MEMO
30 April 2008

To: Dr. Susan Henrichs, Provost

Through: Dr. Joan Braddock, Dean, CNSM

From: Dr. John Craven
Chair and Professor, Physics Department

Subject: Outcomes Assessment for the Physics Department Programs in 2007

An annual outcomes assessment report is submitted herein for the Physics Department. Per instructions, there is a one-page report for each of the four undergraduate and seven graduate degree programs. Faculty reports for the undergraduate and graduate programs are attached, as are copies of each underlying assessment plan.

By way of a roadmap, the order of materials is as follows:
- One-page reports for the undergraduate programs
- One-page reports for the graduate programs
- Physics faculty report for the undergraduate programs
- Physics faculty report for the graduate programs
- Assessment plans for the undergraduate programs
- Assessment plans for the graduate programs.
ANNUAL OUTCOMES ASSESSMENT REPORT FOR PROGRAMS IN 2007

UAF PHYSICS DEPARTMENT

UNDERGRADUATE DEGREE PROGRAM:

____ BS, PHYSICS
X BA, PHYSICS
____ BS, APPLIED PHYSICS
____ BS, GENERAL SCIENCE

SUBMISSION DATE: 30 April 2008    BY: Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2005.

Outcomes assessment data collected this year:
There were no graduates from this program in 2007.
There were two graduates in 2002 and five-year exit questionnaires were received.

Outcomes assessment data planned for collection next year:
Exit questionnaires at graduation and five-year post graduation questionnaires.
A direct measure of student leaning has yet to be devised and approved by the faculty.

Faculty committee review of assessment data in this year:
Yes, and a copy is attached.

Changes in curriculum made this year:
The revised physics curriculum changes made two years ago are now fully implemented.

Budget implications from assessment:
None
ANNUAL OUTCOMES ASSESSMENT REPORT FOR PROGRAMS IN 2007

UAF PHYSICS DEPARTMENT

UNDERGRADUATE DEGREE PROGRAM:

_____ BS, PHYSICS
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Faculty committee review of any assessment data in this year:
No

Changes in curriculum made this year:
The revised physics curriculum changes made two years ago are now fully implemented.

Budget implications from assessment:
None
ANNUAL OUTCOMES ASSESSMENT REPORT FOR PROGRAMS IN 2007

UAF PHYSICS DEPARTMENT

UNDERGRADUATE DEGREE PROGRAM:

- BS, PHYSICS
- BA, PHYSICS
- BS, APPLIED PHYSICS
- X BS, GENERAL SCIENCE

SUBMISSION DATE: 30 April 2008      BY: Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2005.

Outcomes assessment data collected this year:
There was one graduate in 2007 and an exit questionnaire was received.
The graduate from five years ago could not be located.

Outcomes assessment data planned for collection next year:
Exit questionnaires at graduation and five-year post graduation questionnaires.
A direct measure of student learning has yet to be devised and approved by the faculty.

Faculty committee review of any assessment data in this year:
Yes, and a copy is attached.

Changes in curriculum made this year:
The revised physics curriculum changes made two years ago are now fully implemented.

Budget implications from assessment:
None
ANNUAL OUTCOMES ASSESSMENT REPORT FOR PROGRAMS IN 2007

UAF PHYSICS DEPARTMENT

UNDERGRADUATE DEGREE PROGRAM:

X BS, PHYSICS
BA, PHYSICS
BS, APPLIED PHYSICS
BS, GENERAL SCIENCE

SUBMISSION DATE: 30 April 2008    BY: Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2005.

Outcomes assessment data collected this year:
An exit questionnaire was received from the single student who graduated in 2007.
There were no graduates in 2002 so no five-year post graduation questionnaires were received.

Outcomes assessment data planned for collection next year:
Exit questionnaires at graduation and five-year post graduation questionnaires.
A direct measure of student leaning has yet to be devised and approved by the faculty.

Faculty committee reviewed any assessment data in this year:
Yes, and a copy is attached.

Changes in curriculum made this year:
The revised physics curriculum changes made two years ago are now fully implemented.

Budget implications from assessment:
None
ANNUAL OUTCOMES ASSESSMENT REPORT FOR PROGRAMS IN 2007

UAF PHYSICS DEPARTMENT

GRADUATE DEGREE PROGRAM:

- MS, PHYSICS
- MS, SPACE PHYSICS
- MS, COMPUTATIONAL PHYSICS
- MS, GENERAL SCIENCE
- PhD, PHYSICS
- PhD, SPACE PHYSICS

SUBMISSION DATE: 30 April 2008        BY: Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2004.

Outcomes assessment data collected this year:
There were no graduates in 2007.
There were no graduates in 2002.
Assessment files were updated as new information was submitted.

Outcomes assessment data planned for collection next year:
Exit questionnaires at graduation and five-year survey questionnaires.
Continued assembly and evaluation of assessment files by the review committee, as per the assessment plan.

Faculty committee formal review of any assessment data in this year:
No

Changes in curriculum made this year:
Trial graduate course in non-linear dynamics was taught in spring 2008.

Budget implications from assessment:
None
ANNUAL OUTCOMES ASSESSMENT REPORT FOR PROGRAMS IN 2007

UAF PHYSICS DEPARTMENT

GRADUATE DEGREE PROGRAM:

____ MS, PHYSICS
____ MS, SPACE PHYSICS
____ MS, COMPUTATIONAL PHYSICS
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Budget implications from assessment:
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ANNUAL OUTCOMES ASSESSMENT REPORT FOR PROGRAMS IN 2007

UAF PHYSICS DEPARTMENT

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______ PhD, SPACE PHYSICS

SUBMISSION DATE: 30 April 2008 BY: Dept. Chair, John Craven

Current SLOA plan is attached. Implementation Date:
Faculty approval in February 2004.

