



Board of Regents Program Action Request
 Proposal to **Discontinue** a Program of Study
 University of Alaska

1a. UA University UAF	1b. School or College CNSM	1c. Department or Program Atmospheric Science
2. Complete Program Title:		MS in Atmospheric Science
3. Type of Program:		
Undergraduate Certificate	<input type="checkbox"/>	Associate
Master's	<input checked="" type="checkbox"/>	Doctorate
		Baccalaureate
		Post-Baccalaureate Certificate
4. Type of Action:	<input checked="" type="checkbox"/>	Discontinue
Implementation Semester:	Fall	Year: 2020
5. Other programs affected by the proposed action, including those at other campuses (please list):		
Program Affected	Anticipated Effect	
Few	Few programs require ATM courses for their own programs and there are many options for GER undergraduate courses.	
Page number of attached summary where effects on other programs are discussed: _____		
6. Specialized accreditation or other external program certification needed or anticipated. List all that apply or		7. Aligns with University or campus mission, goals, core themes, and objectives (list):
None		
		Page in attached summary where alignment is discussed:
8. Teachout Plan (attached)	<input checked="" type="checkbox"/>	
Submitted by:		Date: 3/31/2020
Consensus support of AC	<input checked="" type="checkbox"/>	Not supported by AC <input type="checkbox"/>
Recommend approval by VPASR		Date: April 10, 2020
Recommend disapproval by VPASR		Date:

Revised: 11/11/2019

In the Academic Council, this program action was supported by the provosts and the committee as a whole, but concerns were raised by the faculty members. The program has 6 tenure track faculty with joint appointments in institutes (IARC and GI). Program discontinuation could negatively impact successful research programs in climate studies with relatively little actual UGF savings (<\$200,000). This is true for both the MS and Ph.D.

University of Alaska – Fairbanks
College of Natural Science and Mathematics
Teach-Out Plan

Proposed Discontinuation: M.S. Atmospheric Sciences

- The program will be closed to new admissions immediately upon approval of discontinuance. Students who have been accepted into the program but have not attended class will be encouraged to switch to a different program.
- The teach-out period will be for two academic years, beginning in the Fall 2020 semester and ending with the conclusion of Summer 2022 semester.
- Course work will be managed as follows:
 - Current courses will continue to be offered (either face-to-face or by distance) throughout the teach-out period;
 - Courses offering will be scheduled as to allow all students to complete their degree requirements but will be phased out over the teach-out period;
 - Students will receive regular communications as to when courses will be offered and will have comprehensive advising from both faculty and college advisers;
 - Course substitutions will be allowed per University guidelines and the program requirements published in the UAF Catalog;
 - Individual studies or directed studies, per University policy, where necessary;
 - Students will be allowed to use transfer courses, per University policy, from other accredited institutions to meet program requirements;
 - Students will be offered the opportunity to switch to an interdisciplinary degree or another major with comparable outcomes. Advisers will ensure students experience a minimal loss of credit hours and time.
 - Students who do not accept the teach-out plan, do not follow the plan, or who cannot complete within the defined period will be advised into a different program.

Degree Program Name	Atmospheric Science MS
PROGRAM DEMOGRAPHICS	
FY19 Majors	3
FY19 Graduates	0
FY19 SCH from degree program	333 SCH from department (148 ugrad, 43 MS, 142 PhD)
FY19 UGF allocated to the program	\$229,400 (dept total); \$29,622 (MS only)
FY19 total program budget	\$311,400 (dept total); \$40,170 (MS only)
\$ UGF / MS SCH	\$688.88/ SCH
STAFFING	
Tenure-track FTE faculty impacted by program deletion	2 (dept; % effort .25 to .5 per faculty); 0.462 (MS only)
Non-tenure track FTE faculty impacted by program deletion	0
staff impacted by program deletion	0.3 for department
-- for each of these describe reduction phase-in during teachout	2 FTE will be maintained for 2.5 years then subsequently 1 FTE will be maintained to complete the teachout
PROGRAM IMPACTS	
Potential for the program to obtain external funding	Very high, faculty are highly successful obtaining extramural funding
Impacts on meeting state or workforce needs	Notable, this program is unique in state, producing needed graduates
PROGRAM UNIQUENESS AND TEACH-OUT PLAN	
Is this program unique in the UA system? If no, describe duplicate or similar programs	Yes
Are there other majors to which the students may transfer (at MAU and at other MAUs)?	Yes, UAF has 'similar' programs in Geoscience, Engineering, Chemistry and Physics. Interdisciplinary degree is another route
What reasonable options within your university do students have ?	Geoscience, Engineering , Chemistry, Physics, nterdisciplinary programs
What reasonable options do students have across the UA System?	To attend UAF Geoscience, Engineering , Chemistry, Physics, Interdisciplinary programs
What reasonable options do students have for transfer to another university?	There exist other programs similar to MS Atm Sci in other states.
What are the on-line options within UA for completion?	None; this program is unique to UAF
PROGRAM REDUCTION SAVINGS	
Total UGF savings following teachout (FY19)	\$229,400 (dept total); \$29,622 (MS only)
Timeline for cost savings and faculty/staff reductions	4 years, FY20 through FY22 (timeline for teachout)



