Board of Trustees
Academic and Student Affairs Committee
April 27, 2020 from 9:00 am – 12:00 pm
Zoom Meeting

REVISED 4-22-2020

BOARD COMMITTEE MEETING LIVE AUDIO STREAM

AGENDA

9:00-9:20am
Tab 1 Change to Board Policy 310 on Tenure, and Amending Academic & Student Affairs Duties and Responsibilities

9:20-9:30am
Tab 2 UMS COVID-19 Responses

9:30-9:50am
Tab 3 UMS Early College Initiative Update

9:50:-10:00am
Tab 4 New Policy Proposal: UMS Academic Integrity Policy

10:00-10:20am
Tab 5 Programs for Examination Update

10:20-10:40am
Tab 6 Brightspace Learning Management System Migration

10:40-10:50am
Tab 7 Unified Accreditation Update

10:50-10:55am
Tab 8 Faculty Representative Discussion

10:55-11:00am
Tab 9 Student Representative Discussion

11:00am-11:10pm **Executive Session**

Following the Executive Session, the Committee will reconvene the Public Meeting to take action on the following items:

11:10am-11:15am
Tab 10 Tenure at Time of Hire, Professor of Law

11:15-11:25am
Tab 11 Academic Program Proposal: B.S. in Computer Science, UMPI

11:25-11:35am
Tab 12 Academic Program Proposal: B.S. in Health Administration, UMPI

11:35-11:45am
Tab 13 Academic Program Proposal: B.S. Environmental GIS, UMM

Items for Committee decisions and recommendations are noted in red.
Note: Times are estimated based upon the anticipated length for presentation or discussion of a particular topic.
An item may be brought up earlier or the order of items changed for effective deliberation of matters before the Committee.

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

AGENDA ITEM SUMMARY

1. NAME OF ITEM: Change to Board Policy 310 on Tenure, and Amending Academic & Student Affairs Duties and Responsibilities

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: X **BOARD ACTION:**

4. OUTCOME: **BOARD POLICY:**
310 and Academic & Student Affairs Committee Duties and Responsibilities

5. BACKGROUND:

Board Policy 310 on Tenure and the accompanying administrative procedures first came into effect in 1970, and were revised in 1990. The Vice Chancellor for Academic Affairs and the General Counsel and Chief of Staff to the Chancellor recommend specific changes to update the policy to better reflect the expectations of operating under unified accreditation. These include:

- Specifying Board authority to approve tenure-track faculty lines;
- Adjusting guidelines and numbers;
- Aligning language with unified accreditation to remove ambiguity; and
- Amending the Academic & Student Affairs Committee oversight responsibilities to reflect the above.

4-17-2020

Draft Proposed Changes to Board Policy 310 - Tenure

Effective: 6/7/70
Last Revised: 7/9/90, 4/XX/20
Procedures for ~~Awarding~~ Granting Tenure

The decision to grant or not to grant tenure rests solely with the Board of Trustees. Nothing in these guidelines, or in the criteria developed under these guidelines, or in the approval of the criteria, shall limit or restrict that discretionary authority of the Board.

The Board exercises its authority to grant tenure in two primary ways: by approving the filling of any tenure-track faculty line, and by considering the grant of tenure for faculty who have completed their probationary periods with a recommendation from their respective university that they be granted tenure.

Draft Proposed Changes to Administrative Procedures for Granting Tenure

Guidelines:

1. University Presidents seeking either new or replacement tenure lines must request approval to fill the lines from the Academic and Student Affairs Committee of the Board. The ASA Committee will review such requests in a timely fashion and forward its recommendations to the Board of Trustees for which tenured faculty lines should be filled.

2. Each new appointee should receive a letter of appointment that includes, as a minimum, such data as:

a. academic rank and/or title of position;
b. general duties to be performed;
c. beginning and ending dates of appointment;
d. type of appointment – probationary, temporary;
e. indication of amount, if any, or prior service to be counted toward probationary period;
f. salary.

3. The specific assignment of prior credit will be part of the letter received at the time of initial appointment. The time credited as probationary years with regard to service at other institutions of higher education, whether ~~units of~~ universities in the University of Maine System or not, shall not exceed three years.

4. A probationary appointment shall not exceed six consecutive academic years in a full-time position on a single ~~campus~~ university. A leave of absence, sabbatical, or teacher improvement assignment shall not constitute a break in continuous service, nor shall it be included in the six-year period without prior written agreement between the faculty member and the President at the time of the request.

5. Individuals on probationary appointments shall normally complete the full term, i.e., the sixth year, before the Board ~~awards~~ considers granting tenure.

6. At the time of initial appointment, exceptionally qualified individuals may be ~~awarded~~ granted tenure at the rank of full professor, with the approval of the appointment by the Trustees. In other cases, as the ~~institutions~~ universities deem appropriate, full professors may receive an initial appointment without tenure but, with Trustee approval at the time of their appointment, may be given the opportunity to apply for tenure during the second year of their appointment.

7. Tenure shall not be awarded ordinarily below the associate professor level or its equivalent.

8. Each ~~institution~~ university shall develop its criteria for promotion and tenure, and, once developed, a statement of such criteria shall be forwarded to the Chancellor and the Trustees for review and approval and thereafter be made available by the ~~campus~~ university administration to all faculty members in the ~~institution~~ university. These criteria shall include reference to teaching, public service, research, and scholarship activities as are appropriate to the ~~University~~ System and ~~institution~~ university missions. Criteria may vary among units or departments, but shall be in accord with the overall ~~campus~~ university criteria.

9. Student input is a desirable and meaningful part of faculty evaluation, and the contribution students make to the evaluative process is essential to the improvement of instruction. Student evaluations are to be secured on a regular, systematic, and equitable basis and made part of the official record.

10. Evidence should be obtained from outside the ~~institution~~ university and from outside the University of Maine System, as appropriate, regarding the scholarship and research of candidates for tenure.

11. Tenured and non-tenured faculty, ~~as well as nontenured faculty,~~ shall be reviewed on an annual basis. Each ~~institution~~ university shall develop its own criteria for faculty evaluation, and, once developed, a statement of such criteria shall be forwarded to the Chancellor and the Trustees for review and approval and thereafter be made available by the ~~campus~~ university administration to all faculty members in the ~~institution~~ university.

12. The tenure guidelines provide the policy framework for the process to be followed at each ~~institution~~ university. Where exceptions are sought, it is necessary that the ~~campus~~ university present its request in detail, including the rationale for the exception, to the Chancellor and the Board of Trustees.

13. Tenure may be transferable among the ~~institutions~~ universities of the University of Maine System at the discretion of the Board of Trustees, consistent with the tenure policies of the ~~institution~~ university to which transfer is sought.

14. Senior administrators shall not be awarded tenure as part of their administration contracts. However, the Trustees will consider, on an exceptional basis, a nomination to tenure for an academic dean, when presented under these conditions:

~~1.~~ a. the nominee will have been accepted by an appropriate academic department and accorded faculty rank, at the time of appointment as academic dean;

~~2.~~ b. the nomination will have been duly evaluated through the ~~campus~~ university tenure processes.

15. A chief academic officer or other university employee in a position at the level of vice president may be considered for tenure to be effective upon assuming a full-time faculty appointment after completion of service in the administrative position. The employee must have been accepted by an appropriate academic department and accorded faculty rank at the time of appointment to the administrative position. Evaluation for tenure will occur under the university's tenure process at the time of initial appointment, or, with approval of the President, during the final year of service in the administrative position. The final decision regarding the ~~award~~ grant of tenure is made by the Board of Trustees. If tenure is granted, it will not be effective until the date the employee assumes the full-time faculty position and the term in the administrative position ends.

See: Policy Manual Section 310: Tenure

University of Maine
System Board of Trustees

Academic and Student Affairs Committee
Duties and Responsibilities

Committee established: 1993
Last revised: 10/14/2009; 8/23/2010; 5/23/2011; 9/5/2013
Approved by the Board of Trustees: 5/23/2011; 9/23/2013

The Academic and Student Affairs Committee shall have oversight of the following:

- curricular aspects of the University of Maine System (System), including the articulation of the academic mission of the System, the quality of the faculty, the quality of the academic program including but not limited to program delivery, degree completion, etc, and activities that support the academic mission of the System;
- all activities related to all populations of students including student recruitment, retention, student success, and all other activities and initiatives

Committee Authority

Academic Affairs:

Bylaws – Section 3
Board of Trustee Policy Manual
Section 213 – Honorary Degrees
Section 300 – Academic Affairs
Section 600 – Human Subject Review
Section 1000 – Review of Non-Academic Programs

Student Affairs:

Bylaws – Section 3
Board of Trustee Policy Manual
Section 500 – Student Affairs

The primary duties and responsibilities of the Committee shall be to:

Academic Affairs:

Have oversight of the shaping and reviewing of policies affecting the overall curricular program.

1. Review and make recommendations to the Board on the approval, suspension or elimination of degree programs at the universities.
2. Have oversight of the academic support programs, including faculty and academic staff development.
3. Make recommendations to the Board of Trustees with respect to promotion and ~~awarding~~ granting of tenure, including the approval of proposed tenure-track faculty lines requested by the Presidents of the universities.
4. Review of periodic reports from the campuses reflecting on philosophy, organization, conduct, and funding of their athletic programs.
5. The Committee is responsible for sending the following agenda items to the Board of Trustees for review or approval:
    a. Creation or Elimination of an Academic Program
    b. University Mission Statements

c. Awarding of Academic Degrees
d. Organization and Establishment of Major Units
e. Named Chairs and Professorships and University Professorships
f. Tenure
g. Academic Calendar
h. Diversity Plans
i. Honorary Degree Nominations

Student Affairs:

1. At least every three years ensure to conduct a review of the UMS Student Conduct Code and recommend for approval.
2. The Committee also reviews other student codes, behaviors, or ethics (i.e., student athletes).
3. The Committee is responsible for sending the following agenda items to the Board of Trustees for review or approval
    a. Recruitment and Admissions Updates
    b. Discussions Regarding Student Success
    c. Retention Strategies
    d. Financial Aid Discussions
    e. UMS Student Conduct Code
    f. Enrollment Reports
4. All Committee actions shall be reported to the Board for approval.

Membership of the Committee

The Academic and Student Affairs Committee shall be made up of at least three voting members of the Board of Trustees. Typically, the Chair and Vice-Chair of the Board and the Chancellor shall be ex-officio members, but the Chancellor shall have no vote. Faculty and Student Representatives to the Board may be members of the Academic and Student Affairs Committee, but have no vote.

Meetings

Meetings of the Committee ordinarily shall be called by the Committee Chair, but may be called by the Chair of the Board or a majority of the Committee.

Staff to the Committee

The Academic and Student Affairs Committee shall be staffed by the Vice Chancellor for Academic Affairs and the Chief Student Affairs Officer.

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

AGENDA ITEM SUMMARY

1. NAME OF ITEM: UMS COVID-19 Responses

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: X **BOARD ACTION:**

4. OUTCOME: **BOARD POLICY:**

5. BACKGROUND:

The novel coronavirus has had a significant impact on the operations of all the UMS universities, and of the System itself. It has required additional efforts on behalf of students and their families, university faculty, staff, and administrators, and System personnel. The academic enterprise has remained at the heart of these challenges, and the UMS and its universities are committed to mitigating the impact of COVID-19 on its students. They have, therefore, adopted a set of agreements that add flexibility, demonstrate understanding of students' experiences, and address their concerns. The Vice Chancellor for Academic Affairs, Dr. Robert Placido, will summarize those efforts.

4-17-2020

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

AGENDA ITEM SUMMARY

1. NAME OF ITEM: UMS Early College Initiative Update

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: X **BOARD ACTION:**

4. OUTCOME: **BOARD POLICY:**
Academic Collaborations and
Student Success

5. BACKGROUND:

Dr. Amy Hubbard, the UMS Executive Director of Early College, will discuss the initiatives undertaken in the context of helping the high schools and Early College students handle COVID-19 disruptions. She will also provide an update on collaborative efforts with the Maine Community College System.

Updates include:

- How UMS campuses are working with and supporting high school concurrent enrollment teachers in response to the transition to online learning;
- Communicating and collaborating with school counselors and administrators;
- Providing student support services including advising, P/F options, NetTutor;
- Maintaining our programs and processing applications with our online application portal ExplorEC; and
- Collaborating with the MCCS to utilize the portal to ensure student access, continue our work in promoting purposeful course selection, shared use, and simplify the application process and course tracking for our high school partners.

4-17-2020

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

AGENDA ITEM SUMMARY

1. NAME OF ITEM: New Policy Proposal: UMS Academic Integrity Policy

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: X **BOARD ACTION:**

4. OUTCOME: **BOARD POLICY:**
New policy proposal
UMS Academic Integrity Policy

5. BACKGROUND:

The UMS has had a System-wide Student Conduct Code since 1972; however, there has not been a similar approach to academic integrity, the policies for which remain varied and at the campus level. The proposed UMS Academic Integrity Policy is an intended counterpart to the Student Conduct Code, and will provide necessary fairness, transparency, and uniformity for students, faculty, and staff in the context of unified accreditation.

In 2018, the office of the Vice Chancellor for Academic Affairs convened a workgroup made up of representatives from each campus drawn from faculty, student affairs, and other relevant departments, to review existing campus Academic Integrity Policies and craft a new policy for System-wide implementation. The proposed policy was shared in draft form multiple times with all campuses, their Chief Academic Officers, and their Presidents. The policy was accordingly revised based on their collective feedback. It has also been vetted through the UMS General Counsel's Office to address any compliance and due process concerns.

The Office of the Vice Chancellor for Academic Affairs recommends that the Board accept the proposed new policy on Academic Integrity for September 1, 2020 implementation.

University of Maine System Academic Integrity Policy Effective as of September 1, 2020

Academic integrity violations strike at the heart of the educational mission of the University of Maine System. The academic community of the University of Maine System recognizes that adherence to high principles of academic integrity is vital to the academic function of the University. Academic integrity is based upon honesty. All students of the University are expected to be honest in their academic endeavors. All academic work should be performed in a manner that will provide an honest reflection of the knowledge and abilities of each student. All members of the academic community should regard any breach of academic honesty as a serious offense.

In accordance with the System's mission, campuses within the System have increased cooperative programs with each other to provide better access to courses and programs for students. Students are taking University courses while still in high school, the number of non-traditional students is increasing as is enrollment in on-line and asynchronous courses, and students are increasingly taking courses from multiple campuses during the same semester. All of these factors represent positive change because they represent increased educational opportunity for all students. These factors also require that the University of Maine System adopt this System Academic Integrity Policy to set forth specific and uniform standards of academic integrity that will apply to all courses on all campuses within the System.

Each University campus may adopt procedures for carrying out the provisions of this Policy within the guidelines set forth by this Policy as described below, as long as those campus procedures are consistent with this Policy. Professional schools, such as the School of Law, having a professional code of ethics may adopt additional procedural provisions to be applicable to their own students, as long as they are consistent with this Policy and all procedural requirements of this Policy are met.

Responsibilities:

While the institution offering the course has jurisdiction in matters of academic integrity, the entire academic community shares the responsibility for establishing and maintaining standards of academic integrity. Those in charge of academic tasks have an obligation to make known the standards and expectations of acceptable academic conduct in all academic contexts (e.g. classrooms, online, research, laboratories, clinicals, internships, etc.). Each student has an obligation to know and understand those standards and expectations. While the academic community recognizes that the responsibility for learning and personal conduct is an individual matter, all students, faculty, and staff are expected to help to maintain academic integrity at the University by refusing to participate in, or tolerate, any academic dishonesty.

Violations:

Academic integrity means not lying, cheating, or stealing. To cheat on an examination, to steal words or ideas of another, or to falsify the results of one's research corrupts the essential process by which knowledge is advanced. Cheating, plagiarism, fabrication of data, giving or receiving unauthorized help

on examinations, and other acts of academic dishonesty are contrary to the academic purposes for which the University exists.

Violations of academic integrity include any actions that attempt to promote or enhance the academic standing of any student by dishonest means. Academic integrity means that one's work is the product of one's own effort, and that one neither receives nor gives unauthorized assistance in any assignment. Because advanced academic work depends on the sharing of information and ideas, academic integrity at the college level includes rigorous adherence to the conventions for acknowledging one's use of the words and ideas of other people.

Put plainly: academic honesty is very important. It is dishonest to cheat on exams, to copy term papers or to submit papers written by another person, to fabricate experimental results, or to copy parts of books, articles, or websites into your own papers without putting the copied material in quotation marks and clearly indicating its source.