Outcomes assessment data collected this year:
There were no graduates in 2007.
There was one graduate five years ago and a survey questionnaire has been received.
Assessment files were updated as new information was submitted.

Outcomes assessment data planned for collection next year:
Exit questionnaires at graduation and five-year survey questionnaires.
Continued assembly and evaluation of assessment files by the review committee, as per the assessment plan.

Faculty committee formal review of any assessment data in this year:
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Changes in curriculum made this year:
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Budget implications from assessment:
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ANNUAL OUTCOMES ASSESSMENT REPORT FOR PROGRAMS IN 2007

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Budget implications from assessment:
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UAF PHYSICS DEPARTMENT

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Faculty committee formal review of any assessment data in this year:
Yes

Changes in curriculum made this year:
None

Budget implications from assessment:
None
Physics Department

Annual Report of Outcomes Assessment

Undergraduate Programs in 2007

John Craven
Chair, Physics Department

Review Committee
Assist. Prof. Renate Wackerbauer
Assist. Prof. Curt Szuberla

28 April 2008
Annual Report of Outcomes Assessment
by the Physics Department's Faculty
for Undergraduate Programs in 2007

This report is for the Physics Department's 2007 BS programs in Physics and in General Science, for which there is one graduate in each program.

The primary method of assessing outcomes has been to obtain “exit interviews,” or surveys, from each graduating student. The survey is in the form of a questionnaire and a request for written comments. An invitation for a personal interview with the department chair or an alternate faculty member of the student's choice is also offered. The results for this assessment activity are provided in Part 1 of this report for the two graduates.

An opportunity is also provided to each graduate five years later, when we present a questionnaire that includes post-graduation career choices and opinions about his or her UAF experience. Two of three survey questionnaires were returned this year from five-year graduates. The results for this assessment activity are provided in Part 2 of this report.

This first page presents a summary of potential issues extracted from the assessment activity that may require attention by the faculty at the outset of the next academic year. The basis for these issues derives from an analysis of the information gained in Part 1 and Part 2.

Each of the two parts that follow is laid out in similar formats: summary findings followed by the underlying data. The first page of each part (Section 1.A and 2.A) contains a summary of the significant finding(s) from all information. Section 1.B provides verbatim copies or summaries of points that were raised in the written comments offered by each graduating student. Section 1.C provides a brief interpretation of the results contained in the questionnaire, for which the individual results are given in Table 1. Section 2.B contains a distillation of responses by the two students who graduated five years ago; it is a summing of the individual comments. The last section, 2.C, contains individual written comments by the former students.

Issues for faculty consideration in the fall semester that follow from this assessment activity are as follows:

Undergraduate research: We thought this had been addressed previously, but is worthy of further consideration.

Teaching versus research: This is an issue of concern for both faculty and students, given the diverse nature of appointments in the department.

In addition, it is acknowledged that the department has yet to create a direct measure of assessing undergraduate outcomes. This must be done.
PART 1

Graduation Assessment for the Physics
Undergraduate BS Program in 2007

1.A. Summary of Finding and Response

Findings

1. Student assessments of the Physics Department's program remain very positive. This year the student-to-faculty ratio and the opportunities for student-faculty interactions were particularly highlighted in the exit interviews.

2. Faculty interest in research versus teaching was raised.

3. Lack of an undergraduate research experience.

4. General Science minor in physics is too rigid in its course selections.

Responses

1. The faculty remains heartened by students' continuing positive assessment.

2. The diverse nature of faculty appointments, ranging from quarter-time to full-time, is definitely a challenge for the Physics Department. In addition, the physical separation of office space between in the GI and REIC can make it inconvenient for a student to ask for help when needed (outside of office hours). However, the student clearly points out that the faculty members were "available during office hours and when extra help was needed". In this sense faculty members with a higher focus on research in their appointment fulfilled their commitment towards teaching.

3. Given the current number of our students involved in undergraduate research it is difficult to understand a comment that there are no opportunities. The faculty should consider again if the opportunities are adequately advertised to interested undergraduates or demonstrate that all available positions have been competitively filled. The department notes with pride the high percentage of graduating physics students that have had an undergraduate research experience. The application process for an undergraduate research position is very competitive, especially in today's funding climate. Still, the success rate is very high. Above 90% (maybe even higher) of our physics majors have had some experience in undergraduate research upon graduation. These students work closely with faculty in the Physics department, at the GI, through various REU programs, at OEM, and to a small part in other UAF science departments.

4. The General Science curriculum for a physics emphasis was reviewed earlier in this year and modifications made that are intended to increase flexibility.
PART 1

Graduation Assessment for the Physics
Undergraduate BS Program in 2007

1.B. Collection of Written Responses to Questions Posed in the Exit Interview Form
for the Undergraduate BS Physics Program

Describe an area (or areas) in which the instructional program was; (a) very good;
(b) acceptable or in need of minor improvements; and/or (c) sadly lacking.

Student 1. "The area I believe the physics department (and UAF in general) truly shines is the
student-to-faculty ratio. This creates a very welcome environment, and lots of opportunities for
individual interaction between students and faculty."