Daniel M. White, Chancellor

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March 23, 2020

TO James R. Johnsen, President, University of Alaska

FROM Daniel M. White, Chancellor, University of Alaska Fairbanks

RE UAF Expedited Academic Review

In accordance with Regents' Policy 10.06.10, and as required by University Regulation 10.06.10.C.2, UAF followed the following process for expedited, exceptional Program Review that was tailored to UAF's particular financial circumstances. The process and timeline are included on the Provost's web site (<https://uaf.edu/assessment-review/expedited-review.php>). The effort began last October and we are now nearing the final stages of the process. Remaining steps are as follows with this step constituting step number 1, below:

1. Monday, March 23 by 5pm - Chancellor recommendations will be sent to the UA President and VP of Academic, Students, and Research.
2. April 1, 2020 – President's recommendations go to the SW Academic Council
3. April 9, 2020 – BOR Public Testimony
4. April 13-14, 2020 – BOR Academic and Student Affairs committee meets to discuss recommendations
5. June 4-5, 2020 – Board of Regents meets to vote on any program changes, including eliminations.

My program review recommendations are based on my review of the committee's analysis and recommendations, dean's reviews, consultation with the Provost, faculty senate motions, public input, budget considerations, and our need to make vertical cuts rather than ongoing horizontal cuts. I did not ask the program review committee to reach a specific budget target because I wanted to make sure that the review committee members were given the latitude to evaluate all of the aspects of the programs and not pit programs against one another. As a result, and not surprisingly, very few program reductions were recommended by the committee. I think that is a reasonable result of the process to date. While it is true that all of our programs have value, history, and students, it is also true that some programs will need to be reduced. All aspects of the university will need to play a part in meeting our budget targets. Furthermore, I have received feedback imploring me to make some vertical cuts to programs, not just horizontal percentages from all units. As a result, my recommendations for program reduction are greater than what has been recommended by the committee. Even with greater reductions, academic programs are only one aspect of our overall reductions. I continue to focus on reductions in space, functions at the

UAF Expedited Program Review

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edges of our mission, and reducing footprint. And we will continue to identify what work we can simply stop doing.

Per the review committee's recommendations we will proceed to deletion the following programs already suspended.

1. Chemistry
 - a. BA Chemistry
 - b. MA Chemistry
 - c. MS Biochemistry
 - d. MS Environmental Chemistry
2. Construction Trades Technology
 - a. AAS Construction Trades Technology
3. Economics
 - a. MS Resource and Applied Economics
4. Physics
 - a. MS Computational Physics
 - b. MS Space Physics
5. Power Generation
 - a. Certificate in Power Generation
6. Process Technology
 - a. Certificate in Mining Application and Technology
7. Renewable Resources
 - a. AAS Renewable resources
8. Sociology
 - a. BA Sociology
 - b. BS Sociology
9. Veterinary Science
 - a. Certificate in Veterinary Science

Per the review committee's recommendations we will reinstate the following program already suspended

1. Music
 - a. Masters in Music, Music Performance

I agree with the review committee's new recommendations for suspension or deletion in the following programs:

1. AAS Drafting Technology – Suspension
2. MEd People, Place and Pedagogy – Delete
3. MEd Second Language Acquisition, Bilingual Education and Literacy – Delete
4. Certificate Safety, Health and Environment Awareness Technology – Delete
5. MS Water and Environmental Science – Delete