Types of Academic Integrity Violations

The following is a listing of most, but not necessarily all, actions that are violations of academic integrity:

I. Plagiarism

Plagiarism is the submission of another's work as one's own, without adequate attribution. Plagiarism is academic theft. Examples include, but are not limited to:

a. Submitting as one's own work an examination, paper, homework assignment, or other project (laboratory report, artistic work, computer program, etc.) that was created entirely or partially by someone else, including works purchased from a vendor.

b. Failure to use quotation marks to signal that one is using another person's precise words. Even brief phrases must be enclosed in quotation marks.

c. Creating an academically dishonest paraphrase. When paraphrasing (presenting another person's ideas or information in one's own words), one must find truly one's own way of expressing the original meaning. Simply inserting synonyms into the source's sentence structures is plagiarism.

d. Failure to identify the source of quotations and paraphrases. Of course one must cite the source of quotations; one must also cite the source of ideas and information that is not common knowledge even when paraphrased (presented in one's own words). Sources include unpublished as well as published items -- for example, books, articles, material on the Internet, television programs, instructors' lectures, and people, including other students, friends, and relatives.

e. Failure to identify the source of the elements of a nonverbal work (for example, a painting, dance, musical composition, or mathematical proof) that are derived from the work of others.

II. Cheating

Cheating is the act or attempted act of deception by which a student seeks to misrepresent that he/she has mastered information on an academic exercise that he/she has not mastered. Cheating is also the use or attempted use of unauthorized assistance in an examination, paper, homework assignment, or other project. Examples include, but are not limited to:

a. Copying answers from another student's examination.

b. Communicating in any way with another student or a third party during an examination without the permission of the instructor.

c. Using unauthorized materials or devices (including notes, textbooks, calculators, and communication devices) during an examination without the permission of the instructor.

d. Obtaining and/or reading a copy of an examination before its administration without the permission of the instructor.

e. Collaborating with other students or third parties on a take-home examination, paper, homework assignment, or other project without the permission of the instructor.

f. Duplicate work: submitting a paper or other project in more than one course without the permission of the instructors. Students are expected to produce original work for each course. A student should not submit identical or substantially similar papers or projects in two different courses (in the same or different semesters) unless both instructors have given their permission.

III. Fabrication

Fabrication is the use of invented information or the falsification of research or other findings in an academic exercise. Examples include, but are not limited to:

a. Fabrication of a citation: inventing a citation for a research paper or other project.

b. Alteration of an assignment: changing a graded examination, paper, homework assignment, or other project and re-submitting it to the instructor to claim an error in grading.

c. Changing findings, excluding valid data that doesn’t support one’s thesis, or engaging in other similar activities.

IV. Contributing to academic dishonesty

Contributing to academic dishonesty is assisting another student's academic dishonesty. Examples include, but are not limited to:

a. Writing a paper or other project for another student.

b. Allowing another student to copy from one's examination, paper, homework assignment, or other project.

c. Assisting another student on a take-home examination, paper, homework assignment, or other project if one knows such assistance is not authorized by the instructor.

V. Other forms of dishonest academic conduct

Other forms of dishonest academic conduct include any actions by which one seeks an unfair academic advantage over others. Examples include, but are not limited to:

a. Destroying or altering the academic work of another student.

b. Lying about or otherwise misrepresenting the work of another student.

c. Selling or giving away all or part of an unadministered test including answers to an unadministered test.

d. Bribing any other person to obtain an unadministered test or any information about the test.

e. Entering a building or office for the purpose of obtaining an unadministered test.

f. Continuing to work on an examination or project after the time specified for the student has elapsed.

g. Entering a building or office for the purpose of changing a grade in a grade book, on a test, or on other work for which a grade is given.

h. Changing, altering, or being an accessory to the changing and/or altering of a grade in a grade book, on a test, a “change of grade” form, an electronic record, or other official academic record of the University that relates to grades.

Procedures:

Alleged violations of the Academic Integrity Policy are to be administered through the procedures below as soon as they have been detected. These procedures are designed to create a fair and consistent system for dealing with alleged violations. Students are strongly encouraged to respond to violations of academic integrity that they witness by reporting the violation to the instructor of the course in which it occurred.

While their case is pending or after they have been found in violation of the Academic Integrity Policy, students may not withdraw from the course in which the alleged or established violation occurred.

1. If a faculty member (including an instructor or graduate teaching assistant) has information that a violation of academic integrity may have occurred during an academic term, the faculty member will inform the student in private (either in person or in writing) of the information the faculty member has, the specific incident and the aspect of academic integrity that is alleged to have been violated. The student shall be provided with the opportunity to explain the circumstances and the action. The allegation may be dropped by the faculty member if an explanation by the student is accepted as being adequate.

2. If, after hearing the student's explanation, the faculty member chooses to continue the complaint, the faculty member will complete an Academic Integrity Violation Form within ten business days in order to document the violation and any informal resolution or any academic sanction(s) imposed by the instructor. This action includes notifying the Student Conduct Officer and the appropriate academic administrator. The Academic Integrity Violation Form can be found on the University of Maine System website, at the following URL:

3. The faculty member will provide the student with a copy of the completed Academic Integrity Violation Form in person or via email.

4. Upon receipt of the Academic Integrity Violation Form, the student has ten business days to:

> a. Admit to the violation of the Academic Integrity Policy by signing the appropriate line on the form. If this option is chosen, or if the student does not return the form, the academic sanctions imposed by the instructor automatically apply. The academic administrator will supply a copy of the form to the Student Conduct Officer.
>
> b. Contest the faculty member's finding regarding the violation of the Academic Integrity Policy and/or the appropriateness of the imposed sanction(s) by signing the appropriate line on the form and submitting a letter requesting review to the Dean of the College or designated academic administrator. The letter (no more than two pages in length) requesting review shall state the violation(s) and/or sanction(s) to be reviewed and a detailed rationale for the request for review.

Sanctions:

A student who admits to being responsible or who is found to be responsible for a violation of academic integrity will be subject to appropriate academic sanctions. Academic sanctions will be determined in accordance with the procedures outlined below. The exact academic sanction will depend on the particular circumstances of each individual case. **Academic sanctions imposed under this policy are completely separate and independent from any disciplinary action, which may be taken against the student under the University of Maine System Student Conduct Code.** A student may receive both an academic sanction and a disciplinary sanction for the same act of academic dishonesty. A disciplinary

sanction may only be imposed upon the student in accordance with the University of Maine System Student Conduct Code.

Repeated violations or those deemed sufficiently serious may be referred directly to the Student Conduct Officer for appropriate action under the Student Conduct Code. Whether an allegation of academic misconduct is "sufficiently serious" will be determined by the College Dean or designated academic administrator in consultation with the Chief Student Affairs Officer.

The following is a list of possible academic sanctions that may be imposed upon students for violations of academic integrity. This list shall not be taken to be exhaustive and may be modified or enlarged to meet particular circumstances in any given situation. A combination of two or more of these academic sanctions may be imposed when justified by the type of violation.

1. The faculty member can impose appropriate grade penalties up to and including F or zero grades on an assignment, exam or paper, and/or in one or more courses. Faculty members may be permitted to exercise discretion in prescribing lesser penalties or additional academic tasks appropriate to allow the student to complete a course and thereby receive a grade representing demonstrated knowledge of the course.

2. The faculty member, the Dean, or other appropriate academic administrator may impose other academic actions as may be appropriate (e.g. referral to the academic program for consideration of continuance in that program).

Further Procedures:

1. If a student contests the faculty member's finding, a hearing will be scheduled before the Dean of the College or, in the absence of a Dean of the College, another academic administrator designated by the Chief Academic Officer or their designee.

a. Within seven business days of receipt of the letter requesting review, the Dean of the College or designated academic administrator will notify the student and faculty member of the date, place, and time of the hearing.

b. Prior to the hearing, the Dean of the College or designated academic administrator will review the Academic Integrity Violation Form, information provided by the faculty member, and written and verbal statements provided by the student, the faculty member, and any witnesses. At the hearing, the student may ask questions of the faculty member or other witnesses through the dean or designated academic administrator.

c. The reporting faculty member will attend the hearing, and can ask questions of the student or other witnesses through the dean or designated academic administrator.

d. Students may bring a support person with them to the hearing, but the support person shall not be permitted to speak during the hearing except quietly to the student.

e. The Dean of the College or designated academic administrator will make a determination regarding the request for review within two weeks of the hearing. The outcome of the review may result in a higher sanction, lower sanction, the same sanction, or no sanction at all being imposed. The Dean or designated academic administrator will notify the student and faculty member in writing of their final decision and provide a copy to the Student Conduct Officer.

2. The student or faculty member may each request a review of the Dean's or designated academic administrator's decision by submitting a letter (no more than two pages) requesting review of their decision to the Dean or designated academic administrator no later than two weeks after receipt of the Dean's or designated academic administrator's decision. The letter shall state the violation(s) and/or sanction(s) to be reviewed and a detailed rationale for the request for review. If either party requests a review, the other party shall be provided with a copy of the request for review letter. The review of the Dean's or designated academic administrator's decision shall be a paper review and shall be conducted by an Academic Appeals Committee or the Chief Academic Officer (CAO). If a Committee is appointed, it must have an odd number of members and include at least one student and two faculty members. The Committee or CAO will consider all written information provided by the faculty member, all written information provided by the student and any witnesses and the Dean's or designated academic administrator's written decision. The Committee (by a simple majority) or CAO will then make a determination regarding the request for review within two weeks of receiving the request. The outcome of the review may result in a higher sanction, lower sanction, the same sanction, or no sanction at all being imposed. The decision of the Committee or CAO will be the final decision, and is not subject to review. The Committee or CAO will notify the student, the faculty member and the Dean or designated academic administrator in writing of their final decision and provide a copy to the Student Conduct Officer.

3. Minor Violations: Faculty members may feel that certain violations, based either upon the nature of the violation or its circumstance, warrant an informal warning rather than formal action. As with formal violations, the instructor must discuss the alleged violation with the student either in person or in writing. If the instructor finds there was a minor violation, the instructor may give the student an informal warning or require the student to redo the assignment. A Violations Form should still be completed by the instructor with the infraction and sanction documented. The instructor will provide the student and the Student Conduct Officer with a copy of the form.

After two minor violation reports from any institution in the UMS, the Student Conduct Officer(s) will consult with Academic Deans or other relevant academic administrators and reporting faculty members to determine if a more serious academic sanction should be imposed under this policy and whether a formal student conduct charge under the Student Conduct Code should be filed against the student.

4. Repeated academic violations or those deemed to be of sufficient severity by the faculty member or Dean of the College (or other appropriate academic administrator) may be considered disciplinary in nature and may be referred directly to the Student Conduct Officer for formal action under the Student Conduct Code. The faculty member may proceed with the academic integrity process under this policy at the same time as an action under the Conduct Code is proceeding. Sanctions under the Conduct Code may include, but are not limited to, ineligibility for all future academic honors and awards, departmental

and university awards, and graduation honors in addition to the appropriate academic sanctions. Sanctions for violation of the Student Conduct Code may be found in section IV. of the Student Conduct Code which may be found at the following URL:

http://staticweb.maine.edu/wp-content/uploads/2019/01/Student-Conduct-Code-2018-Complete-accessible.pdf-correctedByPAVE.pdf?0fa197

The maximum sanction imposed under the Conduct Code will be dismissal from the university and, for students whose violation is determined after graduation, revocation of the degree. Disciplinary action taken under the Student Conduct Code is independent of and may be taken in addition to an academic sanction imposed under this Policy.

Resources and Related Policies and Forms:

Academic Integrity Violation Form

University of Maine System Student Conduct Code

Date Issued: September 1, 2020

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

5

AGENDA ITEM SUMMARY

1. NAME OF ITEM: Programs for Examination Update

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: X **BOARD ACTION:**

4. OUTCOME: **BOARD POLICY:**
Academic quality and program relevance

5. BACKGROUND:

Launched in the 2018-2019 academic year, the Programs for Examination (PFE) process has undergone some changes. Initial metrics included numbers of students in the major and numbers of graduates from the program in three-year rolling averages. This year's information will track full-time faculty numbers as well, and other changes will follow

The iterative PFE process is intended to maintain quality and inspire continuous improvement of the portfolio of UMS academic programs while accurately and fairly identifying programs in need of deeper examination. Toward that end, there will be additional metrics and methods adopted for the PFE to improve its usefulness as a mechanism for analyzing program performance and quality. Vice Chancellor for Academic Affairs, Dr. Robert Placido, will explain the revisions to the process, and the anticipated impacts of those revisions.

4-17-2020

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

AGENDA ITEM SUMMARY

1. NAME OF ITEM: Brightspace Learning Management System Migration

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: X **BOARD ACTION:**

4. OUTCOME: **BOARD POLICY:**

Primary Outcomes:
- Increase enrollment
- Improve student success and completion

Secondary Outcomes:
- Relevant academic programming

5. BACKGROUND:

As announced in August 2019, the Brightspace platform from Desire2Learn has been selected as the University of Maine System's next learning management system (LMS), replacing Blackboard Learn. Full implementation of the Brightspace platform has been targeted for Fall 2020. With the recent shift of instruction to remote modalities, training for faculty on the Brightspace LMS will continue online over the next several months. David Demers, UMS Chief Information Officer, will brief the Academic and Student Affairs Committee of the Board of Trustees on progress to date and strategies to be employed to ensure faculty are prepared to conduct courses in the Fall using the Brightspace platform.

4-17-2020

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

AGENDA ITEM SUMMARY

1. NAME OF ITEM: Unified Accreditation Update

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: X **BOARD ACTION:**

4. OUTCOME: **BOARD POLICY:**
All primary and secondary outcomes

5. BACKGROUND:

During the September 15-16, 2019 Board of Trustee meeting, Chancellor Dannel Malloy recommended that UMS universities begin a process to unify their accreditations. The Board concurred and the New England Commission on Higher Education has been kept apprised throughout each subsequent step, including a March status report. James Thelen, General Counsel and Chief of Staff, and Dr. Robert Placido, Vice Chancellor for Academic Affairs will give a brief update on the unified accreditation project and process to date.

4-17-2020

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

AGENDA ITEM SUMMARY

1. NAME OF ITEM: Faculty Representatives Discussion

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: X **BOARD ACTION:**

4. OUTCOME: **BOARD POLICY:**

5. BACKGROUND:

The Faculty Representatives to the Board of Trustees will have the opportunity to discuss the importance of timely and meaningful opportunities for input regarding key UMS decisions. The Faculty Representatives in attendance at the meeting will have a brief discussion.

4/17/2020

AGENDA ITEM SUMMARY

1. NAME OF ITEM: Student Representatives Discussion

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: X **BOARD ACTION:**

4. OUTCOME: **BOARD POLICY:**

5. BACKGROUND:

The Student Representatives to the Board of Trustees will have the opportunity to discuss the importance of timely and meaningful opportunities for input regarding key UMS decisions. The Student Representatives in attendance at the meeting will have a brief discussion.

4/17/2020

AGENDA ITEM SUMMARY

1. NAME OF ITEM: Tenure at Time of Hire, Professor of Law

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: **BOARD ACTION:** X

4. OUTCOME: **BOARD POLICY:** Policy 310

10

5. BACKGROUND:

The University Maine School of Law has requested that Jessica Feinberg, J.D. be awarded tenure at the rank of full Professor, effective September 1, 2020 in accordance with Board of Trustee Policy 310. Ms. Feinberg achieved the rank of full Professor in 2019 at Mercer University School of Law through a thorough and rigorous multi-year review process. She has a superb record of scholarship, teaching and service. Law School faculty have conducted their own review and support this recommendation. Her achievements clearly demonstrate that she meets the standards for tenure at the rank of full Professor at the University of Maine School of Law.

6. TEXT OF PROPOSED RESOLUTION

That the Academic and Student Affairs Committee forwards this item to the May 18, 2020, Board of Trustees meeting for approval of the following resolution:

That the Board of Trustees approves tenure at the rank of Professor of Law at the University of Maine School of Law to Ms. Jessica Feinberg with tenure to be effective at the time of hiring.

4-17-2020

AGENDA ITEM SUMMARY

1. NAME OF ITEM: New Academic Program Proposal: B.S. in Computer Science, UMPI

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: **BOARD ACTION:** X

4. OUTCOME:
Relevant Academic Programing

BOARD POLICY:
305.1 Program Approval, Review & Elimination Procedures

5. BACKGROUND:

The University of Maine of Presque Isle (UMPI) is seeking permission to offer a Bachelor of Science in Computer Science (COS, B.S.). As described in the included proposal, proposed Computer Science program will not only serve the demand for computer science professionals but also provide support for the many computer applications in business, healthcare, mathematics, data analytics, education, sciences, and new and social media. UMPI successfully received a 5-year federal Department of Education grant to fund the development of a Computer Science, Bachelor in Science program with concentrations in Software Development and Information & Data Management. The major will be offered both in a live modality and UMPI's competency-based YourPace programming.

The proposal was reviewed at all appropriate faculty and administrative levels at UMPI was reviewed and subsequently recommended by the Chief Academic Officers Council. Dr. Robert Placido, Vice Chancellor of Academic Affairs recommended the program to the Chancellor. Chancellor Malloy signed his approval of the program on April 21, 2020.

6. TEXT OF PROPOSED RESOLUTION

That the Academic and Student Affairs Committee forwards the following resolution to the Consent Agenda for approval at the Board of Trustees meeting on May 18, 2020.

That the Board of Trustees authorizes the creation of the Bachelor of Science in Computer Science at the University of Maine at Presque Isle.