"Some faculty members seemed to clearly be researchers first, and educators a distant second.
While they were certainly available during office hours, or when extra help was requested, it was
clear that teaching was not their focus. However, they were more than compensated for by
Channon Price. I never imagined a professor could be so knowledgeable, accessible, easy-going,
enthusiastic, and communicate the subject so effectively. I don’t think I would have been able to
graduate without his help and encouragement. He cannot be praised enough."

Student 2. "The general science program is very good in terms of flexibility in both the
major/minor selection and options within the majors and minors. A minor complaint is that the
physics minor for general science was more concrete, so unlike the biology or chemistry minor
there were no choices of classes in it."

Are there any general thoughts on the department that you would like to share?

Student 1. "You couldn’t ask for a better Admin Assistant than Mary Parsons...."

Student 2. "Many non-physics majors who have taken the 211-212 sequence have told me that
the labs were tedious and detracted from their enjoyment of the course. Perhaps there is a way to
make the labs more engaging for non-physics majors."
PART 1

Graduation Assessment for the Physics
Undergraduate BS Program in 2007

1.C. Overview of Responses to the Questionnaire by the Two Students

Tabular results for the Undergraduate Outcomes Assessment Questionnaire are provided in Table 1 for the two students who submitted the questionnaire at the completion of their BS program in Physics or General Science. The upper panel gives the results in the order the 18 questions were asked. Possible response to each of the questions is taken from the following list: 1 (strongly disagree) through 5 (strongly agree), as defined at the bottom of the table. The mean for each of the two replies is given in the right-hand column. The lower panel of the figure presents the results again, but sorted in descending order by the mean of the two replies to each question. For 11 of the 18 questions, the mean is 4.0 or greater; agree or strongly agree. Such strong support again indicates that from an overall perspective the Physics Department and UAF are doing quite well.

Of concern are the lowest scores, for which some intervention might be initiated within the department. In this case, one student displayed a low opinion with regard to the lack of an undergraduate research experience. The general science student did not respond to this question. This evaluation also displayed a poor regard for UAF for a stimulating atmosphere, physics faculty's commitment for education, and preparations for future professional development. For once, the baccalaureate core curriculum was not ranked at or near the bottom.
Undergraduate Outcomes Assessment Questionnaire, 2007, BS in Physics

<table>
<thead>
<tr>
<th>Listed in Order from the Questionnaire</th>
<th>PHYS</th>
<th>GSCI</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>can recommend UAF to another student.</td>
<td>4</td>
<td>4</td>
<td>4.00</td>
</tr>
<tr>
<td>in general, the quality of instruction at UAF is high.</td>
<td>4</td>
<td>4</td>
<td>4.00</td>
</tr>
<tr>
<td>an concept, the UAF baccalaureate core curriculum is a good idea.</td>
<td>4</td>
<td>4</td>
<td>4.00</td>
</tr>
<tr>
<td>IAF as a whole provides a stimulating atmosphere for undergraduate study.</td>
<td>2</td>
<td>4</td>
<td>3.00 3.8</td>
</tr>
<tr>
<td>can recommend my physics degree program to another student.</td>
<td>4</td>
<td>5</td>
<td>4.50</td>
</tr>
<tr>
<td>am pleased with the curriculum in my physics degree program.</td>
<td>4</td>
<td>4</td>
<td>4.00</td>
</tr>
<tr>
<td>he quality of instruction in the physics department is high.</td>
<td>5</td>
<td>5</td>
<td>5.00</td>
</tr>
<tr>
<td>class sizes in the physics classes are appropriate.</td>
<td>5</td>
<td>4</td>
<td>4.50</td>
</tr>
<tr>
<td>Undergraduate research opportunities were available to me.</td>
<td>1</td>
<td>4</td>
<td>2.50</td>
</tr>
<tr>
<td>had a rewarding undergraduate research experience.</td>
<td>1</td>
<td>1</td>
<td>1.00 3.6</td>
</tr>
<tr>
<td>faculty members in the physics department provide a stimulating atmosphere.</td>
<td>4</td>
<td>5</td>
<td>4.50</td>
</tr>
<tr>
<td>faculty members in the physics department are constructively involved in education.</td>
<td>2</td>
<td>5</td>
<td>3.50</td>
</tr>
<tr>
<td>faculty members in the physics department are accessible and helpful.</td>
<td>4</td>
<td>4</td>
<td>4.00</td>
</tr>
<tr>
<td>my academic advisor in the physics department was accessible and helpful.</td>
<td>3</td>
<td>4</td>
<td>3.50</td>
</tr>
<tr>
<td>teaching assistants in my lower-division labs were knowledgeable and helpful.</td>
<td>4</td>
<td>4</td>
<td>4.00 3.9</td>
</tr>
<tr>
<td>fellow students were intellectually stimulating.</td>
<td>4</td>
<td>3</td>
<td>3.50</td>
</tr>
<tr>
<td>the physics department staff was accessible and helpful.</td>
<td>5</td>
<td>5</td>
<td>5.00</td>
</tr>
<tr>
<td>am prepared for the next step in my professional development.</td>
<td>2</td>
<td>4</td>
<td>3.00 3.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Means Sorted in Decreasing Level of Agreement</th>
<th></th>
<th></th>
<th></th>
<th>Greatest agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>the quality of instruction in the physics department is high.</td>
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<td></td>
</tr>
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</table>

Note: 1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree; blank=not applicable, etc.
PART 2

Five-Year Post Graduation Assessment for the Physics Undergraduate BS Program

2.A. Summary of Findings and Response

Findings

1. The two students have not made physics central to their career choices, but both have positive regard for the analytical and thinking skills developed during their undergraduate program.