UAF Expedited Program Review

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I concur with the committee's recommendations in all other areas of continuation or deletion except in the following where I have recommended a different path:

1. Atmospheric science – delete with opportunities for students in existing departments in similar areas (e.g., physics, chemistry, engineering) including possible alternative appointments at UAF for research intensive faculty
2. BA Earth Science – delete
3. BA in Arctic and Northern Studies – continue
4. Certificate in Ethnobotany – delete
5. Certificate Environmental Studies – delete
6. Masters of Education, Med Online Innovation and Design – delete
7. Geography – delete with opportunity to recombine with synergistic programs, including alternative appointments at UAF for research intensive faculty
8. Mining and Geological Engineering – Separate programs. Maintain Mining Engineering BS and MS. Merge Geological Engineering with Civil Engineering in order to offer the ABET accredited GE program with fewer resources than currently needed.

The programs above were selected because there are logical paths for many of the students in those programs to continue pursuing degrees at UAF. It is important to note that only half of our programs were considered this year. We will look at the other half next year. This means that our less expensive programs (on a per student basis) will have the same scrutiny.

If UAF's reduction is ~ \$30 million over the next two years, how will these reductions get us there? We expect less than 10% of the cuts to come directly from academic programs. I do think that we will identify significant savings for this year as a result of our expedited administrative review, our shared services model, and continued strategic use of land, facilities and resources.

This is a difficult time within the university and within the state. No decisions made on program reductions or resource elimination are made lightly. As academic needs, wants and delivery strategies change, we have to change with them and understand that we are committed to a long-term strategy and looking to the future. Thank you.

DMW:jdp

COMMITTEE RECOMMENDATION FOR ATMOSPHERIC SCIENCES

STRENGTHS:

- Important program to Alaska and nation (weather, air quality, fundamentals of climate system and climate impacts/change, applicable to many important public and private concerns).
- Strong faculty and scholarly output (PRJs, grants, student support).
- International experience and teaching experience in several different countries.
- First-class research facilities serve faculty and student researchers.
- Strong employment in their fields for graduates (academic, public, private).
- Strong collaborations across UAF, state, nation and the world.

WEAKNESSES:

- No undergraduate degree makes program vulnerable and leads to low enrollment numbers.
- Two-year rotation for classes makes it hard for other departments to coordinate their requirements.
- Reduction in support staff leads to more administrative demand on faculty.
- The necessity for research grad programs is a small student to faculty ratio and therefore tuition revenue is insufficient to support salaries.
- ICR goes to research institutes so increases in extramural funding do not directly benefit the department.

OPPORTUNITIES:

- Increased interest in Climate Change could lead to higher enrollments.
- Increased collaboration across campus including three proposed new minors, one certificate and one professional endorsement.
- The possibility to put more courses online and partner with the international education community.
- Contributing to additional collaborative professional graduate programs such as Hazard and Emergency Management as well as Homeland and Food Security.

THREATS:

- Uncertainty and reduction of state funding leads to a decrease in staff and outsourcing of administrative functions.
- Decreased thesis completion fellowships poses a threat to timely graduation.
- Increased overhead rates make grant proposals less competitive.
- Changes in VISA regulations make it difficult to enroll international students.
- Lack of adequate high performing computer resources limits capability to run high performance earth system modeling.
- Declining student enrollment and tuition revenue.

CENTRALITY TO MISSION:

- UAF Mission Centric (STEM, Alaska, Arctic, International, Tier 1 research status).
- The program is unique to the UA system.

COST-EFFECTIVENESS:

- The cost of the program includes \$300,000 instructional for an average of 1.6 masters degrees and 1.6 PhDs per year.