Academic Degree Program Request

Benefit Statement

Executive Summary

The University of Maine of Presque Isle (UMPI) is seeking permission to offer a Bachelor of Science in Computer Science (COS, B.S.). As described in the included proposal, proposed Computer Science program will not only serve not the demand for computer science professionals but also provide support for the many computer applications in business, healthcare, mathematics, data analytics, education, sciences, and new and social media. UMPI successfully received a 5-year federal Department of Education grant to fund the development of a Computer Science, Bachelor in Science program with concentrations in Software Development and Information & Data Management. The major will be offered both in a live modality and UMPI's competency-based YourPace programming.

	Academic Year (Fall)			
	2020	2021	2022	2023
Projected new university enrollment due to this program	5	20 (+15)	35 (+15)	50 (+15)
Briefly describe any other anticipated enrollment benefit	With the support of this grant we will phase in the hiring of two 'curriculum development specialist' who will become tenure-track faculty in computer science, develop a new computer lab, and develop 17 new courses with both live and distance modalities. This program will serve a variety of existing majors on campus as well including Business, Mathematics, Biology, Environmental Science, Education, and Professional Communication and Journalism. This program will attract new students to UMPI and produce graduates in computer science to serve local, regional, and national demand in computer science and related disciplines. Further, by supporting existing programs on campus this program will support computer applications essential to many career areas. Note: YourPace CBE enrollment not currently reflected in these projections.			
Estimated revenue beyond tuition and fees, if any				
Briefly describe source of this other revenue	We do not have other gift or philanthropic support at this time. As the program is built, we expect there could be public-private partnerships to support hardware, software, cloud or other resources where our students could benefit along with a local or regional business.			
New FTE faculty and/or staff necessary for the degree program	+1	+1	-	-
Total new employee salary and benefits	91,380	185,045	189,671	194,412
Total other expenses (supplies, renovations, etc.)	9500	9613	16728	16846

If new tuition, fees, and other revenue generated by this program will not fully offset the expenses necessary to deliver the program, provide a brief justification for adding the program and explain how the expenses of the program will be covered.

Projected revenue will exceed costs at over a 2:1 ratio (see below).

Source	Total FY21	Total FY22	Total FY23	Total FY24	Total FY25
Projected Enrollment	5	20	35	50	60
In-state	5	17	29	41	48
Out-state	0	3	6	9	12
Tuition	$36,750	$161,130	$285,510	$409,890	$497,520
In-state	$36,750	$124,950	$213,150	$301,350	$352,800
Out-state	$0	$36,180	$72,360	$108,540	$144,720
Grants					
Title III Salary Support	$101,965	$167,260	$146,788	$151,191	$0
Fees	$4,650	$18,600	$32,550	$46,500	$55,800
Gifts	$0	$0	$0	$0	$0
Total Revenue	$143,365	$346,990	$464,848	$607,581	$553,320
Net Revenue (Expense)	$42,485	$152,333	$258,450	$396,323	$337,080

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

Vice Chancellor for Academic Affairs
15 Estabrooke Drive
Orono, ME 04469

Tel: 207-973-3211
Fax: 207-581-9212
www.maine.edu

The University of Maine

University of Maine at Augusta

University of Maine at Farmington

University of Maine at Fort Kent

University of Maine at Machias

University of Maine at Presque Isle

University of Southern Maine

Date: April 17, 2020

To: Dannel Malloy, Chancellor
University of Maine System (UMS)

From: Dr. Robert Placido, VCAA

Regarding: UMPI Academic Program Proposal: B.S. Computer Science

11.1

Please find the attached program proposal from the University of Maine at Presque Isle (UMPI) to offer a B.S. in Computer Science (BSCS). The attached material includes a letter of support from President Ray Rice, as well as the full program proposal. This is a Competency Base Education (CBE) program with the potential to be a collaborative program with University of Maine at Fort Kent (UMFK).

The proposed CBE B.S. in Computer Science was reviewed and recommended by the Chief Academic Officers Council (CAOC) on April 16, 2020. I am pleased to also recommend this program for your approval.

I approve	I do not approve for the reasons listed below	Additional information needed for a decision	Action
✓			Approval of UMPI BSCS

4.22.20

Chancellor Dannel Malloy *Date*

University of Maine System

Academic Program Proposal

Computer Science, B.S.

University of Maine at Presque Isle

Presque Isle, ME

Office of Academic Affairs

14 April 2020

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Transmittal Letter of Support

181 Main Street
Presque Isle, ME 04769-2888 USA
www.umpi.edu
VOICE 207 768-9525
FAX 207 768-9552

14 April 2020

Dr. Robert Placido, Vice Chancellor of Academic Affairs
University of Maine System
259 Estabrooke Hall
Orono, ME 04469

Dear Dr. Placido:

We write to request your consideration of a new academic program proposal from the University of Maine at Presque Isle. The proposed Bachelor of Science degree in Computer Science program will have considerable value for the University and community. Given that we have received a 5-year U.S. Department of Education Title III grant, we have considerable support to establish the program. This program is important not only for its own merit as a major but also in the many supports it can provide other academic disciplines with extensive computer applications. The local and regional community and economy has considerable need for graduates with these skill sets. Finally, we see opportunities for collaboration with other UMS campuses and a great opportunity to bolster distance (especially CBE) teaching and learning.

We thank you for any consideration and will be glad to address any questions you may have.

Sincerely,

Ray Rice, Ph.D.
President and Provost

Jason Johnston, Ph.D. / Barbara Blackstone, M.S.
College Dean

Jason Towers, M.B.A.

Lorne Gibson, Ed.D., Ph.D.

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Exec. Dir. Enrollment Management

Exec. Dir. Academic Development & Compliance

Carolyn Dorsey, M.S.A.
Exec. Dir. CBE Programs

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I. PROGRAM TITLE

Computer Science, Bachelor of Science

II. PROGRAM OBJECTIVES

A. Program Rationale

Computer Science programs serve not only the demand for computer science professionals but also provide support for the many computer applications in business, healthcare, mathematics, data analytics, education, sciences, and new and social media. UMPI successfully received a 5-year federal Department of Education grant to fund the development of a Computer Science, Bachelors in Science program with two concentrations in Software Development and Information & Data Management. With the support of this grant we will phase in the hiring of two 'curriculum development specialist' who will become tenure-track faculty in computer science, develop a new computer lab, and develop 17 new courses with both live and distance modalities. This program will serve a variety of existing majors on campus as well including Business, Mathematics, Biology, Environmental Science, Education, and Professional Communication and Journalism. This program will attract new students to UMPI and produce graduates in computer science to serve local, regional, and national demand in computer science and related disciplines. Further, by supporting existing programs on campus this program will support computer applications essential to many career areas.

B. General Program Goals

Goal 1: Develop a computer science program with two concentrations in order to educate students who can: 1) attain high-demand careers in programming, software development, and other traditional and emerging computer science careers, as well as 2) attain careers in emerging computer science application based careers in informatics and data analytics that will support enterprise, biomedical, or agriculture and natural resource applications.

Goal 2: Develop courses to support computer applications for majors in business, mathematics, education, science and other fields.

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Goal 3: Build courses with both traditional online and competency-based modalities to support asynchronous learning by traditional and non-traditional students and working professionals.

C. Learning Outcomes

We developed program-learning outcomes that are based specifically on ABET Computer Science Curriculum accreditation student characteristics for graduation from an accredited computer science program:

A graduate of UMPI's Computer Science, B.S. will demonstrate:

11.1

An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.

An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs, both individually and as a team member.

An understanding of professional, ethical, legal, security and social issues and responsibilities.

An ability to analyze the local and global impact of computing on individuals, organizations, and society.

An ability to use current techniques, skills, and tools necessary for computing practice.

An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

An ability to apply design and development principles in the construction of software systems of varying complexity.

III. EVIDENCE OF PROGRAM NEED

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A. Market Analysis

The number of people employed in the computer science field is expected to grow over the next 10 years by 6.7% in the state of Maine, where over 4,000 job postings were identified just over the last 12 months (April 13, 2020). Only 6 institutions offer programs in this space in the state of Maine, and 3 of those are part of the larger University of Maine System (UM, UMF, USM). Turning to a nationwide perspective, a 15.11% growth expectation over the next 10 years is anticipated.

B. Educational, Economic, & Social Needs

In the area of information technology, the state of Maine projects 900 annual openings for the next 5-10 years. Traditionally, these positions require a four-year degree in computer science, with internship experience. In Maine, 89.1% of computer science job postings require a bachelor's degree with the greatest number of postings in the following industries: Finance & Insurance (44%); Professional, Scientific, and Technical Services (24%); Information (8%); and Health Care and Social Assistance (7%) (https://www.burning-glass.com). The field of computer science is virtually recession-proof, providing significant opportunities for college graduates both in Maine and on a national front and demand is expected to remain strong due to the wide variety of computer applications being developed (https://www.jobmonkey.com/highpayingjobs)

C. Workforce Demands

According to WayUp, Computer Science entry-level jobs are one of the fastest-growing fields in Maine, with computer and information scientists earning an average salary of $100,660 per year; these positions are responsible for creating new computer programs and technologies and analyzing large customer information databases for companies and organizations. Salaries for software developers in the state of Maine are equally impressive, averaging $90,530 per year to create edit and test new software programs. Given that the average living wage in Maine is just $30,701, the prospect of a high-wage career is particularly alluring to UMPI

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current and prospective students. Software developer positions in Maine are expected to grow by an incredible 30% by 2020, much faster than average for all professions (https://www.wayup.com),

IV. PROGRAM OVERVIEW

A. Outline of required and/or elective courses

Core Courses		Credits
Introduction to Computer Science		3
Programming Fundamentals		4
Data Structures		3
Network Concepts		3
Introduction to Web Design		4
Object-Oriented Programming		4
Algorithm Theory and Development		4
MAT 131: Calculus I		4
Mat 274: Linear Algebra		3
MAT 201: Probability and Statistics I		3
MAT 202: Probability and Statistics II		3
	total credits	38
Practical Learning Experience (choose one)		
Internship		3
Independent Study		3
Senior Thesis		3
	total credits	3
Select One of two Concentrations:		
Software Development Concentration		
Multimedia Design		4
Advanced Web Design		4
Software Engineering I		4
Software Engineering II		4
	total credits	16
OR		
Information and Data Management Concentration		
Management of Enterprise Data		4
Data Analytics		4
Management of Agriculture and Natural Resource Data		4
Bioinformatics		4

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total credits	16
Choose 12 credits in electives from Business (BUS), Computer Science and Cybersecurity (COS), ENV 308 (Geographic Information Systems), or Mathematics (MAT)	12
General Education Credits	40
General Electives	11
Total Credit Hours for degree	120

B. New and Displaced Courses

All new courses which have been created in 2019-2020 or will be developed over the coming several years are in the table below. We may displace one existing course, COS 105, Computer Programming, since we have added two additional programming courses that serve a broader range of existing and new needs in three programs: Mathematics, B.S., Cybersecurity, B.S., and Computer Science, B.S.

Course Development Sequence for B.S. in Computer Science	
New Courses for the B.S. in Computer Science (Core Courses)	
Introduction to Computer Science	Developed Year 1, Pilot tested Year 2
Programming Fundamentals	Developed Year 1, Pilot tested Year 2
Data Structures	Developed Year 1, Pilot tested Year 2
Network Concepts	Developed Year 1, Pilot tested Year 2
New Courses for the B.S. in Computer Science (Software Development Concentration)	
Introduction to Web Design	Developed Year 2, Pilot tested Year 3
Multimedia Design	Developed Year 2, Pilot tested Year 3
Advanced Web Design	Developed Year 2, Pilot tested Year 3
Object-Oriented Programming	Developed Year 2, Pilot tested Year 3
Software Engineering	Developed Year 2, Pilot tested Year 3
Software Engineering II	Developed Year 2, Pilot tested Year 3
New Courses for the B.S. in Computer Science (Information & Data Management Concentration)	
Algorithm Theory and Development	Developed Year 3, Pilot tested Year 4
Management of Enterprise Data	Developed Year 3, Pilot tested Year 4
Data Analytics	Developed Year 3, Pilot tested Year 4
Management of Agriculture and Natural Resource Data	Developed Year 3, Pilot tested Year 4
Bioinformatics	Developed Year 3, Pilot tested Year 4
Elective Computer Science Courses	
Elementary Education Computer Science	Developed Year 4, Pilot tested Year 5

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Secondary Education Computer Science	Developed Year 4, Pilot tested Year 5
Conversion of Computer Science Core Courses to Online Delivery	
Introduction to Computer Science (Online/Hybrid)	Developed Year 4, Pilot tested Year 5
Programming Fundamentals	Developed Year 5, Pilot tested Year 5
Data Structures	Developed Year 5, Pilot tested Year 5
Network Concepts	Developed Year 5, Pilot tested Year 5

C. Research and Program Integration

Faculty hired into the program will be required to develop an undergraduate research program by which students may gain experience and have the potential to present posters or talks at conferences, and to publish. Faculty will be encouraged to seek extramural funding to fund this level of research, and will be encouraged to collaborate with other UMPI faculty who have computer science research applications, including in cybersecurity, GIS, environmental, geological, biological, and biomedical sciences, mathematics, informatics, and other applications.

D. Experiential Learning Opportunities

The program consists of hands-on 3 and 4-credit coursework and will include a senior 'capstone' experience of either an internship, independent study, or senior thesis that will require each graduate to employ their computer science skills toward a computational solution to a novel research question or application in business, natural resources, healthcare, or related enterprise need.

E. UMS and UMPI Academic Collaborations & Impacts

There are three other UMS campuses that deliver a Bachelor's degree in Computer Science, i.e. USM, UM, and UMF (see table below); additionally UMFK and UMA offer related degrees in related topics. UMPI currently has a Cybersecurity B.S., which has been developed through the UMS MOU and in collaboration with UMaine-Augusta. We see the development of this new Computer Science program to round out our own offerings and to provide more opportunity for collaboration with UMaine-Augusta. We are especially convinced of this potential because of our goal to develop online or competency-based distance education courses to serve the range of student demographics including non-traditional students and working professionals. Further, we have already discussed the potential of collaboration with UMFK, in particular to

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combine our limited resources to meet local demand for computer science as well as the many applications from computer science that affect local businesses, healthcare, and agricultural and natural resources businesses and state/federal entities.

Campus	Degree program(s) in computer science or related field
University of Southern Maine	Computer Science BS, Cyber Security BS, In Information Technology BS, Technology Management BS, Applied Technical Leadership BS, Minors in Cyber Security, Information and Communications Technology, Digital Media and Designs, Information and Communication Technology.
University of Maine	Computer Engineering BS, Computer Science BS, Computer Science BA. Minors in Computer Science, Computer Engineering.
University of Maine Augusta	Computer Information Systems BS, Computer information Systems AS, Post Baccalaureate of Science in Computer Information Systems. Minors in Computer Information Systems, Computer Networking, Cyber Forensics, Cyber Security, Web Applications. Certificates in Health Informatics, Cyber Forensics, Cyber Security, Web Development.
University of Maine Farmington	Computer Science BA. Minor in Computer Science.
University of Maine Fort Kent	Computer Applications BS, Cyber Security BS. Computer Science AA, Information Security AS. Minor in Information Security. Certificate Information Security.

F. Distance and Hybrid Delivery

This program has considerable opportunity for both traditional online delivery and for competency-based education (YourPace) delivery. We have plans within the Title 3 funding to develop most of the courses into one or both distance platforms. In fact, as we conceive and develop each course we will do this with delivery through these 3 modalities in mind. While the delivery will certainly vary by modality, it is much easier to consider the modalities in course development rather than to convert an existing (e.g. live course) to another modality. Especially given the 'hands-on' nature of learning computer science this discipline is very amenable to distance delivery.

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G. Microcredential Opportunities

There are many microcredential opportunities in IT and computer science generally, e.g. from Microsoft, Oracle, and many other software, hardware, and networking computer firms – these types of microcredentials will be evaluated after we hire our first faculty member and develop relevant plans for our program. Additionally, we would be able to offer microcredentials or certificates and traditional minors in areas such as web design, data informatics, and computer science for educators. These opportunities will be developed in collaboration with other majors or in consideration of the needs of working professionals.

V. PROGRAM RESOURCES

A. Personnel

i. Current and New Personnel

Fred Strickland, Assistant Professor of Cybersecurity, will contribute to introductory computer science, programming courses and any cybersecurity electives (see CV in Appendix A). Two new faculty will be phased in during Academic year 2020-2021 and 2021-2022 – one with a specialty in traditional computer science (programming, software development, etc.) and the second with more emphasis on advanced computer applications and informatics.

ii. Faculty Assignments

New courses will be taught by two newly hired faculty or will be taught by one existing cybersecurity faculty for those courses (4) where courses meet the requirements of both majors. Thus, there will not be any workload adjustment. Courses in other disciplines (e.g. mathematics) will be included as part of regularly scheduled courses, and will increase enrollment in these courses but not workload for current faculty.