2. A theme from an earlier assessment has again appeared where the physical separation of faculty between the GI and the REIC has an impact, if in perception only.

3. There was a strong belief on the part of one student that some faculty members can display "openly hostile and manipulative" behavior or appear "openly bored and unenthusiastic about the course material."

Responses

1. The baccalaureate degree is not a training program for individual disciplines; rather, it serves as a base upon which specializations may be built. The students have successfully advanced and broadened their education, with an emphasis on the methods and subjects covered in physics. This reflects favorably on our program in that it provided them with the basics of critical thinking required in a number of diverse fields. That they have advanced in other areas of interest to them, and these areas now have greater priority, demonstrates what, we trust, is a habit of life-long learning.

2. The faculty has not sought any means to relieve the real or perceived difficulties related to physical separation as there is as yet no known way forward. However, the physics faculty is conscientious about office hours and often extends office hours in REIC. The department also offers several events per academic year for students (like a turkey dinner, beginning-of-semester pizza party, and a newly adopted plan for several additional food-fueled informal gatherings). These informal gatherings are an effective means of getting faculty and students acquainted outside the classroom.

3. Student assessment of instruction can be much more open once the instructor-student relationship and its inherent power structure are removed by time and distance. Greater confidence in discussing such issues at the time with the department chair and/or the college dean could be effective, but it is understood that this is not easy. While particulars may or may not be known privately within the faculty, it certainly would be incorrect for a faculty member to assume that such behavior or tendencies are not known to other faculty members and certainly to other students at the time. Respect can be damaged even in the presence of a collegial working relationship.
2.B. Overview of Responses from Two Students

Too few graduates to make this useful. Go directly to Part A, above.
2.C. A Summary of Comments by the Individual Students

Student #1 (BA in Physics)

1. Post Graduate Career
   "Started a business – Wandering Star Studio - producing and selling stained glass jewelry and fine art around the state. Worked briefly as an adjunct for the physics dept. teaching physics labs."

2. Was your career related to or influenced in any way by your UAF degree?
   "My degree has definitely influenced my artwork - in fact I had a solo exhibit last August called 'Simple Machines' that featured six painting representing each of the simple machines and abstractly interpreting each machine's functions through landscapes and artifacts.

   The critical thinking and problem solving skills developed have also helped structure my business financially and aided my organization and 'multi-tasking.'"

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
   "Absolutely – the professors I had at the fundamental level were crucial in establishing that base. Without them I am sure my understanding would be much weaker and upper level courses much less understandable. It is the basic topics that I remember most strongly now."

4. Would you recommend the physics program to a perspective student?
   "It has been also most 10 years since I was active in the department – since the faculty left the greatest impression on me then, and since the faculty has surely changed since then, I can't say."

5. Lasting positive and/or negative impressions of the UAF baccalaureate program.
   "Faculty. The opportunities for physics students were great due to the Geophysical and IARC and graduate students – but the greatest influence on me was faculty for positive and negative.

6. Lasting positive and/or negative impressions of UAF and Fairbanks.
   "Positive: opportunities for research, exposure to diverse research programs, diverse courses and engaging faculty in all departments (particularly mathematics dept).
   Negative: faculty; "big fish in a small pond" mentality in some professors."

7. Things you always wanted to tell us.
   During the course of my studies in the physics dept I decided to abandon my pursuits of a B.S. and opted for a B.A., switching to an emphasis on mathematics and obtaining a B.S. in math. The reason for this was a series of negative experiences with some faculty members – some openly hostile and manipulative, and others so openly bored and unenthusiastic about the course material that it was impossible to become interested myself. The passion I initially felt towards physics – the fantastic unanswered questions – was completely killed by what I saw as utter boredom in some of my professors – particularly once I got to upper level courses. If professors can't stand the material – students will pick up on that."
FIVE-YEAR POST GRADUATION ASSESSMENT FOR THE PHYSICS
UNDERGRADUATE BS PROGRAM

Student #2

1. Post Graduate Career
"After graduation I worked and traveled for three years before enrolling in graduate school for a Masters in international policy studies. During those three years, I worked as an aircraft mechanic in Fairbanks, a guide at an Alaskan backcountry lodge, and a contractor's assistant in Eureka, California. I attended a 3 month language training program in St. Petersburg, Russia, and traveled for several months in Madagascar. Since earning my Master, I've continued working as an aircraft mechanic, as well as working for a non-profit organization focused on education, training and advocacy of international negotiation, mediation, and conflict resolution. I will be attending law school in the fall of 2008."

2. Was your career related to or influenced in any way by your UAF degree?
"My career is not related to my physics degree directly, though I believe the analytical problem-solving skills I learned in those courses have continued to serve me well. These skills influence my method and examination of policy issues and the framing of an analytical paper. While I appreciated the physics education, ultimately it was not the path I felt most fit my interests and aspirations."

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
"n/a"

4. Would you recommend the physics program to a perspective student?
"I would recommend the physics program to prospective students. I appreciated the small class sized, the personal attention and interest of the faculty, and the supportive conduct of fellow majors. I also felt that undergraduate students had a unique opportunity to become involved in faculty research projects and gain first-hand, practical training in research and experimentation."

5. Lasting positive and/or negative impressions of the UAF baccalaureate program.
"Lasting impressions involve long, late hours spent in the student room working with classmates to find the nuance to a physics problem that would lead to its solution. The camaraderie and support of fellow majors helped make the experience positive."

