information and re-submitting the billing information to the Chemistry and Biochemistry Accounting.

B. Criteria for Departmental Instrumentation Acquisition

The Department may agree to support shared instrumentation through the Research Support Services which meet the majority of the following criteria.

- a. **Customer Base: At least five research groups, primarily within the Department, should be committed to using an instrument on a regular basis for an instrument to be considered a Departmentally Supported Instrument.** Several federal agencies have determined that at least **five** research groups are required to meet the definition of a shared usage instrument. When the number of groups reaches or exceeds five, an instrument is managed more reliably by an individual external to the user groups as a number of practical issues need to be resolved such as priority scheduling and maintenance.
- b. **Costs of Purchase and Operation -Instruments included may have an initial cost above \$250,000:** The cost of an instrument should not be a sole criterion for inclusion as a RSS supported instrument. However, federal granting agencies consider that an instrument with an initial cost of less than \$100,000 can be readily available via the normal research grant process. Instruments with costs above \$250,000 are not as readily available without considerable justification under a multi-user environment.
- c. **Costs of Operation and Maintenance - There must be a business plan based on costs and projected usage to recover costs as per general departmental policy before an instrument can be acquired as a Departmentally Supported Instrument.** Requests for funding also typically include the stipulation that continuing support of the instrument will be provided by local resources. Instruments acquired without grant funding will require local funds for both purchase and operating costs. The cost of maintaining the instrument will frequently eclipse the initial cost to acquire that instrument. There has to be an acceptance of the users' responsibility to share the costs of the facility's daily operation, maintenance, management, and upgrades through hourly or sample fees.
- d. **Supervision and Expertise - Instruments which require supervision of the instrument's operation and training of users should be considered for inclusion as a Departmentally Supported Instrument.** Supervision of users, initial and on-going training, continuous monitoring of instrument performance, and scheduling and completion of preventive maintenance can drastically decrease the annual costs of an instrument and dramatically increase to useful lifetime of the instrument. With regard to multi-user instruments, it is not reasonable to expect that a principal investigator should reduce the research output of his/her research group to provide support for all of the users. Department experience has shown that unsupervised usage results in high incidences of instrument failures and subsequent down-time of the instrument for all users.
- e. **Meets specification and functional.** The instrument must be functional before it can be accepted by the Department. Final payment on new instruments is contingent on passing final acceptance testing for the instrument. A similar criterion should be applied to used equipment. The Department of Chemistry and Biochemistry should require under normal circumstances that all repairs on used equipment be completed prior to transfer to the Department.
- f. **Written management agreement.** All instruments should be accepted on a provisional basis. A memo of understanding (MOU) should be prepared and signed by all parties concerned which states the terms of acceptance. These terms should include the ability of the

RSS to provide adequate training, maintenance and access for the instrument; the ability of the users to provide adequate usage for the instrument to meet the proposed business plan, and the ability of the manufacturer to continue to supply adequate technical and material support to keep the instrument operational. The MOU and business plan should be reviewed periodically.

- g. **Meet infrastructure requirements.** - A RSS staff scientist (Senior Research Associate or similar), or a new hire, should be designated as the Manager before an instrument is accepted. Those acquiring potential RSS instruments must recognize that qualifications of the RSS Manager will require significant salaries to attract suitable individuals. There must be physical space available in an RSS facility to house the instrument, preferably contiguous to existing RSS instrument space. The details of supplying power, cooling, cryogenes and gases need to be agreed to prior to acceptance. In the case of new instrumentation, it is best practice for the designated manager to be involved early in the proposal preparation.