B. Library Acquisitions

In reviewing proposed materials for this new program, library director Roger Getz recommends the ACM Digital Library, which is a database that provides both journals and ebooks, along with other sources. It is problematic to purchase paper books for computer sciences, as they are usually outdated in 2-4 years. It costs approximately $4,500 annually. Since there are 2-3 other UMaine campuses that subscribe to this database, we could perhaps collaborate and/ or negotiate with the vendor to reduce per campus costs.

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C. New Equipment Requirements

Computer Science Lab will employ smart teaching technologies include the following components at a total cost of $17,475 per classroom unit Extron instructor controller with IN1608 processor, controller, DVD player, DTP and cabling ($12,000), Panasonic PT-RZ570W projector ($2,645), Chief Mount Projector Mount ($300), DaLite Tensioned Contour Electrol 52" X 92" Screen ($2,530). 20 Computers: HP CPU 512 SSD, Z2 G4 Cire i7, 8700 3.2 ghz, 16 gb, 512 ssd @ $1,542 each; HP 3 year Care Pack Warranty @ $76 each; 23" monitors @ $179 each; total/ computer = $1797.65

D. Facilities Requirements

In project year one (Fiscal Year 2020), a 950 sq. ft. space on the ground floor of Folsom Hall (Room 101A) will be renovated to house a new Computer Science Lab. The lab will include 20 ergonomic student workstations. The lab will create an instructional setting for students to practice writing programs and develop software.

E. UMS and UMPI Resource Collaborations

See IV e., above; there is considerable potential for collaboration and cooperation, i.e. sharing faculty or courses with e.g. UMFK or UMA.

VI. FINANCIAL ANALYSIS

A. Five-year Business Plan

The five-year business plan assumes the program would launch in Fall, 2020 and one new hire would be in place to begin design and pilot courses. Assuming a starting salary of $60,000, benefits rate of 52.3% and an annual increase of 2.5% salary costs for the first and then second (added in FY 22), personnel costs are included in the table below. There would be no additional administrative or support costs. Equipment and facility expenses would largely be incurred and spent by the end of FY 20, whereby a full computer lab, with computers, and distance education technologies would be installed in a renovated computer science laboratory. Additional library expenses come mainly for the additional subscription to online databases, journals, and e-books. Marketing expenses will go mainly to materials, mailings, and recruiting efforts.

Table: Program resources and expenses

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Rank/Position	Total FY21	Total FY22	Total FY23	Total FY24	Total FY25
Assistant Professor of Computer Science	$91,380	$93,665	$96,006	$98,406	$100,866
Assistant Professor of Computer Science		$91,380	$93,665	$96,006	$98,406
Additional Support	$0	$0	$0	$0	$0
Equipment/Facility	$0	$0	$10,000	$10,000	$10,000
Additional Library	$4,500	$4,613	$4,728	$4,846	$4,967
Marketing	$5,000	$5,000	$2,000	$2,000	$2,000
Total Expenses	$100,880	$194,657	$206,398	$211,258	$216,240

Revenue projections are based on projected enrollment of 5 students in the first year and the addition of 15 students each subsequent year. We assumed 20% out of state and 80% in state. Our FY21 estimate of 5 students (all in state) is based on the late timeframe. However, from experience launching the cybersecurity program in Fall, 2019, we added 11 students to that major in the first semester with a similarly late launch. Fee income was estimated at $30/credit for the comprehensive fee. Grant funding has already been secured to cover a sliding percentage of faculty expense as they transition from a 'curriculum specialist' developing, piloting, and implementing new courses to a full tenure-track assistant professor by the end of the grant whereby UMPI will bear the full salary expense in FY 25. We do not have other gift or philanthropic support at this time. As the program is built, we expect there could be public-private partnerships to support hardware, software, cloud or other resources where our students could benefit along with a local or regional business.

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Table: Summary of Projected Revenue

Source	Total FY21	Total FY22	Total FY23	Total FY24	Total FY25
Projected Enrollment	5	20	35	50	60
In-state	5	17	29	41	48
Out-state	0	3	6	9	12
Tuition	$36,750	$161,130	$285,510	$409,890	$497,520
In-state	$36,750	$124,950	$213,150	$301,350	$352,800
Out-state	$0	$36,180	$72,360	$108,540	$144,720
Grants					
Title III Salary Support	$101,965	$167,260	$146,788	$151,191	$0
Fees	$4,650	$18,600	$32,550	$46,500	$55,800
Gifts	$0	$0	$0	$0	$0
Total Revenue	$143,365	$346,990	$464,848	$607,581	$553,320
Net Revenue (Expense)	$42,485	$152,333	$258,450	$396,323	$337,080

B. Scenario if costs exceed revenue

Costs are not expected to exceed revenue, and by FY 25, we expect enrollments to cover the full faculty salary expenses.

C. Existing sources of revenue

A U.S. Department of Education Title III grant is the sole source of non-E&G funding. Maintenance, supplies, and increased portion of faculty salary expenses are being phased in starting in FY 22. These expenses do not exceed the projected revenue even with a modest new student admissions goal of 15 students per year.

D. Should program be considered for differential tuition?

No differential tuition expected for live or traditional online delivery; any additional costs for program delivery can be partly ameliorated by consideration of laboratory or program fees where appropriate. YourPace programming will employ reduced subscription-based tuition.

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VII. PROGRAM ASSESSMENT AND EVALUATION

In order to comply with UMS and NECHE standards, this program shall adhere to the University's academic program planning and assessment policies. These policies include procedures for utilizing Program Assessment Logs, Academic Grades, Student Proficiency Tracking, Faculty Course Assessment Logs, Student Course Assessments, Current Student Surveys, Career Fields Relevance and Value Assessments, and Graduate Performance and Career Placement Assessments. Additionally, these policies include procedure for administrative and faculty systematic review and oversight of program planning and assessment, as well as comprehensive program self-studies and reviews. The University's academic program planning and assessment policy manual can be viewed in full here: https://drive.google.com/drive/u/1/folders/1v_X9zHHgHP3_6VB-HaAa9DXKos6L5pCh

11.1

A. Learning Outcomes Assessment Plans (Student Proficiency Tracking)

Faculty will develop rubrics for each program-learning outcome in order to clarify varying levels of proficiency as well as to standardize scoring among program instructors. A student progression and assessment plan will be created to track expected proficiency development of students as they take the respective program courses, as well as, indicating courses in which students will receive direct assessments of their progress of each learning outcome. These direct assessments are recorded utilizing each courses' gradebook function within the Mainestreet PeopleSoft platform. Student proficiency scores will be extracted from the Mainestreet platform annually, and analyzed to detect and redress issues with the curriculum and students' proficiency progress.

B. Programs for Examination & Full Program Review Plans

UMPI's Academic Affairs officers will review the program's viability and provide its CAO with annual interim reports on enrollment and delivery success for a three-year probationary period. A full program review will be conducted after the probationary period that will consist of external reviews, a self-study, executive summary, and final report. The self-study will address the following areas:

- Program Overview
  - History and Rationale
  - Students
  - Faculty and Instructors

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  - Enrollment, Scope, Expenditures, and Revenues
  - Mission and Major Proficiency Outcomes
  - Major Categories of Competency Outcomes
  - Requirements and Curriculum Organization
- Interim Review Recommendations and Response Assessment
- University Strategic Planning and Mission Alignment Assessment
- External Service and Impact Assessment
- External Academic Agreements Assessment
- External Resource Agreements Assessment
- Academic Quality Assurance, Transparency, and Public Disclosure Assessment
- Enrollment Management and Student Success Assessment
- Extracurricular Opportunity and Engagement Assessment
- Advising and Student Services Assessment
- Academic Assessment
  - Student Academic Performance Assessments
  - Student Research and Service Assessments
  - Course Assessments
  - Instruction Assessments
  - Career Fields Relevance Assessments
  - Graduate Performance and Career Placement Assessments
- Curriculum and Program Development Assessment
  - Proficiency Areas Development
  - Competency Areas Development
  - Course Development: Progression and Alignment of Outcomes
  - Faculty and Instruction Development
- Curriculum Assessment by University Faculty
  - Curriculum Assessment and Recommendations
  - Collaboration Assessment and Recommendations
- Program Projections and Recommendations
  - Students Success and Enrollment Projections and Recommendations
  - Faculty Quality Projections and Recommendations
  - Finance Projections and Recommendations
  - Curriculum Projections and Recommendations
  - Collaboration Projections and Recommendations

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VIII. APPENDICES

Appendix A: Faculty Vitae

Fred Strickland
University of Maine at Presque Isle
181 Main Street
Presque Isle, ME 0476

Education

Ph. D, Computer Science with Information Assurance Option
Auburn University.

MS, Computer Information Systems
Troy State University (Now known as "Troy University Montgomery Campus.")

BS, Computer Science
University of Maryland at College Park.

AS, Communications Technology
Community College of the Air Force.

MA, Management and Supervision
Central Michigan University.

BA, Religion
Stetson
University.

Florida Community College at Jacksonville (Later known as "Florida Junior College at Jacksonville." Now known as "Florida State College at Jacksonville.")

Professional Positions

Innovative Research

Scholar/No rank/Researcher, PreScouter. (April 2015 – Present)
Work remotely. Completed 68 research projects. Currently working on five research projects.
PreScouter, Inc.
1 North Franklin Street
Suite 1850
Chicago IL 6060

Academic

PhD/Assistant Professor of Cybersecurity and Computer Information Systems, Jointly assigned to the University of Maine at Presque Isle and the University of Maine at Augusta (Official start date of September 1, 2019 until)

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11.1

University of Maine at Presque Isle

No subordinate unit level below the College of Arts and Science for cybersecurity.
College of Arts and Sciences

Ph.D./No rank/Adjunct Instructor, South University. (April 3, 2007 – Fall 2016).
South University
Information Technology
College of Business
Montgomery
CampusPh.D./No
rank/Adjunct Instructor,
Troy University
Montgomery Campus.
(January 1997 – Fall
2016).
Troy University Sorrell College of
Business
and
Department of Computer Science
College of Arts and Sciences
Montgomery Campus

Graduate Teaching Assistant and Graduate Research Assistant, College of Engineering, Computer Science and Software Engineering, Auburn University. (2002 - August 9, 2008).

NOTE: I taught one computer programming course at Auburn University Montgomery. This was when I was still a graduate student at Auburn University. I do not recall the details nor the dates.

NOTE: I taught two or so courses at H. Councill Trenholm State Technical College. This was when I was still a graduate student at Auburn University. I do not recall the details nor the dates

Adjunct Instructor, Texas Community College. (1984 - 1985).

Adjunctnstructor, Ricker College and Unity College. (1976 - 1980).

Government (Federal and State)

Programmer, Alabama Commission on Higher Education (2016- present)
Skills: ASP.NET Visual Basic programming; DNN (better known as DotNetNuke) 9 programming; JavaScript, Microsoft SQL Server Management Studio (SSMS), Microsoft SQL Server Reporting Services (SSRS), Microsoft Visual Studio, Microsoft Office, SAFE Software FME (program works with Shapefile or mapping files.)

Programmer, As an Advanced Systems Design contractor to the Alabama Commission on Higher Education (2016)

Programmer, Alabama Department of Human Resources, (2015-2016)
C# and Visual Basic programming; Microsoft SQL
Frequency Manager, HQ Civil Air Patrol. (July 17, 1995 - April 12, 2013).

Military

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Spectrum Manager/Master Sergeant (E-7)/Various locations, United States Air Force. (August 1974 - September 1995).Professional

President and CEO, Strickland Technologies & Special Services, Inc. (August 20, 2009 - Defunct)

Licensures and Certifications

Completed various training programs on ethics, on cybersecurity, and on other work place topics.

Professional Memberships

Member, Montgomery Chamber of Commerce. (January 2010 - January

2012). Student Member, Association for Computing Machinery. (2002 -

2009).

Development Activities Attended

Attended one-on-one staff meetings with Dr. Henry Felch and with Dr. Betina Tagle, University of Maine at Augusta, (August 15 through August 16, 2019). Note: While attending these meeting, attended the Maine cyber Range Opening at University of Maine at Augusta ("Ribbon cutting ceremony").

Attended Alabama state training programs. Some covered handling PII and cybersecurity.

Continuing Education Program, "SCOB Informational Meeting: Effective Communication with Blackboard Tools," SCOB, Troy University, Troy, AL. (March 15, 2015).

Continuing Education Program, "EXPLORE Watson-Glaser for Winter 2015," South University, Pittsburgh, PA. (January 21, 2015).

Self-Study Program, "2014 HR Harassment and Discrimination Prevention," HR Department, Troy University, Troy, Alabama. (November 5, 2014 - November 5, 2014).

Self-Study Program, "Preventing Discrimination and Sexual Violence: Title IX, VAWA and Clery Act for Faculty and Staff," EDMC. (October 29, 2014).

Self-Study Program, "QEP1122 October 2014 - Supporting Watson-Glaser II," EDMC. (October 16, 2014).

Self-Study Program, "SANS Securing the Human: Auburn Security Awareness," Auburn University, Auburn, AL. (September 9, 2014 - September 24, 2014).

Self-Study Program, "EDMC Security Awareness and Violence Prevention Training - Part 1 and Part 2," Education Management Corporation (EDMC), Pittsburgh, PA. (August 25, 2014 - August 26, 2014).

Self-Study Program, "FY '15 EDMC Business Ethics Policy and Code of Conduct - Part Time," Education Management Corporation (EDMC), Pittsburgh, PA. (July 14, 2014).

Self-Study Program, "QEP1122 - Supporting Watson-Glaser II," EDMC. (July 7, 2014 - July 14, 2014).

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Self-Study Program, "QEP1102 - Modifications for ITS1000 – Computer and Information Literacy," EDMC. (June 13, 2014).

Self-Study Program, "QEP 1100 -- Classroom to Career," EDMC. (June 1, 2014 - June 4, 2014).

Self-Study Program, "Information Classification Policy and Standard," EDMC. (May 6, 2014).

On-line via Go to Meeting, "Graduate Honor Council Training," South University, Savannah, GA. (April 30, 2014).

Self-Study Program, "FY'14 EDMC Records Management," EDMC University, Pittsburgh, PA. (February 3, 2014).

Self-Study Program, "Great Starts: Privacy and Information Security," EDMC, Pittsburgh, PA. (January 29, 2014).

Seminar, "Lunch and Learn: Who's who at South University," South University, Montgomery, GA. (October 7, 2013).

Online Training, "QEP1002 - Programmatic Application of the Paul Elder Model," South University, Savannah, GA. (May 9, 2013 - May 23, 2013).

Online Training, "QEP1001 - Critical Thinking & Informational Literacy," South University, Savannah, GA. (April 15, 2013 - April 26, 2013).

Online Training, "QEP1000 - On Demand - South University," South University, Montgomery, Alabama. (April 23, 2013).

Self-Study Program, "The Business Ethics Policy and Code of Conduct," Education Management Corporation (EDMC), Pittsburgh, PA. (May 30, 2012).

Online Training, "Teaching with Technology," South University, Montgomery, AL. (March 12, 2012).

Online Training, "QEP1000 - QEP Essentials - South University," South University, Montgomery, Alabama. (February 27, 2012).

Webinar, "Special Faculty Development Webinar, Student Strategies: Digital Natives, Millennials and the Strangers Among Us," Education Management Corporation (EDMC). (August 11, 2011).

Webinar, "QEP 3002 Cohort Training Session: Artifact Training," Education Management Corporation (EDMC). (July 18, 2011).

EDMC Office 2010 Training (Hosted on Skillport's Online Learning Community), "The New Office 2010 Interface, Word 2010, and Excel 2010," Education Management Corporation, Pittsburgh, PA. (June 20, 2011).

EDMC Office 2010 Training (Hosted on Skillport's Online Learning Community), "Office 2010 New Core Features," Education Management Corporation, Pittsburgh, PA. (June 19, 2011 - June 20, 2011).

Webinar, "Books on the Brain," Education Management Corporation (EDMC), Pittsburgh, PA. (March 17, 2011).

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Self-Study Program, "Quality Assurance (QA)," Troy University eCampus, Troy, AL. (2010).Self-Study Program, "Blackboard 9.1 Proficiency Training," Troy University eCampus, AL. (May 2010).

Awards and Honors

Membership, Golden Key International Honour Society.

TEACHING

Teaching Experience

University at Maine at Presque Isle

COS 101, Introduction to Computer Science, 1 course (Projected for Fall 2019).

University at Maine at Augusta

ISS 240, Security policy and Governance, 1 course (Projected for Fall 2019

Troy University

CS 2265, Advanced Programming I, 1
course. CS 3323, Data Structures, 1
course.
CS 3330, Data Structures and Algorithms, 1 course. (Currently, teaching this course.)
CS 4420, Introduction to Database Systems, 1 course.
CS 5543, Software Engineering, 3 courses.
CS 5547, Applied Systems Analysis, 2 courses.
IS 2241, Computer Concepts and Applications, 13 courses.