6. Lasting positive and/or negative impressions of UAF and Fairbanks.
"UAF has a strong base for physics research and education. Unfortunately, the physical distance between the GI and the science building led to a sort of mental separation, in that the Geophysical Institute scientist seemed somewhat inaccessible. It would be good to see the practical physics being conducted there better integrated with the physics education."

7. Things you always wanted to tell us.
Physics Department

Annual Report of Outcomes Assessment

Graduate Programs in 2007

John Craven
Chair, Physics Department

Review Committee
Assist. Prof. Renate Wackerbauer
Assist. Prof. Curt Szuberla

28 April 2008
Annual Report of Outcomes Assessment
by the Physics Department's Faculty
for Graduate Programs in 2007

This report is for the Physics Department's 2007 graduate programs in Physics, for which there were three graduates: one in physics, one in space physics, and one in the interdisciplinary degree program (with engineering). For the purposes of this assessment, however, it is reasonable to consider the three as having been in identical programs since the course selections and research area for the graduates in physics was largely interchangeable with that of a typical space physics graduate.

The primary method of assessing outcomes has been to obtain "exit interviews," or surveys, from each graduating student. The survey is in the form of a questionnaire and a request for written comments. An invitation for a personal interview with the department chair or an alternate faculty member of the student's choice is also offered. The results for this assessment activity are provided in Part 1 of this report for the three graduates.

An opportunity is also provided to all graduates five years later, when we present a questionnaire that includes post-graduation career choices and opinions about their UAF experience. Three of three survey questionnaires were returned this year from five-year graduates. The results for this assessment activity are provided in Part 2 of this report.

This first page presents a summary of the issues extracted from the assessment activity that require attention by the faculty at the outset of the next academic year. The basis for these issues derives from an analysis of the information gained in Part 1 and Part 2.

Each of the two parts is laid out in the same general format: summary findings followed by the underlying data. The first page of each part (Section 1.A and 2.A) contains a summary of the significant finding(s) from the data. Section 1.B provides a compact summary of the main points raised in the written comments by each graduating student. Section 1.C provides an interpretation of the results contained in the questionnaire, whose individual results are given in Table 1. Section 2.B contains a distillation of responses by the three students who graduated five years ago. The last section, 2.C, contains direct quotes of individual written comments by the former students. Faculty names have been removed.

Issues for faculty consideration in the fall semester that follow from this assessment activity are given below.

- Separation of the faculty in the GI and REIC is again raised by graduates.

- Integrity of the PhD examination; preparations and confidentiality of exam problems.

- Impact on graduate TAs from an inconsistent policy on lower-division makeup labs.
PART 1

Graduation Assessment for the Physics Graduate Programs in 2007

1.A. Summary of Finding and Response

Findings

1. Some faculty instruction is excellent. Some faculty members displayed lesser skill in the classroom and were reported to have poor ‘board skills,’ errors in lecture notes, lack of accessibility during office hours, etc.

2. More clarity is required in make-up policies for lower-division teaching labs. Make-up lab opportunities at the end of the semester have a significant impact on TAs.

3. Separation of faculty between the GI and the Physics Department.


Responses

1. Tenure-track faculty members have their teaching evaluated more closely than the tenured faculty as part of early instructional evaluation and temporary instructors are evaluated only via the IAS format. Critical evaluation of instruction is generally lacking after the granting of tenure, and the only way a department chair may know of a problem is when students complain in large numbers and in person or a college dean passes on complaints. IAS scores should be studied more carefully. The lack of access to the ‘yellow’ sheets is also an impediment to departmental evaluation. The department offers travel money for faculty development and has had members participate in teaching workshops. The department should begin a discussion about a more comprehensive plan for teaching evaluations across the ranks and encourage tenure-track and tenured participation in teaching workshop offerings.

2. Instructors and the lab supervisor need to reemphasize the existing policy concerning make-up labs in individual courses or establish more explicit policies. There must be a balanced concern for the students and TAs (who are also students) by the instructors and lab supervisor.

3. Physics faculty members with their main office at GI must make sure that they have posted office hours in the RIEC and are available at those times. The department also offers a few events within the academic year (Thanksgiving turkey lunch, beginning of a semester pizza party, etc.), and has agreed to establish additional informal gathering of this sort.

4. Students need be made aware of competing demands on faculty members’ time and faculty members need to provide reasonable estimates on return dates for materials submitted. It is incumbent upon the committee to keep this communication channel clear.
PART 1

Graduation Assessment for the Physics Graduate Programs in 2007

1.B. Collection of Written Responses to Questions Posed in the Exit Interview Form for the Graduate Physics Programs

Describe an area (or areas) in which the instructional program was; (a) very good; (b) acceptable or in need of minor improvements; and/or (c) sadly lacking.

Student 1. PhD in Physics

"The quality of instruction at UAF was uneven. Some instructors (notably Dr. Price) had excellent board skills, clear and organized lectures, and challenging homework that served to emphasize the relevant material. Others used homework as the primary means of teaching the fine points of the subject (Digital time series lent itself to this approach) and spent class time covering the basics and fundamental concepts. On the other hand, some classes were taught in a haphazard manner with poor board skills, lecture notes that contained errors which should have been caught in review (leading one to assume that no review was preformed prior to lecture), and assignments which in no way reflected the material covered in class. I discovered that some professors used one book to teach and another for assignments leading to conflicting views of the relevant material between classes and homework. This would not have been a problem if the professor were in his/her office during office hours to provide guidance. When available to answer questions, the answers provided were incomplete and sometime contradictory causing a lack of faith in the professors knowledge of his/her subject."