	MAJORS	DEGREES
Atmospheric Science MS	AY15: 8/ AY19: 3	AY15: 3/ AY19: 0
Atmospheric Science PhD	AY15: 9/ AY19: 10	AY15: 1/ AY19: 2

COMMITTEE RECOMMENDATION FOR ATMOSPHERIC SCIENCES**Atmospheric Sciences MS:**

RECOMMENDATION:	ADDITIONAL COMMENTS:	DATE FOR FOLLOW-UP:
Revision or restructure (8 votes)	Academic programs may not be sustainable without restructuring of ICR revenue-sharing model between College and research institute.	one year (plan from dean and research director/s)

Atmospheric Sciences PhD:

RECOMMENDATION:	ADDITIONAL COMMENTS:	DATE FOR FOLLOW-UP:
Revision or restructure (8 votes)	Academic programs may not be sustainable without restructuring of ICR revenue-sharing model between College and research institute.	one year (plan from dean and research director/s)

Date: 11 November 2019
TO: Expedited Program Review Committee
FROM: Kinchel C. Doerner, Dean, College of Natural Science and Mathematics
SUBJECT: SWOT Analysis for the Department of Atmospheric Sciences

Introduction: The Department of Atmospheric Sciences is unique and only houses two graduate degrees, the M.S. Atmospheric Sciences and Ph.D. Atmospheric Sciences. The focus of the department is research and graduate education. The department offers graduate courses to support the M.S. and Ph.D. programs and those courses provide the majority of revenue. The faculty do, however, teach general education courses which supplement the revenue stream. Atmospheric sciences include study of climate, weather, and the physical factors that produce changes in these phenomena from both short-term and long-term perspectives. Clearly, these disciplines are required for understanding climate change and the warming trends of northern latitudes.

Strengths: The department's strength lies in the scholarly output of the faculty and the necessity of continuing the research. This area of research has important practical outcomes such as predicting the location and severity of wildfires and the interaction of sea ice with terrestrial weather systems. The faculty bring their extensive experience into the classroom and provide excellent graduate education opportunities for students. The program is also very small, only 1.5 full time faculty members, although the academic appointments are spread among 6 scientists.

Weaknesses: The revenue realized from undergraduate and graduate credit hours is insufficient to support faculty salaries. As of FY19 the faculty supported 8.5 students per faculty member. Using data not presented here, revenue would need to roughly (at least) double from the FY19 level for the department to be solvent. In the likely event of further reductions in state support, such as those predicted for FY20 and FY21, the revenue stream would necessarily need to further increase without increased faculty salary expenditures. Additional obstacles impeding the department is the tendency of undergraduate students to not pursue atmospheric science as a bachelor's degree. Students are not attracted to this discipline at appreciable levels, arguably, due to the quantitative nature of discipline and the lack of familiarity with the topic (e.g. few high schools provide instruction in atmospheric sciences with sufficient intensity to kindle an appreciation in the student student).

The funding model for the Department of Atmospheric Sciences is outdated, at best. The model requires that faculty salaries are funded from credit hours sold with state appropriation making up the balance. However, the department does not have an undergraduate program; salaries are nearly entirely supplemented by graduate tuition revenues. Due to the fact that research focused graduate programs must maintain a small student to faculty ratio, expectations of this program ever being financially viable are dubious.

Any increase in extramural funding received by faculty members will not benefit the department. All indirect cost recovery realized by Atmospheric Sciences faculty is received by the university to be applied toward general overhead costs or received by the research institute to which the faculty member has sponsorship. Thus, indirect cost recovery is not available to the department to supplement academic salaries or other academic expenses. Similarly, extramural funding, to expand research, which pays for tenured or tenure-track faculty salaries for a few years should not be considered a viable solution. Eventually, the extramural funding ends but the faculty salary costs continue, sometimes for decades. Thus, any claim that increasing levels of extramural funding will alleviate the fiscal challenges must be disregarded.

Opportunities: The department is already moving to expand their offerings to undergraduate students. These include offering undergraduate minors in Arctic Hydrometeorology, Air Pollution Meteorology, and Agrometeorology. Additionally, the department is pursuing a certificate and a professional endorsement in unmanned aircraft systems operations. These efforts are only in the preparations stages but will likely draw enrolment from around the state and country. The challenge for the departmental leadership will be to increase student credit hour revenue without increasing faculty salary expenditures. Revenues must increase disproportionately to expenditures for these efforts to be successful.

Threats: Threats to this department are typical to public institutes of higher education, which include declining student enrollment and declining state appropriations.

FACULTY COMMITTEE EVALUATION SHEET

DEPARTMENT:	Atmospheric Sciences, CNSM
PROGRAM:	Atmospheric Sciences
DEGREE:	MS

I. PROGRAM PRODUCTIVITY AND EFFICIENCY

1) Analysis of PAIR data:

a. Total SCH: is the trend positive or negative?