South University

ITS 1000, Computer and Internet Literacy; 2015 Spring, 2015 Winter, 2014 Fall (two sessions), 2014 Summer (two sessions), 2014 Winter, 2013 Summer, 2012 Summer, 2010 Winter
ITS 1101, Foundations of Information Technology; 2015 Winter, 2007 Summer (?)
ITS 1103, Ethics and Information Technology; 2013 Summer, 2011 Winter, 2008 Summer, 2007 Spring
ITS 1104, Human Computer Interface; (Course revised and is now coded as ITS 2108.) 2008 Spring, 2007 Summer
ITS 2104, Programming Logic; 2011 Summer, 2009 Fall, 2009 Winter, 2008 Spring, 2007 Summer [Alice is used as the teaching programming environment.]
ITS 2105, Programming I; 2011 Fall, 2010 Winter, 2009 Spring, 2008 Summer, 2007 Fall (Used Visual Basic.) [Microsoft Visual Studio C+ is used. In the past this course has been taught in Java and before that in Visual Basic.]
ITS 2106, Programming II, 2010 Spring, 2009 Summer, 2008 Winter (Used Visual Basic.)
ITS 2108, Human Computer Interface, 2014 Spring, 2013 Fall.
ITS 2111, Multimedia Web Development; 2012 Spring
ITS 3100, Software Engineering Fundamentals; 2015 Spring, 2013 Fall, 2012 Fall, 2011 Spring, 2010 Summer, 2009 Fall, 2008 Spring
ITS 3101, Advanced Operating Systems and Architecture; 2013 Summer, 2012 Summer, 2011 Spring
ITS 3104, IT Security: Access and Protection; 2011 Fall, 2009 Spring, 2007 Fall
ITS 3105, Programming II; 2013 Spring (Microsoft Visual Studio C++ is used.)
ITS 3107, Technology Industry Assessment: Tools & Products; 2011 Winter (Discontinued course.)

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ITS 3110, Applied Systems Analysis; 2012 Fall, 2010 Fall, 2009 Winter
ITS 4090, Applied Systems Analysis II; 2013 Winter
ITS 4011, IT Project Management; 2013 Spring, 2012 Spring (ITS 3112), 2010 Winter
ITS 4099, IT Research; 2014 Fall, 2013 Winter [Students are taught about LaTeX and about computer science research skills.]
ITS 4101, Fault Tolerance; 2009 Summer, 2008 Winter (Discontinued course.) ITS 4103, Information Technology Capstone I
ITS 4104, Information technology Capstone II; 2008 Fall (Discontinued course.) ITS 4211, Network Security; 2014 Spring, 2012 Winter, 2010 Summer
ITS 4221, Application Software Security; 2014 Summer, 2012 Summer, 2011 Summer, 2010 Spring
ITS 4231, Case Studies in Computer Security; 2013 Spring, 2012 Winter, 2010 Fall MIS 3101, Application of Management Information Systems, 2014 WinterRESEARCH

Published Intellectual Contributions

Books

Strickland, F. L. (2009). *Using Different Radio Bands to Provide More Flexibility: Using a Helio Based Protocol in a Battlefield Sensor Network with Directional Antennas and Enhanced Security*. VDM Verlag Dr. Müller.

Refereed Journal Articles

Liu, H., Chen, Y., Strickland, F. L., Dai, R., Qi, B. (2011). System Development and Application of Taylor Kriging Metamodeling. *Engineering Computations, International Journal for Computer- Aided Engineering and Software, 28*(3), 220-241. www.emeraldinsight.com/0264-4401.htm

Conference Proceedings

Strickland, F. L., Wang, Y. (2008). In Hamid R. Arbnia and Victor A. Clincy (Ed.), *HEAPINGS: From Concept to Simulation* (pp. 590-596). Las Vegas, NV: International Conference on Wireless Networks (ICWN '08).

Strickland, F. L., Wang, Y., Lim, A. S. (2007). In Hamid R. Arbnia, Victor A. Clincy, and Laurence T. Wang (Ed.), *HEAPINGS: A Secure Counterintuitive Sensor Network Protocol* (pp. 474-480). Las Vegas, NV: International Conference on Wireless Networks (ICWN '07).

Strickland, F. L., Seals, C. (2005). *Using Elementary and Graduate Students to Compare 3D System with Minimalist Tutorials*. HCI International 2005/Lawrence Eribaum Associates, Inc.

Strickland, F. L., Seals, C. (2005). *Using Elementary and Graduate Students to Compare 3D System with Minimalist Tutorials* (2005 - Networks and Alliances ed., pp. 11). Troy AL: Troy University Business Research Symposium. business.troy.edu/Downloads/Publications/TSUSBS/2005SBS/2005Tutorials.pdf

Strickland, F. L. (2004). *Directional Antennas and Beams: From Minor Support to Being a Central Part of MAC Protocols* (2004 - Globalization ed., pp. 16). Troy AL: Troy University Business Research Symposium. business.troy.edu/Downloads/Publications/TSUSBS/2004SBS/2004Antennas.pdf

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Strickland, F. L. (2003). *Radio Spectrum: The Achilles Heel of Wireless Computing* (2003 - Business Paradigms in Transition ed., pp. 15). Troy AL: Troy University Business Research Symposium. business.troy.edu/Downloads/Publications/TSUSBS/2003SBS/2003Radio.pdf

Strickland, F. L., Mariano, M. J. (2002). *Comparing Corba and Java RMI-IIOP* (2002 - Quality in Business ed., pp. 9). Troy AL: Troy University Business Research Symposium. business.troy.edu/Downloads/Publications/TSUSBS/2002SBS/2002Corba.pdf

Strickland, F. L. (2001). *A Distributed Computing Approach to College Registration* (2001 - A Business Odyssey ed., pp. 2). Troy AL: Troy University Business Research Symposium.

Strickland, F. L. (2000). *What is the Role of Java in Education?* Troy University System Business Research.

Strickland, F. L. (1999). *The Use of Java Programming in Business*. Troy AL: Troy State System Business Research.

Internal to Auburn University (While a graduate student)

Strickland, F. L. (2003). *Classification and Analysis of Ad-hoc Routing Protocols for Sensor Networks*. Auburn AL: Auburn University Graduate Student Council.

General or Popular Press Articles

Strickland, F. L. (July 2019). In Sofiane Boukhalfa and Mariama Jomha (Ed.), *PreScouter Journal*, "Are long-range flights on the rise in 2019?" (https://www.prescouter.com/2019/07/are-long- range-flights-on-the-rise-in-2019/)

Published Intellectual Contributions

Note: PreScouter is a company that pulls together scientists, engineers, economists, analysts, and developers to apply their academic knowledge and problem-solving skills to challenges faced in industry. Since its founding in 2010, PreScouter has presented over 1,500 projects to more than 300 clients. As a PreScouter Scholar, I have completed over 68 projects. The deliverables included presentations, white papers, and research papers. I signed a non-disclosure agreement and so I am not permitted to submit the work to peer-reviewed journals. The following are the topic areas that I worked on:

Completed in 2015

High Power RF Generator	Low Cost Tags
Branding	Nano Scale
Acoustic Sensing	Energy Harvesting
Foam Project	Innovative Contact Lenses
High Power RF Generator	Low Cost Tags
Branding	Nano Scale
Acoustic Sensing	Energy Harvesting
Foam Project	Innovative Contact Lenses

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Grinding-Debris Collector	Automating Filter Change
Toric Contact Lenses	Touch and Gesture
Broadband AMP	AGIS
Mining	Wireless

Completed in 2016

Embedded Controls	AI in the Home
Natural Language Processing (NLP)	Power of Water Flow
Automatic Bale Inspection	Aerospace
Competitive Landscape in Aerospace	Strategic Technology Partnerships
Bromine Processing Improvements	Data Center
AI Clinician Support System	Vacuum Coating Process Technology
Automotive Exhaust Gas Sensor	Material Dispensing Systems
Dielectric Core Tunable Filters	Big Data and IT Analytics
Airborne Radar	Kitchen of the Future
Advanced Simulations Market Project	Internet of Things
Personal Digital Storage	Highly Conductive Resistant Surfaces
AUV Navigation	AUV Maneuverability

Completed in 2017

Cylinder Bore	Automotive Purchasing
Connectivity of Industrial Devices	C++ Libraries
Innovative Contact Lenses Sensing	Display in Glass
Future use of Data	EV Market
Thermoelectric Power Generation for High Performance Engines	Military Crew and Mission Seating
Singulation of Cloth	Deep Learning
RF Filtration	High Value Asset Tags for Tracking
Software Configuration Management Industry Review	

Completed in 2018

Multi-drop Bus Technology	3D Printing
Charge Acceptance for Lead Acid Batteries	Digital Electronic Modeling for Fast Simulation
Information Delivery Optimization	Geiger Mode Avalanche Photo-Diode Based Sensors
Tight and Even Packing of Materials in Appliances	Improved Wear in the Performance of Stainless Steel

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Completed in 2019

High Energy Discharge Technology	Cybersecurity
IT/OT Security Vendor Analysis	Long Range Radar
Blast Furnace Cleaning	

Ongoing Work in 2019

Enterprise Inventory Management	

Presentations Given

Strickland, F. L. (Presenter & Author), Golden Key International Honour Society, "How to Write Better Papers and Theses," Auburn University Chapter. (September 2010).

Strickland, F. L. (Presenter & Author), Wang, Y. (Author Only), International Conference on Wireless Networks (ICWN '08), "HEAPINGS: From Concept to Simulation," WORLDCOMP. (July 2008).

Strickland, F. L. (Presenter & Author), Wang, Y. (Author Only), Lim, A. S. (Author Only), International Conference on Wireless Networks (ICWN '07)., "HEAPINGS: A Secure Counterintuitive Sensor Network Protocol," WORLDCOMP. (June 2007).

Strickland, F. L. (Presenter & Author), Seals, C. (Author Only), HCI International 2005, "Using Elementary and Graduate Students to Compare 3D System with Minimalist Tutorials." (2005).

Strickland, F. L. (Presenter & Author), Seals, C. (Author Only), Troy University Business Research Symposium, "Using Elementary and Graduate Students to Compare 3D System with Minimalist Tutorials," Sorrell College of Business. (2005).

Strickland, F. L. (Presenter & Author), Troy University Business Research Symposium., "Directional Antennas and Beams: From Minor Support to Being a Central Part of MAC Protocols," Sorrell College of Business. (2004).

Strickland, F. L. (Presenter & Author), the Thirteenth Annual Research Forum, "Classification and Analysis of Ad-hoc Routing Protocols for Sensor Networks," Auburn University Graduate Student Council. (2003).

Strickland, F. L. (Presenter & Author), Seals, C. (Author Only), Troy University Business Research Symposium, "Radio Spectrum: The Achilles Heel of Wireless Computing," Sorrell College of Business. (2003).

Strickland, F. L. (Presenter & Author), Mariano, M. J. (Author Only), Troy University Business Research Symposium, "Comparing Corba and Java RMI-IIOP," Sorrell College of Business. (2002).

Strickland, F. L. (Presenter & Author), Troy University Business Research Symposium, "A Distributed Computing Approach to College Registration," Sorrell College of Business. (2001).

Strickland, F. L. (Presenter & Author), Troy University Business Research Symposium, "What is the Role of Java in Education?" Sorrell College of Business. (2000).

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Strickland, F. L. (Presenter & Author), Troy University Business Research Symposium, "The Use of Java Programming in Business," Sorrell College of Business. (1999).

Media Contributions

Internet

SouthSource.

Biographical information submitted to:
UMA
UMPI
HR newsletter entitled “The Pariliament” Other campus publications

Awards and Honors

Membership, Upsilon Pi Epsilon Computer Science Honor Society.

SERVICE

11.1

University Service

Committee Member, Graduate Honor Committee (EDMC). (April 30, 2014 – circa

2015). Grader, "Comprehensive Exam Working Group". (February 2011 – circa

2015).

Attendee, Meeting, Ad Hoc Certification Study. (April 21, 2011 - April 25, 2011).

Professional Service

Reviewer, Conference Paper, ACM ITICSE 2015, Vilnius. (January 16, 2015 - January 21,

2015). Reviewer, Book, Jones & Bartlett Learning, Burlington, MA, 01803. (September 23,

2014 -

September 26, 2014).

Reviewer, Conference Paper, ACM SIGCSE2015, Kansas City, MO. (September 7, 2014 - September 22, 2014).

Reviewer, Conference Paper, ACM SIGCSE: ITiCSE 2014, Uppsala. (February 1, 2014 - February 18, 2014).

Reviewer, Conference Paper, ACM SIGCSE, Atlanta, GA. (September 16, 2013 - September 23, 2013).

Reviewer, Journal Article, IEEE Transactions on Education. (February 12, 2013 - March 12, 2013).

Reviewer, Conference Paper, ACM SIGCSE, Denver, CO. (September 25, 2012 - September 26, 2012).

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Reviewer, Journal Article, IEEE Transactions on Education. (September 10, 2012 - September 11, 2012).

Reviewer, Conference Paper, ITiCSE 2012, Haifa. (July 3, 2012 - July 5, 2012).

Reviewer, Journal Article, IEEE Transactions on Education. (May 21, 2012).

Reviewer, Journal Article, IEEE Transactions on Education. (May 4, 2012).

Reviewer, Journal Article, IEEE Transactions on Education. (February 14, 2012 - February 21, 2012).

Reviewer, Conference Paper, SIGCSE 2012, Raleigh, North Carolina. (September 5, 2011 - September 29, 2011).
Reviewer, Conference Paper, ITiCSE 2011, Darmstadt. (June 27, 2011 - June 29, 2011).
Reviewer, Conference Paper, The 42nd ACM Technical Symposium on Computer Science Education, Dallas, TX. (March 9, 2011 - March 12, 2011).

Reviewer, Book, John Wiley & Sons, Inc. (December 31, 2007).

Public Service

Member, Air Force Association; life member.

Member, Auburn University Alumni, life

member.

Member, Central Alabama Association for Chinese, Montgomery, AL, inactive.
Member, Non Commissioned Officers Association (better known as NCOA), life member.
Member, The Montgomery AL Chapter of the Auburn University Alumni Club, Montgomery, AL.
(April 2011 - Present).

Consulting

Academic, Strickland Technologies & Special Services, Inc. (August 20, 2009 - Defunct)

Awards and Honors

Service, Professional

Membership, Delta Epsilon Iota Academic Honor Society.

Service, University

Membership, Alpha Theta Chi Honor

Society. Membership, Gamma Beta Phi

Honor Society.

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AGENDA ITEM SUMMARY

1. NAME OF ITEM: New Academic Program Proposal: B.S. in Health Administration, UMPI

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: **BOARD ACTION:** X

4. OUTCOME:
Relevant Academic Programing

BOARD POLICY:
305.1 Program Approval, Review & Elimination Procedures

5. BACKGROUND:

The University of Maine of Presque Isle (UMPI) is seeking permission to offer a Bachelor of Science in Health Administration (HEA, B.S.) with concentrations in Community Health and Health Informatics. As described in the proposal, a comprehensive market analysis identified the fields of Healthcare Administration and Health Informatics to be in high regional demand, to offer numerous career opportunities for our students and areas residents, to be lacking in availability at postsecondary institutions in the area, and to be an appropriate addition to our university's programming as well as feasible and sustainable long term for UMPI. The program has received funding by the US Department of Education's Strengthening Institutions Program (Title III grant). The degree plan will include face-to-face classroom instruction as well as the development of online modalities (UMPI's competency-based YourPace programming).

The proposal was reviewed at all appropriate faculty and administrative levels at UMPI was reviewed and subsequently recommended by the Chief Academic Officers Council. Dr. Robert Placido, Vice Chancellor of Academic Affairs recommended the program to the Chancellor. Chancellor Malloy signed his approval of the program on April 21, 2020.

6. TEXT OF PROPOSED RESOLUTION

That the Academic and Student Affairs Committee forwards the following resolution to the Consent Agenda for approval at the Board of Trustees meeting on May 18, 2020.

That the Board of Trustees authorizes the creation of the Bachelor of Science in Health Administration at the University of Maine at Presque Isle.

Academic Degree Program Request

Benefit Statement

Executive Summary

The University of Maine of Presque Isle (UMPI) is seeking permission to offer a Bachelor of Science in Health Administration (HEA, B.S.) with concentrations in Community Health and Health Informatics. As described in the proposal, a comprehensive market analysis identified the fields of Healthcare Administration and Health Informatics to be in high regional demand, to offer numerous career opportunities for our students and areas residents, to be lacking in availability at postsecondary institutions in the area, and to be an appropriate addition to our university's programming as well as feasible and sustainable long term for UMPI. The program has received funding by the US Department of Education's Strengthening Institutions Program (Title III grant). The degree plan will include face-to-face classroom instruction as well as the development of online modalities (UMPI's competency-based YourPace programming).