"TAing was a rewarding experience all together. An improvement could be made by requiring the professors to conform to the “rules” with respect to the number of labs a student can make up. More than two is unnecessary for a student with the bare minimum of commitment and creates more work for the TA while simultaneously allowing poor work from the students which is unfair to the committed students who follow the rules.

Student 2. PhD in Space Physics

I enjoyed being in a small department – it’s a good environment to know your instructors and fellow classmates. Having good access to your professors is very important.

Student 3. Interdisciplinary PhD Program

No comments provided.

Describe an area (or areas) in which the research program was; (a) very good; (b) acceptable or in need of minor improvements; and/or (c) sadly lacking.

Student 1. PhD in Physics

I got lucky with my research program, which is sadly not always the case. Drs. Olson and Szuberla had both funding and interesting research programs in place to support student.
The number or retired/semi-retired faculty who cannot/will not take on grad students for research causes a "pile up" of second year graduate students who cannot continue to teach but are unable to find a faculty member to do research with. This grad student pile up is the biggest problem with UAF physics and the only reason I would be hesitant to recommend UAF grad school to another student. Also, there appears to be a large difference in the quality of work expected by different committees. I would also like to clarify that while I gave my advisory committee a "2" for contributing to my research this was in no way their fault. With the department split between GI and Natural Science it is impractical to just drop by and talk about half-baked ideas I feel that I need to mention Dr. Price again here for his help that really went above the call of duty. On a related note, the process of setting a thesis written and approved by your committees is frustratingly and unnecessarily stressful. With no set time limit on how long your committee had to read your thesis or limit on how many times the faculty can demand to re-read it you are lift in limbo, unable to move forward until they comment on your work but only when they are good and ready to. I realize that faculty members have other things to attend to, but part of their job is suppose to be to assist in the thesis process and it seems that they believe they are doing you a favor by reading your work.

**Student 2. PhD in Physics**

"My research experience was very good. My research was interesting and I was comfortable talking to all of my committee members. Everyone always made time to answer my questions and I really appreciate that."

**Student 3. Interdisciplinary PhD Program**

No comments provided.
PART 1

Graduation Assessment for the Physics Graduate Programs in 2007

1.C. Overview of Responses to the Questionnaire by the Three Students

Tabular results for the Graduate Outcomes Assessment Questionnaire are provided in Table 1 for the three students who submitted the questionnaire at the completion of their graduate programs in Physics, Space Physics, and an interdisciplinary PhD degree with Physics as the home base. The upper panel gives the results, in the order the 17 questions were asked. The responses to each question are 1 (strongly disagree) through 5 (strongly agree), as defined at the bottom of the table. The mean for the three replies is given in the right-hand column. The lower panel of the figure presents the results again, but sorted in descending order by the mean of the four replies to each question. For 13 of the 17 questions, the mean is 4.0 or greater; agree or strongly agree. Such strong support again indicates that, from the perspective of these students, the Physics Department and UAF are doing quite well.

Of concern is the presence of low scores, in this case the four lowest scores by one graduate (in physics) where the graduate expressed concern (by disagreeing about positive statements) about the graduate advisory committee, quality of course instruction, and faculty members being accessible, helpful, and providing a stimulating atmosphere. All three graduates were neutral about their TA experience.
.. Questionnaire, Graduation Assessment for the Physics Graduate Programs in 2007/8

<table>
<thead>
<tr>
<th>Stated in Order from the Questionnaire, by Degree</th>
<th>PhD PHYS</th>
<th>PhD SPHY</th>
<th>PhD INDS</th>
<th>Combined Mean</th>
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<tbody>
<tr>
<td>recommend UAF to another student</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4.7</td>
</tr>
<tr>
<td>AF as a whole provides a stimulating atmosphere for graduate study.</td>
<td>4</td>
<td>5</td>
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<td>4.3</td>
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<tr>
<td>an pleased with the curriculum within my degree program.</td>
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<td>ie quality of instruction in the physics department is high.</td>
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<td>culty members in the physics department are accessible and helpful.</td>
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<td>ae quality of research work in the physics department and/or GI is high.</td>
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<td>an pleased with the research experience in my degree program.</td>
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<td>y graduate advisor was constructively involved in my research.</td>
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<td>y graduate advisory committee contributed to my research experience.</td>
<td>2</td>
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<td>ad access to modern equipment in my research program.</td>
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<td>y research project was adequately funded.</td>
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<td>y experience as a TA was rewarding.</td>
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<td>3</td>
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<td>allow students were intellectual stimulating.</td>
<td>4</td>
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<td>e Graduate Program Office was accessible and helpful.</td>
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<tr>
<td>am prepared for the next step in my professional development.</td>
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Combined Means Sorted in Decreasing Level of Agreement

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</tr>
</tbody>
</table>

strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree; blank = not applicable, no entry, etc.
PART 2

Five-Year Post Graduation Assessment for the Physics Graduate Programs in 2007

2.A. Summary of Findings and Response

Findings

1. Conflicting information in preparations for taking the PhD examination.

2. Suggestion that confidentiality was compromised in a written PhD examination through someone revealing to a student some information about an exam problem in advance of the exam.

Responses

1. We believe this issue was resolved several years ago. Students taking the PhD examination are provided with a standardized list of topics to prepare for, exam copies from the last 10 years, and a letter stating the PhD exam policies. They are also afforded the opportunity of an information session on the process with the department chair and/or the chair of the exam committee.