- Trend for SCH at graduate level decreased by 16.2%
- Trend in lower division SCH increased by 153% owing to development of online program.
- Program notes discrepancy in PAIR data for FY12 lower level SCH.

b. Majors: Does the number of majors seem to be unusually high or low? What is the trend over time?

- Majors appear consistent over time, average of 11 majors with 1.3 FTEs.
- Drop from FY14 to FY15 noted but explained by a high number of graduates in FY14.

c. Degrees: Does the number of degrees seem to be unusually high or low? What is the trend over time?

- Norm ranges from 2-4 graduates with an unusually high number in FY14.

d. Majors Per Degree Awarded, FY11-FY15: This number could be taken as an indication of how long it takes students to complete this degree. If it is a longer time than expected, does the report provide an explanation? Is the number high because many students are leaving the program (the "Look Forward/ Look Back" table can help determine this)?

- 2.6 years to degree is commendable.

e. Theoretical Tuition Revenue: Does the program generate a significant amount of tuition, particularly compared to its stated budget?

- Tuition revenue brings in 53% of departmental budget.
- Faculty bring in significant grant funding.

f. FTEs: does the number seem adequate for the program's needs?

- FTE's appear to be adequate for program needs.

2) Place of program within department mission and budget: How does this program complement other offerings in the department? Do faculty and staff effort and the budget associated with this program seem to fit the number of students and degrees completed per semester/year?

- DAS offers only MS and Ph.D. program (along with the service core course).
- Coursework in the MS and Ph.D. programs overlaps.

a. Sufficiency of resources: Are there concerns about the long-term sustainability of the program? Are there factors that impact the timeliness of a decision regarding this program (for example, retirements or resignations of faculty or loss of grant funding, or the need for a costly facility upgrade)? Does the budget seem adequate for the program's needs? Are there indications that it is being used efficiently?

- The program Review report indicates that resources are adequate, though it mentions that the number of students it accepts is limited to the number of students for whom faculty can secure grant funding.
- Declining access to federal research dollars may jeopardize program.

3) Productivity of faculty in publication, scholarship, funded research and service: Are the faculty in the program productive according to the standards of their discipline? Does the program have significant external funding to offset its budget?

- Faculty are highly productive in terms of publications.
- They have been highly successful in attracting extra-mural research funds.
- The departmental budget is subsidized by external research funds.

II. NEED FOR PROGRAM

1) Centrality to UAF mission & Core Themes: Does the report adequately link the program to the mission and at least one of the Core Themes?

- The program aligns well with UAF's mission. Faculty research focuses on Alaska, the Arctic and the circumpolar north, while having global implications, in particular with regard to climate change.

2) Important academic, community, or industry partnerships: Are there any special considerations when thinking about the need for this program (for example- are its students funded by an outside agency? Does another program depend on its offerings?)

- The report notes several strong partnerships with, for instance, NOAA, the NPS, and faculty at other American universities, as well as with international universities and scholars, and with the Calista Elders Council.
 - Proximity to NOAA National Weather Service offices have provided networking and collaboration benefits to students and faculty.
- All students in program are funded by extramural research funds.
- Faculty teach in DAS Ph.D. program. Program provides a core natural science designated class for the undergraduate curriculum. Program also serves needs of off-campus students by providing the core natural science designated course by distance.

- Program contributes to atmospheric sciences concentration in BS in Physics degree as well as to graduate requirements for environmental chemistry students.
- Classes are cross-listed with Chemistry, Physics and SFOS.

3) Duplication in the UA system. If the program duplicates another, is there a good justification for continuing UAF's program, such as local student demand, a special emphasis of UAF's program, or other?

- This program is unique in the UA system.

4) Demand by students or graduates: Does there seem to be sufficient student interest in the program? Are its graduates in demand by the workforce? Are they successful in finding employment or do they often pursue further education?

- Demand for the program is greater than can be satisfied by the current faculty.
- Graduates continue in Ph.D. programs or find employment in Alaska and elsewhere.

III. ASSESSMENT AND MISSION FULFILLMENT

1) Quality of SLOA plan: Check all that apply to the SLOA plan

- Program-specific SLOA plan
- Multiple measures of student outcomes
- At least one direct measure of student outcomes

No standardized direct measures of student learning outcomes.