	Academic Year (Fall)			
	2020	2021	2022	2023
Projected new university enrollment due to this program	8	20 (+12)	35 (+15)	50 (+15)
Briefly describe any other anticipated enrollment benefit	UMPI will collaborate with other UMS campuses, such as UMFK's Nursing Program, UMF's Community Health Education Program and USM's Master's in Public Health, in developing this new bachelor's degree. This will allow us to better serve students and provide opportunities for graduate studies and/or local healthcare providers, ensuring appropriate training to support their workforce needs. More specifically, our analysis of local market demand led us to two specializations within the Health Administration degree program: 1) Community Health, and 2) Health Informatics. Our comprehensive analysis has led us to these programs areas and we have found them to 1) be in particularly high regional demand, 2) offer numerous career opportunities for our students and areas residents 3) severely lacking in availability at postsecondary institutions in the area, and 4) an appropriate addition to our university's programming as well as feasible and sustainable long term for UMPI. Note: YourPace CBE enrollment not calculated in these projections at this time.			
Estimated revenue beyond tuition and fees, if any				
Briefly describe source of this other revenue	We do not have other gift or philanthropic support at this time. As the program is built, we expect there could be public-private partnerships to support hardware, software, cloud or other resources where our students could benefit along with a local or regional business.			
New FTE faculty and/or staff necessary for the degree program	+1	-	+1	-
Total new employee salary and benefits	83380	85881	103,820	123634
Total other expenses (supplies, renovations, etc.)	4200	73775 (renovations)	22300	6900

If new tuition, fees, and other revenue generated by this program will not fully offset the expenses necessary to deliver the program, provide a brief justification for adding the program and explain how the expenses of the program will be covered.

Projected revenue will exceed costs at over a 2:1 ratio (see below).

Projected Enrollment	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
In State	8	17	29	41	41
Out of State		3	6	9	9
Total Enrollment	**8**	**20**	**35**	**50**	**50**
Tuition					
In State	$58,800	$127,449	$221,761	$319,795	$326,191
Out of State	$0	$35,986	$73,411	$112,318	$114,565
Total Tuition	$58,800	$163,435	$295,172	$432,113	$440,756
Fees	$7,440	$18,972	$33,865	$49,346	$50,333
Total Enrollment Revenue	$66,240	$182,407	$329,037	$481,459	$491,089

12.1

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

Vice Chancellor for Academic Affairs
15 Estabrooke Drive
Orono, ME 04469

Tel: 207-973-3211
Fax: 207-581-9212
www.maine.edu

The University of Maine

University of Maine at Augusta

University of Maine at Farmington

University of Maine at Fort Kent

University of Maine at Machias

University of Maine at Presque Isle

University of Southern Maine

Date: April 17, 2020

To: Dannel Malloy, Chancellor
University of Maine System (UMS)

From: Dr. Robert Placido, VCAA

Regarding: UMPI Academic Program Proposal: B.S. Health Administration

12.1

Please find the attached program proposal from the University of Maine at Presque Isle (UMPI) to offer a B.S. in Health Administration (BSHA). The attached material includes a letter of support from President Ray Rice, as well as the full program proposal. This is a Competency Base Education (CBE) program with the potential to be a collaborative program with University of Maine at Fort Kent (UMFK), University of Maine at Farmington (UMF), and the University of Southern Maine (USM).

The proposed CBE B.S. in Health Administration was reviewed and recommended by the Chief Academic Officers Council (CAOC) on April 16, 2020. I am pleased to also recommend this program for your approval.

I approve	I do not approve for the reasons listed below	Additional information needed for a decision	Action
✓			Approval of UMPI BSHA

Chancellor Dannel Malloy — *Date* 4-22-20

BACHELOR OF SCIENCE IN HEALTH ADMINISTRATION (COMMUNITY HEALTH and HEALTH INFORMATICS)

April 14, 2020

Transmittal Letter of Support

181 Main Street
Presque Isle, ME 04769-2888 USA
www.umpi.edu
VOICE 207 768-9525
FAX 207 768-9552

14 April 2020

Dr. Robert Placido, Vice Chancellor of Academic Affairs
University of Maine System
259 Estabrooke Hall
Orono, ME 04469

Dear Dr. Placido:

We write to request your consideration of a new academic program proposal from the University of Maine at Presque Isle. The proposed Bachelor of Science degree in Health Administration program will have considerable value for the University and community. Given that we have received a 5-year U.S. Department of Education Title III grant, we have considerable support to establish the program. The local and regional community and economy has considerable need for graduates with these skill sets. Finally, we see opportunities for collaboration with other UMS campuses and a great opportunity to bolster distance (especially CBE) teaching and learning. UMPI will collaborate with other UMS campuses, such as UMFK's Nursing Program, UMF's Community Health Education Program and USM's Master's in Public Health, in developing this new bachelor's degree. This will allow us to better serve students and provide opportunities for graduate studies and/or local healthcare providers, ensuring appropriate training to support their workforce needs.

We thank you for any consideration and will be glad to address any questions you may have.

Sincerely,

Raymond J. Rice, Ph.D.
President and Provost

Barbara Blackstone, M.S.
Dean of College of Professional Programs

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12.1

UNIVERSITY OF MAINE SYSTEM PROGRAM PROPOSAL

UNIVERSITY OF MAINE PRESQUE ISLE

PROGRAM OBJECTIVES

NARRATIVE DESCRIPTION OF PROGRAM RATIONALE

The University of Maine at Presque Isle (UMPI) is requesting permission to plan a BS in Health Administration. The proposed launch date is for Fall semester of 2020 and is being funded by the US Department of Education's Strengthening Institutions Program (Title III grant). Staffing structure, equipment, supplies, and other resources were identified in this grant application to ensure effective implementation of the bachelor's degree program. Course development will be phased in over five years, with courses developed in one year, then pilot tested and analyzed the year after development. Initially the degree plan will include face-to-face classroom instruction, then it will evolve to include the development of online modalities (distance learning and UMPI's competency-based YourPace). Community Health and Health Informatics concentrations will be developed over the 5 years within this major, and a new Health Administration Instructional Lab will be created with funding provided by the Title III grant.

UMPI will collaborate with other UMS campuses, such as UMFK's Nursing Program, UMF's Community Health Education Program and USM's Master's in Public Health, in developing this new bachelor's degree. This will allow us to better serve students and provide opportunities for graduate studies and/or local healthcare providers, ensuring appropriate training to support their workforce needs.

Through extensive research using Burning Glass and Ruffalo Noel Levitz research, UMPI identified relevant, high demand occupations that aligned with regional and statewide workforce needs--listed as one of the "Top 30 Most in Demand Bachelor's Degree Programs in Maine" with Healthcare Administration ranking second in the list *(Gray Associates Program Evaluation System, 2018).* Market analysis conducted by Hanover Research and Noel Levitz for the University of Maine System in 2015 confirmed several new degree programs that were already on the UMPI radar as having a high demand by current and potential future college students. Further analysis, discussions and a review of external expert studies provided additional support for the programs initially viewed as highly likely; these sources included the US Bureau of Labor Statistics, Maine Bureau of Labor, Northern Maine Development Corporation, the Northeast Development Workforce Board, and Maine's Labor Shortage (Maine Development Foundation and the Maine State Chamber of Commerce). Additional studies included Emerging Markets, Emerging Workforce (CEI, Capital for Opportunity and Change), Maine's Critical Workforce and Labor Market Challenges and A Profile of Socioeconomic Measures on Aroostook County, Maine (Economic Profile System, February 28, 2016). More specifically, our analysis of local market demand led us to two specializations within the Health Administration degree program: 1) Community Health, and 2) Health Informatics. Our comprehensive analysis has led us to these programs areas and we have found them to 1) be

in particularly high regional demand, 2) offer numerous career opportunities for our students and areas residents 3) severely lacking in availability at postsecondary institutions in the area, and 4) an appropriate addition to our university's programming as well as feasible and sustainable long term for UMPI.

Health Informatics professionals will be responsible for managing programs for collecting and updating information for patient records as well as maintaining confidentiality of patient records. Working to improve quality and efficiency, informatics graduates may also manage finances and recordkeeping, and communications with medical staff. This career requires individuals to have a solid understanding of medical coding, clinical documentation, patient care, electronic medical records, HIPPA, associated computer programs, process improvement and project management.

GENERAL PROGRAM GOALS (LIMIT TO 3-5)

1. To prepare students to become **health investigators and advocates**

2. To prepare students to conduct **health research and implement research findings**

3**.** To prepare students to become **educators and leaders in healthcare**

4. To prepare students to be **professional and culturally competent life-long learners** for success in graduate school, work in professional organizations, and/or obtainment of certifications such as MCD's Community Health Workers and Chronic Conditions Training Program

SPECIFIC STUDENT LEARNING OUTCOMES OR BEHAVIORAL OBJECTIVES (LIMIT 5-8)

- Students will gain health literacy education to understand the pathophysiology of different disease states and how those manifest in chronic physical and mental conditions
- Students will learn applied business/management skills in healthcare settings such as: ethics, financing and accounting, health data analytics, applied statistics, leadership and management
- Assess needs for community health education and develop educational materials
- Educate public on healthy habits, lifestyles, and health screenings for positive changes in their communities
- Learn to act as a bridge between providers and individuals to promote health, reduce disparities, and improve service deliveries
- Promote wellness equity by providing culturally appropriate health information to clients and providers
- Assist in navigating the health and human services system and advocate for individual and community needs; find funding/write grants for increased access to health programs
- Collect and analyze community health needs assessment data in partnership with community professionals

EVIDENCE OF PROGRAM NEED

A. EXISTENCE OF EDUCATIONAL, ECONOMIC, AND SOCIAL NEEDS TO INCLUDE CITATIONS OR SPECIFIC AUTHORITIES OR STUDIES CONSULTED.

The fields of Healthcare Administration and Community Health/Health Informatics are growing, and at UMPI we are dedicated to equipping students with degrees that they can directly apply in their fields of study. The US Bureau of Labor Statistics (2019) identifies healthcare as the fastest-growing job sector of the US economy, with job growth estimates for medical and health service managers increasing 18% from 2018 to 2028. Likewise, the Maine Dept. of Economic & Community Development (Strategic Planning Summit, 2019) states that health care (including administrative positions) continues to be one of Maine's largest employers with anticipated job growth of more than 12% (Labor Insight Jobs, Burning Glass Technologies, 2019). In Maine, 62% of health administration positions require a bachelor's degree, while 13% require a master's degree (https://www.onetonline.org). Median salaries range from $62,060 to $69,000 for health information managers and health administration positions, respectively, salaries that are both above the average living wage for our region ($30,701) (Burning Glass, 2020).

The fields of Healthcare Administration are extremely versatile, with graduates of these programs usually transitioning into one of 14 different occupation groups: Registered/practical nursing, project and program managers, business analysis, healthcare administrators and managers, data analysis and mathematics, nursing management and training, general research, occupational safety and compliance, health education and counseling, health IT professionals, civil and safety engineering, youth and career counseling, chemical and physical science, mechanical and related engineers (Burning Glass, 2020). These occupation groups can lead to the following career outcomes: Patient Advocate / Navigator, Community Health Worker, Nursing Home / Home Health Administrator, Healthcare Administrator, Health Educator / Coach, Safety Manager, Safety Specialist / Coordinator, Ergonomist, Health and Safety Engineer, Registered Nurse, Program Manager, Project Manager, Business / Management Analyst, Social Science Researcher, Researcher / Research Associate, Clinical Case Manager, Clinical Analyst / Clinical Documentation and Improvement Specialist, Data / Data Mining Analyst, Nursing Manager / Supervisor, Youth Counselor / Worker, and Physicist. UMPI's new Health Administration bachelor's degree program will prepare individuals for immediate careers as well as the pursuit of graduate studies.

Additionally, the Cary Medical Center in Caribou, ME has recently completed a "Community Health Needs Assessment and Implementation Strategy" for Aroostook county and will continue to update and conduct community needs research every 3 years. The results of extensive analysis yielded Significant Health Needs for the community. The 2019 Significant Health Needs identified for Aroostook County are:

1. Drug and Alcohol Abuse – 2016 Significant Need
2. Mental Health – 2016 Significant Need
3. Obesity – 2016 Significant Need
4. Cancer

5. Tobacco Use – 2016 Significant Need
6. Diabetes – 2016 Significant Need

Further, the hospital has developed implementation strategies for these six needs including activities to continue/pursue, community partners to work alongside, and measures to track progress. This information and community action is a unique resource for UMPI students and such strong community ties and opportunities do not readily exist in other Health Administration programs. Faculty will capitalize on such unique opportunities by designing a curriculum for students that parallel these community health challenges to become educated community-health workers while supporting our current workforce.

More information on the Community Health Needs Assessment and Implementation Strategy can be found here: https://www.carymedicalcenter.org/wp-content/uploads/2020/01/chna.pdf

B. FOR 2-YEAR PROGRAMS, INDICATE POTENTIAL EMPLOYERS WHO HAVE REQUESTED THE PROGRAM AND THEIR SPECIFIC EMPLOYMENT PROJECTIONS

N/A

C. DETAILED SURVEY OF SIMILAR PROGRAMS THAT ARE OFFERED WITHIN THE UNIVERSITY SYSTEM, OR OTHER HIGHER EDUCATION INSTITUTIONS OF OTHER AGENCIES WITHIN THE STATE.

UMPI will collaborate with other UMS campuses, such as UMFK's Nursing Program, UMF's Community Health Education Program and USM's Master's in Public Health, in developing this new bachelor's degree.

D. ENROLLMENT PROJECTIONS FOR FIVE YEARS. (SUPPORT DATA ATTACHED).

Enrollment projections for the Health Administration program include

- First year enrollment of 8 students,
- Second year enrollment of 12 new students for a total of 20,
- Third year enrollment of 15 new students for a total of 35 students,
- and beyond the third year, we anticipate enrolling 15 new students annually in the degree program, for a total enrollment of 50 students annually.

Of these new students, we would anticipate that 80% of new student enrollment would be instate students, with 20% out of state students annually beyond the first year.

Projected Enrollment	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
In State	8	17	29	41	41
Out of State		3	6	9	9
Total Enrollment	8	20	35	50	50

PROGRAM OVERVIEW.

The new B.S. in Health Administration with concentrations in Community Health and Health Informatics addresses community-level health and the impact on individuals, families, and the associated community. Subdisciplines of public health, the Community Health and Health Informatics concentrations have regional relevance with an emphasis on the specific needs of and challenges facing rural communities. This program promotes access to healthy lifestyles through research and policies, health literacy education and promotion, information management and efficiency, and health and human sciences. Community challenges that incorporate industry practitioners and organizations are practical, outside the classroom service-learning and internship experiences available for students.

A. OUTLINE OF REQUIRED AND/OR ELECTIVE COURSES.

Required Core Courses for the program:
Intro to Health Administration
Intro to Community Health
Health Care Delivery Systems
Health Care Statistics and Research
Legal and Ethical Aspects of Health Care
Medical Terminology/Coding
Health Care Practicums/Internships

Electives for the Community Health Concentration:
Principles of Disease Prevention and Health Professions
Principles of Epidemiology
Management and Grants
Planning Health Promotion
Child and Adolescent Health
Community Nutrition
Food Systems and Resources
Maternal and Infant Health and Nutrition
Environmental Health

Electives for the Health Informatics Concentration:
Privacy and Security of Health Records
Electronic Health Records
Health Care Data Analytics
Health Information Management Applications
Reimbursement Methodology

B. DEVELOPMENT OF NEW COURSES AND/OR WHAT THEY MAY DISPLACE

Since this is a new program offering, all courses will be newly developed. We plan to develop 5 courses each semester, to teach or pilot teach the following semester. Note: some of these courses are subject to change as development gets underway, but at this time we believe this is a good reflection of the core curriculum that will be developed for the major. Additionally, all courses will be developed for online modalities, providing students the ability to enroll and complete the degree program through more traditional online formats as well as UMPI's YourPace competency-based education modality.

Course Development Sequence for B.S. in Health Administration			
New Courses for the B.S. in Health Administration (Core)		***Develop***	***Pilot Teach***
Introduction to Health Administration	Developed Year 1, Pilot tested Year 2	Spring 2020	2020-2021
Medical Terminology	Developed Year 1, Pilot tested Year 2	Spring 2020	2020-2021
Health Care delivery Systems	Developed Year 1, Pilot tested Year 2	Spring 2020	2020-2021
Health Care Statistics & Research	Developed Year 1, Pilot tested Year 2	Spring 2020	2020-2021
Legal and Ethical Aspects of Health Care	Developed Year 1, Pilot tested Year 2	Spring 2020	2020-2021
Introduction to Health Administration	Developed Year 1, Pilot tested Year 2	Spring 2020	2020-2021
New Courses for the B.S. in Health Administration (Community Health Concentration)			
Principles of Disease Prevention and Health Professions	Developed Year 2, Pilot tested Year 3	2020-2021	2021-2022
Principles of Epidemiology	Developed Year 2, Pilot tested Year 3	2020-2021	2021-2022
Management and Grants	Developed Year 2, Pilot tested Year 3	2020-2021	2021-2022
Planning Health Promotion	Developed Year 2, Pilot tested Year 3	2020-2021	2021-2022
Child and Adolescent Health	Developed Year 2, Pilot tested Year 3	2020-2021	2021-2022
New Courses for the B.S. in Health Administration (Health Informatics Concentration)			
Privacy and Security of Health Records	Developed Year 3, Pilot tested Year 4	2021-2022	2022-2023
Electronic Health Records	Developed Year 3, Pilot tested Year 4	2021-2022	2022-2023
Health Care Data Analytics	Developed Year 3, Pilot tested Year 4	2021-2022	2022-2023
Health Information Management Applications	Developed Year 3, Pilot tested Year 4	2021-2022	2022-2023
Reimbursement Methodology	Developed Year 3, Pilot tested Year 4	2021-2022	2022-2023
New Courses for the B.S. in Health Administration (Experiential Courses)			
Health Administration Practicum I	Developed Year 4, Pilot tested Year 5	2022-2023	2023-2024
Health Administration Practicum II	Developed Year 4, Pilot tested Year 5	2022-2023	2023-2024
Health Administration Practicum Capstone	Developed Year 4, Pilot tested Year 5	2022-2023	2023-2024
Conversion of Health Administration Core Courses to Online Delivery			
Introduction to Health Administration (Online/Hybrid)	Converted Year 5, Pilot tested Year 5	2023-2024	2023-2024
Medical Terminology (Online/Hybrid)	Converted Year 5, Pilot tested Year 5	2023-2024	2023-2024
Health Care delivery Systems (Online/Hybrid)	Converted Year 5, Pilot tested Year 5	2023-2024	2023-2024
Health Care Statistics & Research (Online/Hybrid)	Converted Year 5, Pilot tested Year 5	2023-2024	2023-2024
Legal and Ethical Aspects of Health Care (Online/Hybrid)	Converted Year 5, Pilot tested Year 5	2023-2024	2023-2024

C. TYPE OF RESEARCH ACTIVITY, IF ANY, IN PROGRAM DESIGN

This program will contain research methods courses, experiential learning opportunities, informatics and data analysis, and senior capstones.