2. We are not aware that this issue was ever raised with the examination chairman or the department chairman. This is a serious accusation although the student felt that this was an isolated case and not done consistently. We also feel that this student was honor-bound to report this level of academic misconduct and failed to do so.
PART 2

Five-Year Post Graduation Assessment for the Physics Graduate Programs in 2007

2.B. Distillation of Responses from the Three Students

1. Post Graduate Career
   The Ph.D. graduate is now in a tenure-track faculty position at a leading university. One M.S. graduate later obtained a Ph.D. at another institution and is now employed in industrial work related to his graduate education in space physics. The second M.S. Graduate continues in research as a lab technician at a university.

2. Was your career related to or influenced in any way by UAF degree?
   All agree that their careers were influenced by their UAF degrees. For the Ph.D. graduate the career is directly related to the degree. Both M.S. graduates cited skills and experience gained while pursuing their degrees as valuable.

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
   A very positive reply from the PhD graduate. One M.S. graduate did not reply and the second cited two courses not offered at the graduate level; optics and instrumentation.

4. Would you recommend the physics program to a perspective student?
   Positive replies were given with one limiting the graduate program to two areas of focus; space physics or atmospheric physics.

5. Lasting positive and/or negative impressions of graduate school at UAF.
   Positive replies included good faculty interactions, good advising, small classes, and good TA experience. Negative replies included limited areas of research, conflicting information on what to expect in the thesis defense and a thesis format issue.

6. Lasting positive and/or negative impressions of UAF and Fairbanks
   Positive replies included UAF, AK and its people. Negative replies included no 24-hour food service on campus.

7. Things you always wanted to tell us.
   Redirect money from the bureaucracy and direct it towards support for graduate research positions. It can now be cheaper to hire a post-doctoral student. Need closer contact between GI faculty and students in the NSF. Uneven information was provided to students taking the PhD exam and a claim that a student was given one of the exam problems (or hint of the problem) in advance of the written examination.
PART 2

Five-Year Post Graduation Assessment for the Physics Graduate Programs in 2007

2.C. A Summary of Comments by the Individual Students

Student #1 PhD in Physics

1. Post Graduate Career
Post doctoral research position (2002-2007) at Imperial College London. Tenure-track assistant professor in physics at Embry-Riddle Aeronautical University, FL.

2. Was your career related to or influenced in any way by UAF degree?
“My career as a physics professor is directly related to the PhD-degree in Physics received from UAF.”

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
“I was very happy by the UAF physics department and received the best possible instruction and opportunities.”

4. Would you recommend the physics program to a perspective student?
“I would definitely recommend the graduate physics program at the UAF. There are several world class scientists at the UAF and I was able to get involved with paid research projects already after my first year in the program and attend and present my research results in Geophysical Institute journal club, at the American Geophysical Union fall meeting and at the Geospace Environment Modelers (GEM) workshops.”

5. Lasting positive and/or negative impressions of graduate school at UAF.
“I had many positive experiences at the UAF. I liked the fact that the program and class sizes were small. This enabled lots of discussion and environment to ask questions. I was most impressed by my graduate advisor, Dr. Antonius Otto, who is an amazing mentor, teacher, and researcher. One negative comment is that at the time of my graduation (August 2002), the graduate school had decided to change the thesis format (some silly cosmetic thing related to the location of the page number) and I did not get my thesis signed by graduate school until this was corrected, which turned out to be very tedious thing to change in the last minute and required some knowledge in the Latex-source code. It was especially annoying because I almost missed my flight because of this.”

6. Lasting positive and/or negative impressions of UAF and Fairbanks
“I wish there was a cafeteria/restaurant in the campus area with healthier food options and which would be open until 10:00 pm. Many students don’t have a car, so it is not easy to get to Fred Meyer if one gets hungry. I found myself ordering pizza at after hours when working late.”

7. Things you always wanted to tell us.
“I would strongly suggest in making it beneficial and easy for leading scientists in GI or at the UAF with external funding to hire PhD students for their research programs. If the tuitions and fees are too expensive, it is more beneficial for researcher to hire a post doc, which in the long run will be really bad for the graduate program. Students need to get
involved with real, important research projects and they need support to be sent to conferences and workshops to present their results – this motivates them to work hard and get exposure so that they get a good job after they graduate. I think that this aspect made my graduate and current career a success and I am currently one of the experts in my field with a permanent position. When I graduated I applied for post doc in two places and was accepted to both. After post doc I only applied to one tenure track position and got it. I think this was possible because I had a very good PhD thesis topic that enabled me to continue and expand my research during my post doctoral career. In summary: take money from unnecessary bureaucracy and put it into support graduate student tuition and stipends, so that it is beneficial for professors in GI and UAF to include PhD student in their grant proposals.
PART 2

Five-Year Post Graduation Assessment for the Physics Graduate Programs

2.C. A Summary of Comments by the Individual Students, Continued

Student #2 MS in Physics

1. Post Graduate Career
   “Immediately after graduating from UAF I started a position as a Research Analyst in the Physical Oceanography department. After working there a year I decided to pursue long track speed skating and move to Salt Lake City, Utah. I found a quick data entry job in the Public Health department at the University of Utah when I arrived in Salt Lake City; which after several months turned into a Research Assistant position. I knew I would have to make the sacrifice of having a job I’m overqualified for in exchange for flexibility with my training schedule.

   After a year and a half as a Research Assistant the project lost funding and everyone was laid off. I soon found a much more interesting and challenging position as a Lab Technician at the University of Utah’s Fluorescence Microscopy Core Facility. I have been working there for just over two years. www.cellimagingcore.org.”