2) Quality of SLOA reporting: Check all that apply to the SLOA summary

- Assessment information is collected regularly and submitted on schedule
- Measures described in the plan are addressed in the summary
- Assessment process has resulted in critical reflection and curricular improvement

There is no evidence in the report that this process has taken place.

3) Results of assessment: Is the program making significant progress toward meeting the outcomes that it has set for itself? Are its plans and summaries adequate?

- The program is meeting its identified outcomes. The SLOA and summary correspond well.
- While authoring conference abstracts and publishing peer reviewed articles are commendable accomplishments for MS students, the program needs to develop at least one standardized direct measure of student learning outcomes that is scored by the faculty.
 - A rubric with specific objectives for the thesis defense would be useful.

COMMITTEE RECOMMENDATION

[include vote tally to continue and discontinue]

Continue Program

11 Votes in favor

Discontinue Program

0 Votes in favor

Request Specific Improvements or Follow-Up (describe below)

The committee recommends adopting at least one standardized direct measure of student learning outcomes, such as a rubric for systematically evaluating comprehensive exams or the quality of the thesis.

ADMINISTRATIVE COMMITTEE EVALUATION SHEET

DEPARTMENT:	Atmospheric Sciences, CNSM
PROGRAM:	Atmospheric Sciences
DEGREE:	MS

1. Comments on program productivity and efficiency:

The number of students and graduates has remained stable over the review period. Student numbers are limited by the availability of federal funding as faculty are hesitant to admit students without funding to support them.

2. Comments on need for program:

The program is unique to Alaska. Graduates are tracked by the program and show strong placement. The program is linked to the mission and core themes.

3. Comments on assessment and mission fulfillment:

As the faculty committee points out, learning outcomes are mostly indirect and the summary is not well linked to the plan.

COMMITTEE RECOMMENDATION

[include vote tally to continue and discontinue]

Continue Program

8 Votes in favor; 1 abstention

Discontinue Program

0 Votes in favor

Request Specific Improvements or Follow-Up (describe below)

The committee recommends adopting at least one standardized direct measure of student learning outcomes, such as a rubric for systematically evaluating comprehensive exams or the quality of the thesis.

Date: 11 November 2019

TO: Expedited Program Review Committee

FROM: Nicole Mölders, Uma Bhatt, Xiangdong Zhang, Richard Collins and Javier Fochesatto (Chair). Department of Atmospheric Sciences Faculty.

SUBJECT: SWOT Analysis for the Department of Atmospheric Sciences MS and PhD

DEPARTMENT OVERVIEW:

UAF is the leading US-Arctic Research University with a strong focus on Climate Change. The Department of Atmospheric Sciences provides education related to weather, air quality and climate within the missions of CNSM and UAF delivering university wide the fundamentals of the climate system and climate impacts research.

STRENGTHS:

The strengths of our department comes from a combination of our impactful research and graduate curricula, which prepares our graduates to succeed.

- **The department is the only department of atmospheric sciences in the State of Alaska.** Our research addresses needs in Alaska and the Arctic (e.g., Alaskan residents, State organizations and private sector, federal organizations, etc). Our department supports cutting-edge research programs at UAF and brings international leadership to UAF in Arctic research and education. The department is aligned with UAF goals (Modernize the student experience, Solidify our global leadership in Alaska Native and Indigenous programs, Achieve Tier 1 research status, Transform UAF's IP development and commercialization enterprise, Embrace and grow a culture of respect, diversity, inclusion and caring, Revitalize key academic programs).
- **The department has strong faculty.** The department has 6-joint appointed faculty members comprising 2 FTEs. The joint-appointments resulted in a very-lean program with a high research revenue value, strong scholarship and creativity of our faculty. In the evaluation period 2015-2019, the faculty published 129 journal peer reviewed papers, three book chapters, one textbook and brought in a total of \$45.97M working as PIs or in projects with UAF and external colleagues as Co-PIs.
- **We attract students to Alaska from the state, the nation and around the world.** On average during the evaluation period we had 16.1 graduate students per year supported by our own grants resulting in approximately \$300K in student support (tuition, stipends, fees and health insurance). Currently, the department has a total of 21 students from which 6 are MS students and the rest are PhD. Faculty at UAF from outside the department place and support their students in our programs.
- **Our academic programs meet the needs of diverse student populations.** Provision of core science courses that fit distance delivery. Our department has five e-learning classes and most of 600 level courses have been stacked to 400 level courses. This provides access for students across disciplines and campuses, in communities across Alaska and nationwide. Furthermore, this enables workforce and professional development. We offer courses that allow students to study their local environment and to connect with the regional and global environment