D. NATURE OF INDEPENDENT STUDY, CLINICAL EXPERIENCE, AND/OR FIELD PRACTICUMS EMPLOYED IN CURRICULUM DESIGN

In addition to course curriculum, students will be required to take practicum/internships throughout their college experience. We plan to partner with at least 30 different internship sites to provide students with a vast array of options that may suit their individual interests, or give them the chance to explore areas that they are unfamiliar with. Service-learning will also

be embedded within the curriculum so that students are able to apply classroom knowledge in the field to gain practical skills.

E. IMPACT OF PROGRAM ON EXISTING PROGRAMS ON THE CAMPUS

The addition of the HA program will have a significant crossover with other majors offered at UMPIincluding the Business Administration , Social Work, Exercise Science, Nursing, and all Healthcare related programs. Students will have the option to choose electives from those programs if they suit their interests within the Health Administration field.

PROGRAM RESOURCES

A. PERSONNEL

1. VITA OF EXISTING FACULTY WHO WILL ASSUME MAJOR ROLE FOR PROGRAM TO BE INCLUDED IN THE APPENDIX; OR THE NEED FOR NEW FACULTY (See Appendix)

UMPI will employ a total of two full time Assistant Professors of Health Administration/Curriculum Development Specialists to lead curriculum development in each new degree concentration areas: Health Administration, Community Health (yrs.1-5 of the Title III grant), and Health Administration, Health Informatics (yrs. 3-5 of the Title III grant). Each Assistant Professor/Curriculum Specialist will lead course development efforts for their individual new degree concentration and be responsible for ensuring curriculum is submitted to and gains approval from all pertinent UMPI, University of Maine System, state, and national accrediting entities. The specialists will be lead instructors for new courses to be pilot tested. In years 4 and 5, curriculum specialists will convert to online/hybrid delivery the core program courses (originally developed for on-campus delivery).

Curriculum Specialist positions will be filled in accordance with the program development schedule and be institutionalized with UMPI absorbing an increasing percent of salary/benefit costs beginning year three. Qualifications include a Master’s (PhD preferred) degree in Computer Science (2 positions) and Health Administration, or related field (2 positions), a minimum of 5 years postsecondary teaching experience, a minimum of 3 years curriculum development experience, and demonstrated understanding of employment trends/opportunities within their discipline of expertise across Aroostook County, the state of Maine, and the greater region in order to facilitate student placement upon graduation.

2. SPECIFIC EFFECT ON EXISTING PROGRAMS OF FACULTY ASSIGNMENTS TO NEW PROGRAM. LIST NECESSARY FACULTY ADJUSTMENTS.

N/A - New faculty hires

B. CURRENT LIBRARY ACQUISITIONS AVAILABLE FOR NEW PROGRAMS

- Healthcare acquisitions in library are limited but we hope to expand hands on resources with funds from the Title III grant

- $3500 from Title III grant for education materials for journal subscriptions

C. NEW EQUIPMENT NECESSARY FOR THE NEW PROGRAM AND PLAN FOR ITS ACQUISITION AND IMPLEMENTATION

The following equipment will be purchased for the Health Administration program. These expenses will be funded 100% by the US Department of Education's Title III grant, totaling nearly $63,000 over the five-year grant.

Health Administation Department Equipment Resources	
Instructor Classroom Technology/Podium	17,475
20 Classroom Student Computers and Software	34,300
Faculty Laptops, Monitors, and Peripherals	4,000
Instructional Supplies	3,850
Printer Lease Fees	3,000
Total Health Admin	**$ 62,625**

D. ADDITIONAL SPACE REQUIREMENTS, IF ANY, INCLUDING RENOVATIONS.

A new Health Administration Instructional Center will be developed during Years 2 and 3 of the program. The classroom will be determined by the Space Committee. This space will be renovated to house the new center with ease of access to UMPI's other health programs (Nursing, Exercise Science, MLT, and Biology). UMPI's Facilities Director, Joseph Moir, will serve as renovation project manager to ensure renovation projects are progressing as planned. He will be responsible for working with UMPI's administrative staff, Title III Director, Health Administration faculty, Procurement, Facilities personnel, and external vendors performing work. Mr. Moir will ensure adherence to all rules and regulations related to required internal bidding processes and federal guidelines, including assurance of contractor compliance with Davis-Bacon regulations and adherence to federal requirements for payment of prevailing wages for contractors used for renovation projects.

Renovation costs totaling nearly $31,000 (to include the purchase of 20 ergonomic student workstations for the center) will be paid by the Title III grant as outlined below:

Health Administation Department Resources Folsom Hall			
Trade Or Shop	***Labor***	***Materials/ Services***	***Total***
Final Clean	100		100
New Door w/Hardware		753	753
Paint Existing Drywall	750	400	1,150
Window Treatments	200	658	858
Electrical, Data & Fire Alarm	550	1,025	1,575
Ergonomic Workstations (20)		20,322	20,322
Subtotal	***$ 1,600***	***$ 23,158***	***$ 24,758***
Contingency @ 10%	160	2,316	2,476
Design Fee @ 8%	128	1,853	1,981
Construction Fee @ 6%	96	1,389	1,485
Total Renovation Costs for Computer Science Lab	***$ 1,984***	***$ 28,716***	***$ 30,700***

E. EXTENT OF COOPERATION WITH OTHER PROGRAMS, BOTH ON THE INITIATING CAMPUS AND OTHER CAMPUSES

In addition to existing programs on the UMPI campus (e.g. Social Work and Business) UMPI will collaborate with other UMS campuses, such as UMFK's Nursing Program and UMF's Community Health Education Program, in developing this new bachelor's degree. This will allow us to better serve students and provide opportunities for local healthcare providers, ensuring appropriate training to support their workforce needs.

TOTAL FINANCIAL CONSIDERATION

Once fully launched, we project the new Health Administration degree programs will generate an enrollment of 41 FTE in-state students and 9 FTE out-of-state students annually, resulting in total revenue of $491,089, which includes $440,756 in tuition revenue and $50,333 in fee revenue each year. Additionally, a very modest 18% (or 9) HA students living in campus housing annually will yield $78,642 in room and board revenues. Therefore, total annual revenues of $569,731 will more than cover annual salaries and benefits of the two faculty members teaching in the program.

Bachelor of Science in Health Administration						
	Year 1 2019-2020	Year 2 2020-2021	Year 3 2021-2022	Year 4 2022-2023	Year 5 2023-2024	Total
Salaries	55,000	56,650	68,483	81,553	83,999	345,685
Benefits	28,380	29,231	35,337	42,081	43,343	178,373
Travel	2,200	2,200	4,400	4,400	2,200	15,400
Library Resources		3,500				3,500
Computer Technologies (Lab & Faculty)	2,000	19,900	16,400			38,300
Equipment (Instructor Technology)		17,475				17,475
Renovation of HA Instructional Lab		30,700				30,700
Printer Lease Fees for HA Lab		750	750	750	750	3,000
Instructional Lab Supplies		750	750	1,750	600	3,850
Total Title III Grant Funding for Expenditures	**87,580**	**161,156**	**126,120**	**130,534**	**130,892**	**636,283**
Institutionalization of E&	**Year 1 2019-2020**	**Year 2 2020-2021**	**Year 3 2021-2022**	**Year 4 2022-2023**	**Year 5 2023-2024**	**Total**
Salaries	-	-	20,422	35,198	36,253	91,873
Benefits	-	-	10,538	18,162	18,707	47,406
Title E&G	**$ -**	**$ -**	**$ 30,960**	**$ 53,360**	**$ 54,960**	**$139,279**

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Projected Enrollment	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
In State	8	17	29	41	41
Out of State		3	6	9	9
Total Enrollment	**8**	**20**	**35**	**50**	**50**
Tuition					
In State	$58,800	$127,449	$221,761	$319,795	$326,191
Out of State	$0	$35,986	$73,411	$112,318	$114,565
Total Tuition	$58,800	$163,435	$295,172	$432,113	$440,756
Fees	$7,440	$18,972	$33,865	$49,346	$50,333
Total Enrollment Revenue	$66,240	$182,407	$329,037	$481,459	$491,089

Assumptions:

- FY21 proposed tuition rate of $239/cr hr/in state student; $382/cr hr/out of state student
- FY21 proposed unified fee rate of $31/cr hr/student
- 15 credit hours/semester /student
- Student Mix: 80% instate; 20% out of state
- 2% annual increase in tuition and fee rates/year beginning 2021-2022

APPENDIX

Vita for major faculty role:

TARA K. WHITON
7 Summer Street, Bethel, ME 04217 | 207-730-3289 | tara.k.whiton@gmail.com

EDUCATION

East Tennessee State University
Doctor of Philosophy 2019
Sport Physiology and Performance
Dissertation: “The Influence of Branched-Chain Amino Acid Supplementation on Measures of Central and Peripheral Fatigue in Training Athletes”

Honors/Awards: Doctoral Fellow 2017-2019

Montana State University
Master of Science 2014
Exercise Physiology and Nutrition
Thesis: “Characterizing Training Habits of Competitive Masters Aged Nordic Skiers”

University of Southern Maine
Bachelor of Science 2011
Exercise Physiology and Biology

AWARDS

Doctoral Fellowship – Center of Excellence and Sport Science Education
August 2017 – August 2019

Outstanding Master’s Student Research Award – 2014 NWACSM
May 2014

TEACHING EXPERIENCE

Gould Academy – STEM Faculty
2018-present
Seminar – Nutrition, Health, and Wellness; AP Statistics; Anatomy and Physiology

East Tennessee State University - Adjunct
2017-2019
Teaching Aerobic Conditioning, Advanced Exercise Physiology II, Structural Kinesiology w/ Lab, Wellness for Life

12.1

University of Maine at Presque Isle - Adjunct
2017-2018
Physiology of Exercise
Designed, created, and proposed curriculum for new Exercise Science major

Montana State University – Graduate Teaching Assistant
2012-2014
Advanced Exercise Physiology w/ lab, Kinesiology

PUBLICATIONS AND PAPERS

"The effects of chronic branched-chain amino acid supplementation on the perceptions of stress and soreness from daily training in collegiate distance runners" – in submission 2019

"The effects of chronic branched-chain amino acid supplementation on running kinematics: Single case research" – in submission 2019

"Coaching considerations: The importance of strength training before power training for collegiate female athletes" – in submission 2018

"Innate biological differences can explain differences in lean muscle mass functionality that contribute to differences in sport performance: A review" –in submission 2018

"Salivary alpha-amylase: A potential biomarker for athlete monitoring" – in submission 2018

"Beyond statistical significance: Unifying the language between sport scientists and coaches" – conference presentation – Coaches College 2018

"Changes in stretch-shortening cycle and jump height after a competitive training season in collegiate distance runners" – conference presentation – Coaches College 2018

"Preliminary analysis: Moderating the stress perception of collegiate distance runners using branched-chain amino acids" – conference presentation - Southeast and National American College of Sports Medicine Conference 2018

"Branched-chain amino acid supplementation may produce marginal reductions in task-specific muscular soreness in collegiate distance runners" – conference presentation - Southeast and National American College of Sports Medicine Conference – Chattanooga, TN and Minneapolis, MN 2018

"The contribution of muscle cross-sectional area to jump height in collegiate athletes" – conference presentation - Southeast American College of Sports Medicine Conference - Greeneville, SC 2017

"Blood lactate monitoring in a periodized distance training program: A case study" –Extended Abstract and Poster – Coaches College, Johnson City, TN 2016

"Characterizing the competition season training habits of competitive masters-aged cross-country skiers" – conference presentation - Winter Sports Interest Group - National ACSM conference - San Diego, CA – Award Finalist 2015

"Characterizing the pre-season training habits of competitive masters-aged cross-country skiers" –conference presentation –Northwest ACSM Conference - Wenatchee, WA - Awarded 2014 Outstanding Masters Student Research Award 2014

"Characterizing the training habits of recreational masters-aged cross-country skiers" – Abstract - published in the International Congress on Science and Skiing 2013

"Reliability and validity of using a hand-held GPS monitor to control over-ground hiking speed" – conference presentation – NWACSM Salem, OR 2013

MEMBERSHIPS

NSCA – National Strength & Conditioning Association
Certified Strength and Conditioning Specialist

ISSN – International Society of Sport Nutrition
Certified Sport Nutritionist

ACSM - American College of Sports Medicine
Certified Exercise Physiologist

ISAK – International Society for Anthropometry and Kinanthropometry
Licensed Anthropometrist Level 1

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AGENDA ITEM SUMMARY

1. NAME OF ITEM: New Academic Program Proposal: B.S. in Envrionmental GIS, UMM

2. INITIATED BY: Lisa Marchese Eames, Chair

3. BOARD INFORMATION: **BOARD ACTION:** X

4. OUTCOME:
Relevant Academic Programing

BOARD POLICY:
305.1 Program Approval, Review & Elimination Procedures

5. BACKGROUND:

The University of Maine at Machias (UMM) to offer a B.S. Environmental Geographic Information Science (BSGIS). The attached material includes a letter of support from President Ferrini-Mundy, Interim Provost Gilbert, and Head of Campus and Vice President of Academic Affairs Qualls, as well as the full program proposal. The importance of GIS has become evident during the COVID19 crisis, as leaders across the country make decisions on the basis of the GIS Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. There are currently 2,153 GIS jobs available in New England, and this demand is expected to grow by 10% nationally.

The proposed B.S. Environmental Geographic Information Science was reviewed and recommended by the Chief Academic Officers Council (CAOC) on April 16, 2020. Dr. Robert Placido, Vice Chancellor of Academic Affairs recommended the program to the Chancellor. Chancellor Malloy signed his approval of the program on April 21, 2020.

6. TEXT OF PROPOSED RESOLUTION

That the Academic and Student Affairs Committee forwards the following resolution to the Consent Agenda for approval at the Board of Trustees meeting on May 18, 2020.

That the Board of Trustees authorizes the creation of the Bachelor of Science in Environmental GIS at the University of Maine at Machias.

Academic Degree Program Request

Benefit Statement

Executive Summary

The University of Maine at Machias (UMM) is seeking permission to offer a Bachelor of Science in Environmental Geographic Information Systems (BS in EGIS). As described in the included proposal, the proposed program will meet growing demand for geographic information systems (GIS) professionals in Maine and beyond, offering students a structured program core and three concentrations, providing a broad background knowledge and skills in the field and options for specialization. Students may complete the program core, Community Applications and Spatial Data Science concentrations mostly on campus or entirely online. Courses in the Ecological Applications concentration involve field and laboratory, so that concentration will not be accessible entirely online. The program involves multiple courses from other UMS campuses and builds on close collaborations through the Maine Geospatial Institute.

	Academic Year (Fall)			
	2020	2021	2022	2023
Projected new university enrollment due to this program	5	19 (+14)	36 (+17)	56 (+30)
Briefly describe any other anticipated enrollment benefit	UMM GIS courses already provide valuable instruction to over 100 students per year at UMM, UM and other UMS campuses. The new program will offer an additional pathway for those wishing to pursue GIS, and it is stackable with existing certificates, including a new early college GIS certificate. The new program will also include a new online course, GIS 102 Our Digital Earth, an earth systems science course that meets general education requirements and will be available to students at any UMS campus.			
Estimated revenue beyond tuition and fees, if any	$2000	$3000	$4000	$5000
Briefly describe source of this other revenue	The UMM GIS Service Center has a long history of engaging students in service projects through contracts, grants and partnerships. This revenue generates, on average $4,000 per year to support GIS courses and student internships, and we expect this to continue and expand with an expanded program.			
New FTE faculty and/or staff necessary for the degree program	+0.1	+0.1	+1.1	+1.1
Total new employee salary and benefits	$4000	$4000	$82500	$82500
Total other expenses (supplies, renovations, etc.)	$4000	$500	$500	$500

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If new tuition, fees, and other revenue generated by this program will not fully offset the expenses necessary to deliver the program, provide a brief justification for adding the program and explain how the expenses of the program will be covered.