2. Was your career related to or influenced in any way by UAF degree?
   “Physics give you a strong foundation in all the principals that the sciences are based on as well as excellent mathematical skills. I have found that after working in three different fields unrelated to physics my skills in math/logic, data analysis, experimentation/instrumentation, machine shop, and computer programming were extremely valuable. It is because of these skills that I have had relative ease in transitioning into different fields. Although I would say my UAF-specific-physics degree has not heavily influenced my career choice.”

3. Did the Physics Department provide an adequate background in the fundamental physics topics?

4. Would you recommend the physics program to a perspective student?
   To an undergraduate I would definitely recommend a physics degree from UAF. A physics background gives you a strong foundation in math and the fundamental principles of all the science fields. These skills are adaptable to many jobs in many different fields. You have to learn how to market yourself and apply what you know.

   To a potential graduate student I would recommend a graduate degree at UAF if they had a research specific interest in Space or Atmospheric physics.

5. Lasting positive and/or negative impressions of graduate school at UAF.
   “The faculty in the physics department are very approachable and genuinely concerned about the students. I had an excellent advisor, but I blame myself for not having a significant interest in the research that was going on there. After studying at SUNY Stony Brook, which has a huge physics department comprising almost all the fields of physics, I assumed that when I started at UAF I would find something that interested me and there would be several fields to choose from as well as fulfilling my desire to move to Alaska. On the contrary I was
surprised to find that there were only two fields available at the time, and I had a weak interest in both of them.
I did learn many valuable skills in signal processing, and had some great experiences working in the field. Although the most valued skill I took from graduate school is knowing how to program in Matlab, and write software.”

6. **Lasting positive and/or negative impressions of UAF and Fairbanks**
   “I definitely enjoyed living in Fairbanks, and going to school at UAF. This was mainly because of the warmth and sincerity of the people, the interesting local culture, and the immense beauty of Alaska.”

7. **Things you always wanted to tell us.**
PART 2

Five-Year Post Graduation Assessment for the Physics Graduate Programs

2.C. A Summary of Comments by the Individual Students, Continued

Student #3 MS in Physics

1. Post Graduate Career
I went to Utah State University in Fall 2002 to pursue my Ph.D with Mike Taylor as supervisor. My main thesis work was about short-period gravity waves observed at high latitude over Antarctica. However, my work with Mike was not limited to gravity waves as I also got an opportunity to participate in the Leonid multi-aircraft campaign, and observations of the Genesis and Stardust re-entry capsules. I installed and operated all-sky imager during the MacWAVE winter campaign in northern Sweden and also got an opportunity to study NCL's from Alaska through the PARS summer school.
I graduated in Fall 2006 and spend 6 months as a post doc at the HIPAS facility in Two Rivers, Alaska. There, I got a chance to experience radar technology and perform ionospheric heating experiments. Particularly, two experiments were performed during this period. An experiment which included the first incoherent scatter radar observations of pumping at the second electron gyroharmonic, and an experiment involving ELF/VLF generation through resonant excitation.

Since summer 2007 I have been working at the Naval Research Lab (through Computational Physics Inc., due to my resident status). My main research is analysis of the Navy's weather prediction system, which the NRL group has extended into the mesosphere, lower thermosphere (MLT) region. Currently, the main focus is on comparing the results with observations obtained from the NASA AIM satellite, which investigate Polar Mesospheric Clouds (PMC). Other research questions I am currently addressing using this product is: global large-scale wave variability using wavelet analysis, and high-latitude dynamics and its influence on gravity wave propagation.

The above work has to date resulted in 17 publications (or in preparation for submission/publication) of which I am first-author on 8.

2. Was your career related to or influenced in any way by UAF degree?
Yes, I learned a tremendous amount of instrument problem solving from Hans and programming skills from both Hans and Dirk, both of which have proven extremely useful in my career.

3. Did the Physics Department provide an adequate background in the fundamental physics topics?
I was certainly missing a few classes at UAF...in particular, an optics class and a laboratory (experiments) class at the graduate level. The theoretical material I found was covered in the curriculum.

4. Would you recommend the physics program to a perspective student?
Yes, already did. Mainly due to the small class setting and Alaska is a great place to experience.
5. Lasting positive and/or negative impressions of graduate school at UAF.
Positive: I found majority of the faculty to be easy to approach both personally and academically. I enjoyed the independence Hans gave me to work out problems. My TA experience was a blast (liked it so much I asked to be a TA through all my semesters at UAF).

Negative: My defense. I felt my presentation went really well and had prepared to go into detail in my defense. However, my defense questions were more broad and took me by surprise. I wish I had prepared differently so I could have finished on a more successful note.

6. Lasting positive and/or negative impressions of UAF and Fairbanks
Positive: I love Alaska and Fairbanks. I got an opportunity to share Alaska with my wife and kids when we went to live in Two Rivers, and they all love it. So we hope to come back and run our sled dogs one day.

Negative: None

7. Things you always wanted to tell us.

I wish there would have been a closer “contact” between the GI faculty and the students in the NSF. Since I was a TA for 4 years, I spent most of my time in the TA office in the NSF and at times felt that the GI faculty thought I was a slacker (which may at times have been ok :) It is understandable since they seldom saw me at the GI and didn't know I was a TA.

There seemed to have been some discrimination a few times, where some students were favored over others. Some students were told they could bring formulas etc to the comprehensive exams while others were told they could only bring a pencil. In addition, some of the problems had been given to a student (or hint to which problem would be on the exam).

I felt the above was disrespectful, and the department did not seem interested in wanted to deal with it at that moment. I felt it was isolated cases and not something that went on consistently.