(*Observe locally and connect globally*) as a network of students across Alaska. Our faculty also teach abroad in different settings and countries (e.g., Iceland, Colombia, China, Finland, etc). Our department is a UCAR member for research and our academic program is certified by NCAR-National Center for Atmospheric Research. This affiliation provides professional opportunities for graduate students since: 1) they benefit from shared computational facilities and software available to major universities across the country and, 2) they work in an environment that is professionally recognized as the worldwide top level for weather, climate and atmospheric sciences.

- **Our students are successful in achieving their professional goals.** As part of their education they have access to first class research facilities and international projects (e.g., NABOS, Lidar Research Laboratory, Arctic Facility for Atmospheric Remote Sensing, Laser Raman Spectroscopy Lab., UCAR-NCAR facilities and specialized training, etc). Our graduates find careers in academia, private, public and research settings both in the US and around the world. For example, recent graduates are now working in the private sector as Senior Meteorologists in FedEx (Memphis, US), Maersk (Singapore, Malaysia) and in the public sector at NASA, NCAR and NRL and in education sectors in the US and other countries.

- **Our department has established strong collaborations across UAF, the State, the Nation and worldwide.** The department also produced datasets from small scale meteorological experiments to large scale climate datasets that are of use by the scientific community, Alaskan private sector and the community abroad. The department is also the hub for large scale earth system science modeling of ocean and atmospheric processes related to climate change, regional climate projections, mesoscale dynamics and hydrometeorology as well as expertise on experiments from microscale surface-atmosphere interaction to upper atmosphere mesosphere phenomena. Our faculty integrates organizations having a worldwide impact in climate sciences and policies in both areas of atmospheric and ocean processes related to climate change (e.g., NABOS program, serving on the IPCC panel, serving in UCAR/NCAR, NASA for science mission definitions and program evaluations, and in several leading editorial roles in American and European Journals).

WEAKNESSES:

The major weakness we see in our analysis is that our department provides graduate education only.

- **The lack of an undergraduate program makes our department vulnerable.** The analysis of performance indicators such as Department Revenue(including tuition fees only) / (Labor Total + Direct Expenditures)~ 0.24 for FY19 gives lower than optimal values. Historically, this ratio was 0.28 on average from FY15 to FY19. To address this weakness we have increased the number of distance classes, stacked most of our graduate classes with the 400 level, and proposed three new minors, one new certificate and one professional endorsement.

- **Two year rotation schedule of teaching classes complicates planning in other departments.** The two-year rotation of classes (2 FTEs) makes it difficult for other departments to coordinate their students requirements. For example, Geosciences has some of our classes as 'options' such as ATM 610 Analysis Methods in Meteorology and Climate. Due to DAS course scheduling, it has not been offered recently.

- **Reduction of support staff has increased administrative demands on faculty.** Budget cuts have resulted in fewer staff and lost institutional memory from retirements and unfilled positions. This has increased the responsibilities of current staff and faculty, but also has led to many processes falling through the cracks. The follow-up management to deal with crises is time consuming. The growing outsourcing of tasks to faculty, leaves less time for the key missions of teaching and research.

OPPORTUNITIES:

The worldwide rise of climate change concerns is stimulating in the new generations of students an increasing appeal to climate science in its diverse expressions throughout science and engineering fields. Intensifying and diversifying the scientific and academic formation as well as streamlining professional formation in this wide area of climate change is a focus for UAF.

- **Increasing academic partnerships across campus(es).** We have developed three minors; *Air Pollution Meteorology* and *Arctic Hydrometeorology* in collaboration with the UAF CEM-Department of Civil and Environmental Engineering and *AgroMeteorology* in collaboration with CNSM-Department of Natural Resources and Environment. *Air Pollution Meteorology* is a minor proposed in CNSM and includes CEM faculty and faculty from the Department of Chemistry. This minor train students in models used for atmospheric dispersion of contaminants quantification and in the techniques and methods needed to succeed in job opportunities as engineers or science majors looking at companies focused on environmental analysis and consulting. *Arctic Hydrometeorology* is a minor proposed in CNSM in collaboration with CEM departments in UAF and UAA. This minor prepares students to use remote sensing methodologies and atmospheric models to produce quantitative seasonal analysis of icing and snow accumulation of key importance for hazard evaluation in the area of transportation as well as flood analysis. *Agrometeorology* is a minor proposed in CNMS in collaboration with faculty in the Department of Natural Resources and Environment. Food security is a worldwide issue that strongly relates to weather and climate analysis. This transdisciplinary minor prepares students for a market that has an increasing demand from insurance companies to crops manufacturers. Similarly, we also developed a Certificate for Unmanned Aircraft Systems Operations (UAS-Ops) and one Occupational Endorsement for UAS-Ops in collaboration with faculty at CEM-Electrical Engineering and ACUASI personnel. This area of business is expected to generate \$1B of revenue with entry level salary of \$100K. One Health Science is another opportunity since Air Quality as well as thermal comfort have adverse health impacts. Thus, the proposed programs are strategic in the workforce development and in combining our assets to help students succeed. Such programs embedded in the high profile structure of departments and centers/institutes gives UAF an extra attraction improving enrollment.

- **Hazard and Emergency Management as well as Homeland and Food Security require understanding of weather and climate data.** Based on our academic experience abroad; universities in the US and in other countries we have identified the need for non-traditional graduate programs. In order to be more attractive to these students we are in the process to develop graduate programs that emphasize: 1) workforce development and 2) non-traditional interdisciplinary science.

For example, we are developing an MA program two years where the academic requisite for graduation are accomplished in the first year and with an internship in an organization where the

student will acquire real-world experience in a desired area of development. An example of such a program may be (*MA: Climate Change and Global Sustainability*).

- **Growth of the sustainable economy.** Increasing Challenges in the Energy and Transportation Sectors (Wind, Solar, icing, road and visibility conditions, etc) require insight into weather and weather forecasting, wildfires prediction and economical losses. In order to arrive at a substantive increase of students we are studying the implementation of an undergraduate academic level. The specific focus is yet under discussion but it could involve meteorology, atmospheric sciences, climate sciences. This process has been in our strategic planning. We have been implementing the 400 level courses and several of them online as well as 100 level with great success so far. In the near future with a little more effort, developing the 300 level courses our department would be in a position to launch the undergraduate level with basically the same faculty without the need of further hires. This implementation can also be accomplished including the fast track 5 yrs plan to get the BS+MS program. That way the department will remediate the 62.5 % decrease in MS student cohort indicate by PAIR data. MS programs is also too expensive in the way the department runs it. In that way grant support will be dedicated to PhD programs basically.
- **Partnership with international education community.** In order to create new, exciting and high value added marketable opportunities we are developing partnerships with institutions across the country and abroad. Students are searching for graduate study abroad programs with new and exciting transdisciplinary professional development.

THREATS:

- **The uncertainty of State funding and Status of the University of Alaska Fairbanks may negatively impact student enrollment.** Student applicants in 2019 were concerned about studying at UAF. These concerns were about faculty retention and hence the quality of their education as well as the stability of the program.
- **The decrease in availability of thesis completion fellowships.** This poses a threat to timely graduation. Federal grants normally fund three-year graduate programs and there is a need to support the graduate students for final completion.
- **Increasing overhead rates makes our proposals less competitive.**
- **Outsourcing administrative tasks and computational support to faculty.** This is a great factor of distraction for faculty from our main mission which is research, education and student mentoring.
- **Instability in the International Arctic Politics.** This is a factor that introduced interruption in our international collaborations and may impact delayed students graduation and student attraction from overseas.
- **Policies and visa regulations impose extra hurdles for international students.** Our campus has significant value for international students however, regulations and policies limits their choice to come to UAF campus and get their degrees. Similarly overseas organizations have cancelled their exchange programs.
- **Lack of adequate support for high performance computing resources.** Software and computational network support limits our capability to run high performance earth system modeling.