Startup costs and new adjunct faculty will be entirely offset in the first year by revenue generated by students in other majors who take GIS courses at UMM. Costs are also kept to a minimum because many courses will be cross listed with offerings from other UMS campuses through our partnership with the Maine Geospatial Institute, and some instruction will be provided by a graduate teaching assistant covered by the UMaine Graduate School. We expect that as enrollment increases in year 3 we will need to hire one new tenure track faculty.

Maine's Public Universities
UNIVERSITY OF MAINE SYSTEM

Vice Chancellor for Academic Affairs
15 Estabrooke Drive
Orono, ME 04469

Tel: 207-973-3211
Fax: 207-581-9212
www.maine.edu

The University of Maine

University of Maine at Augusta

University of Maine at Farmington

University of Maine at Fort Kent

University of Maine at Machias

University of Maine at Presque isle

University of Southern Maine

Date: April 17, 2020

To: Dannel Malloy, Chancellor
University of Maine System (UMS)

From: Dr. Robert Placido, VCAA

Regarding: UMM Academic Program Proposal: B.S. Environmental GIS

13.1

Please find the attached program proposal from the University of Maine at Machias (UMM) to offer a B.S. Environmental Geographic Information Science (BSGIS). The attached material includes a letter of support from Head of Campus and Vice President of Academic Affairs Daniel Qualls, as well as the full program proposal. The importance of GIS has become evident during the COVID19 crisis, as leaders across the country make decisions on the basis of the GIS Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. There are currently 2,153 GIS jobs available in New England, and this demand is expected to grow by 10% nationally.

The proposed B.S. Environmental Geographic Information Science was reviewed and recommended by the Chief Academic Officers Council (CAOC) on April 16, 2020. I am pleased to also recommend this program for your approval.

I approve	I do not approve for the reasons listed below	Additional information needed for a decision	Action
✓			Approval of UMM BSGIS

4.22.20

Chancellor Dannel Malloy *Date*

Office of the President
University of Maine
and University of Maine at Machias

THE UNIVERSITY OF MAINE

5703 Alumni Hall
Orono, ME 04469-5703
Tel: 207.581.1512
Fax: 207.581.1517
umaine.edu

April 21, 2020

Dr. Robert Placido, Vice Chancellor of Academic Affairs
University of Maine System
259 Estabrooke Hall
Orono, ME 04469

Dear Dr. Placido:

We write to request your consideration of a new academic program proposal from the University of Maine at Machias. The proposed Bachelor of Science degree in Environmental Geographic Information Science, to be housed in the Environmental and Biological Sciences Division at the University of Maine at Machias. This program relies heavily on UMM's existing GIS certificates and the UMS Maine Geospatial Institute. For example, the Spatial Data Science concentration will benefit from the University of Maine at Augusta's expertise in this area. This program is also our attempt to revise the Environmental Studies program due to being consistently identified as a program for examination.

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The proposal has been reviewed and approved by the Division of Environmental and Biological Sciences, the Program Review and Evaluation Committee (PREC) and the UMM faculty assembly. We hereby submit the proposal for review and approval by you, the University of Maine System chief academic officers, the Chancellor and the Board of Trustees.

We thank you for any consideration and will be glad to address any questions or concerns you may have.

Faye Gilbert

Dr. Faye Gilbert
Interim Provost, University of Maine

Joan Ferrini-Mundy

Dr. Joan Ferrini-Mundy
President, University of Maine

THE UNIVERSITY OF MAINE AT MACHIAS

UMaine's regional campus • machias.edu

THE UNIVERSITY OF MAINE AT MACHIAS

Division of Environmental & Biological Sciences
116 O'Brien Avenue ~ Machias, Maine 04654
(207) 255-1214

Dr. Robert Placido
Vice Chancellor of Academic Affairs
University of Maine System
Office of the Vice Chancellor of Academic Affairs
15 Estabrooke Drive, 259 Estabrooke Hall
Orono, ME 04469

April 10, 2020

Dear Vice Chancellor Placido,

Please find attached a proposal for a new degree program, B.S. in Environmental Geographic Information Science, to be housed in the Environmental and Biological Sciences Division at the University of Maine at Machias. The proposal has been reviewed and approved by the Division of Environmental and Biological Sciences, the Program Review and Evaluation Committee (PREC) and the UMM faculty assembly. We hereby submit the proposal for review and approval by you, the University of Maine System chief academic officers, the Chancellor and the Board of Trustees.

13.1

Signed:

_____
Dr. Tora Johnson
Chair, UMM Division of Environmental and Biological Sciences

_____
Dr. Daniel Qualls
UMM Head of Campus and Vice President of Academic Affairs

UNIVERSITY OF MAINE SYSTEM NEW PROGRAM PROPOSAL

I. **Full program title: B.S. in Environmental Geographic Information Science**

II. **Program objectives**

a. **Narrative description of program rationale**

With National Science Foundation support (NSF CCILI Award #0126639) in collaboration with other UMS partners, the University of Maine at Machias established a geographic information systems (GIS) laboratory and ran its first GIS courses in 2002. Another NSF grant awarded in 2007 (NSF ATE Award #0802417) supported an expansion of the laboratory and allowed UMM to begin offering certificate and minor programs to meet growing, well-documented workforce demand. The GIS concentration became a popular option for students enrolled in the Environmental Studies program. UMM's GIS courses and programs have since grown to serve more than 100 students per year using highly innovative pedagogical approaches and pioneering online and blended instructional methods. Our courses now provide introductory and advanced instruction to undergraduates across the system and offer incumbent workers important training opportunities. Students in UMM GIS courses conduct service projects that have significant impact on communities in the Downeast Region and across the state (see Appendix A for examples of such projects and awards earned by the program and its faculty).

Conversely, the Environmental Studies at UMM program has seen declining enrollment. For several years it has been on the UMS list of programs for evaluation because of the small number of matriculated and graduating students. Investigation into other Environmental Studies programs across the northeastern US and the job prospects for those graduates revealed 136 competing programs, most of which have minimal enrollment, indicating a saturated market. In 2018, these institutions produced far more graduates than available entry-level jobs in the field (see table below). Clearly UMM is at a competitive disadvantage to recruit students, and graduates of the UMM program will face stiff competition in securing jobs in their field. It should be noted that in a recent survey conducted for this program review 40% of UMM alumni reported being employed full- or part-time in the field; many of those employed cited GIS training received at UMM as a key reason they were successful in finding employment. A program review of the Environmental Studies program this year pointed to the need to reinvest in an area with better job prospects for graduates and less competition for admissions.

Among the environmental-related fields that UMM has the expertise to support with projected job growth, geographic information systems (GIS) specialists is an area of great potential. The field of geographic information systems has been categorized by the US Department of Labor as a high-growth industry, and there are few competing institutions with four-year GIS programs in the northeastern US (see "program need" below). The UMM GIS program currently enjoys robust enrollment. Based on this information the Environmental and Biological Sciences Division is proposing to suspend the Environmental Studies degree and create a B.S. in Environmental GIS (EGIS) with three concentrations. The new program would be part of a shift at UMM toward workforce oriented education aimed at high-growth careers needed in Maine, and it would build on strong existing collaborations among UMS geospatial faculty through the Maine Geospatial Institute (MGI).

b. The relationship between the proposed program and the Maine Geospatial Institute

Building a four-year program that leverages faculty expertise and capacity on all UMS campuses was among the mid-term goals established by MGI when it was formed two years ago. Each campus has unique faculty specializations and areas of focus, so a program that integrated all of them would provide a comprehensive program with diverse curriculum options. The need for UMM to shift its curriculum to increase enrollment and better serve the workforce provided the opportunity to pilot such a model.

While MGI itself has no intention of administering the program, it provides a forum to facilitate collaboration, and we anticipate greater integration among programs as we continue to pursue shared goals and the system continues to remove barriers to collaboration. Even though there are GIS courses, minors and/or certificate programs at all seven UMS campuses, no UMS campus alone has the capacity to offer a four-year GIS program. However, the collaboration among the seven member campuses of the Maine Geospatial Institute has made it possible to build a program collaboratively, and such collaborations are an explicit goal set by the Chancellor's office and the Board of Trustees.

The MGI executive committee supported and provided feedback for the development of this proposal and is committed to facilitating collaboration in support of the program over the long term.

The proposed EGIS program at UMM will leverage this collaboration and incorporate courses from other UMS campuses to enhance our capacity to offer a comprehensive program and provide exciting and robust learning opportunities for students. The following are MGI-supported collaborative elements of the proposed program:

- UMA has a strong data science program and faculty who are knowledgeable in spatial information science, so UMA data science courses are required in the core of the proposed program, form the backbone of the Spatial Data Science concentration, and provide electives to broaden options for students in the major.
- UMF will offer online instruction for two courses that will be key to the Community Applications concentration.
- Geography and GIS field courses at USM and UMF will be available as electives for UMM EGIS students.
- Exemplary EGIS students will be able to apply to the UM Spatial Information Engineering, Spatial Informatics, and (proposed) Data Science Engineering 4+1 programs in their junior year, allowing them to take a five-course sequence of graduate courses that count as electives in their program before transferring to UM to complete a master's degree in one year after graduation.
- A group of faculty from USM, UM, UMPI and UMFK are developing course work in operating and collecting data using drones designed to be available to students across the system, and this will be incorporated into the proposed program when it is implemented.
- The UM Graduate School has committed to providing a two-year graduate teaching assistantship to help support GIS instruction at UMM beginning in the fall of 2020.

c. General program goals

The proposed EGIS program is structured with a program core and three concentrations. The program core provides all students with broad background knowledge. The concentrations point students

towards more specific career paths with the field of environmental GIS. The program is aligned with the US Department of Labor Geospatial Technology Competency Model and informed by the GeoTech Center for Excellence model courses and programs.

The Ecological Applications concentration prepares students for careers or graduate study in the biological and ecological sciences and conservation. Potential employers are state and federal agencies, tribes, resource extraction industries, and non-profit organizations. Because of the nature of the training required, this concentration is not available as an all-online program.

The Community Applications concentration prepares students for careers or graduate study in planning, land conservation, community resilience and sustainability. This concentration is available in a fully online format.

The Spatial Data Science concentration prepares students for careers or graduate studies in spatial data science, GIS application development, and geomatics.

d. **Specific student learning outcomes or behavioral objectives**

Upon completion of the Environmental GIS program core and the UMM General Education requirements, students will:

- demonstrate geographic, environmental and spatial awareness of the human and natural world through geospatial inquiry and hypothesis-driven analysis
- demonstrate proficiency in the use of GIS applications through:
    - the application of GIS analysis to geospatial problems and/or research questions
    - creating GIS tools and cartographic visualizations that are fit-for-purpose
    - troubleshooting problems
- demonstrate proficiency in multiple modes of communication with professional, management, and lay audiences, including:
    - written and verbal communication
    - graphic and cartographic design
    - data visualization
- be able to create or acquire data using appropriate technologies and applying best practices for processing, documentation, quality control and critical assessment
- be able to evaluate the qualitative and quantitative uncertainty and limitations of data
- demonstrate proficiency with database management, data modeling, and query
- demonstrate basic proficiency in GIS application development using at least one widely used programming language
- execute a project applying geospatial technology to a specific problem of the natural or human world in collaboration with a community partner through a capstone project
- be able to critically evaluate and creatively solve problems relating to geospatial questions and environmental issues

Upon completion of the Ecological Applications concentration student will:

- demonstrate an understanding of biological and ecological concepts
    - o apply knowledge of ecological systems to evaluate data used in GIS projects and the maps produced

- demonstrate knowledge of a particular group of organisms and the ability to use that group as a model for understanding other groups
- demonstrate proficiency in the use of advanced GIS tools and applications to ask and answer questions about ecological systems

Upon completion of the Community Applications concentration student will:

- demonstrate proficiency in common applications of geospatial technology for communities, such as land use planning, land records, environmental decision making, stormwater and utility management, etc.
- demonstrate an understanding of socioeconomic, cultural and geographic factors affecting community resilience
- demonstrate an understanding of local and regional community governance and management practices

Upon completion of the Spatial Data Science concentration student will:

- demonstrate basic proficiency with standard query language (SQL)
- demonstrate proficiency in differential calculus
- demonstrate proficiency in spatio-temporal information analysis

Program Competency Domains:

- Geographic, environmental and spatial awareness and inquiry
- GIS applications
- Data visualization, graphic and cartographic design
- Data acquisition, processing, documentation, and quality control
- Computer information science and database management
- Basic application development using at least one widely used programming language
- Communication
- Project management
- Problem solving and critical thinking

III. Evidence of program need:

A 2011 study of Maine's geospatial workforce needs by Colgan, Johnson, Valentine and Bampton documented a growing need for geospatial professionals in Maine, and an aging workforce. The majority of the geospatial workforce at the time was working in environmentally-related jobs requiring baccalaureate or master's degrees, and about a third were nearing retirement. This study also showed a growing need for data science and database management expertise in Maine's geospatial workforce, as well as a demand for online education opportunities in the field. The retirements predicted in the 2011 study have begun, and employers are now seeking well-trained workers with updated skills to fill the vacated positions. Anecdotally, we have heard that many employers are hiring qualified professionals from out of state because of a lack of graduates here in Maine.

The US Department of Labor classifies geographic information systems science and technology as a "bright outlook" field. In 2018 there were 2,153 job openings and just 1,594 graduates in New England, according to Burning Glass. In addition, demand in the field is expected to increase by 9% from 2016 to 2026. There are only 10 institutions in the northeast offering four-year degrees in GIS, and none in Maine.

According to the Department of Labor's O*Net database, employment in the field is expected to grow by 10% nationally and by 4% in Maine between 2016 and 2026. So, there is a growing demand for workers in this field even beyond Maine.

A recent study of GIS jobs in the US found that bachelor's degrees in GIS were the most desired degrees for technicians and analysts in the field. However, Maine currently does not currently have a four-year degree program in GIS.

Select geospatial professionals in Maine and beyond were consulted in the development of this proposed program. In addition to providing valuable input, they all expressed support for the idea and/or the need for such a program. The following are excerpts from some of their comments:

> "Thanks for sharing this. I read through the curriculum and it strikes me as quite complete – I think any student who completes this course work would be very prepared for a job in environmental GIS."
>
> - *Erik Martin, Spatial Ecologist, The Nature Conservancy*

> "This looks like a great proposal, and I think that moving in this direction is a good move for students and for the program."
>
> - *Jeremy Gabrielson, Senior Conservation and Community Planner, Maine Coast Heritage Trust, and former UMM GIS student*

> "I think this is something the University needs and would be very complimentary to the [Maine Geospatial Institute]. I like the approach and the cross campus tie-ins to make it easier for students to pursue regardless of where they are enrolled."
>
> - *Joe Young, Maine GeoLibrary Board and retired director of the Maine Office of GIS*

> "I think this is great. The ability to concentrate in geospatial science is excellent. Of course I am looking at it from my perspective as a software company but increasing the GIS technical skill set is huge."
>
> - *Patrick Cunningham, President & CEO, Blue Marble Geographics*

> "Overall, I think it's a great idea! I like the contrast in the three different concentrations. Although I work for a wildlife agency, I find the Spatial Data Science concentration to be the most closely related to my type of work and the skills I am pursuing in my current position…. To answer your big question, yes, I think that students coming out of this program as it is currently proposed would be prepared for the geospatial workforce."
>
> - *Michael Lachance Conservation Data Specialist at MassWildlife and UMM Graduate in ES with GIS Concentration*

> "I think this program sounds very interesting. What I repeatedly hear from academic institutions looking at updating their curricula and also from companies hiring new graduates is that there is a major demand for skills in basic programming/scripting (python, javascript, etc.) and also in databases and enterprise level database management. It looks like both of these are highlighted in this plan."
>
> - *Katrina Schweikert, Product Manager, Blue Marble Geographics*

"[This] could be something that will turn heads throughout academia and beyond. I say 'bravo' and I wish you all success with this!"

- *Joseph J. Kerski, Education Manager, Esri, Inc.*

IV. **Program Overview.** The opening paragraph will indicate the holistic nature of the program design in narrative form with attention to such items as listed below but not limited to these:

Environmental GIS is, by nature, an interdisciplinary field, so the proposed program core incorporates coursework in geospatial technology, data acquisition, environmental studies, geographic inquiry, computer and data science, programming, and design. Each course in the program is included to address skills, knowledge and competencies outlined in the US Department of Labor Geospatial Technology Competency Model and emerging workforce needs as identified by the US Department of Labor and workforce research. Courses incorporate hands-on, applied projects that not only reinforce course skills and competencies, they also teach soft skills required for career success such as critical thinking, project management, oral and written professional communication, ethics, initiative, etc.

The program concentrations prepare students for specific sectors of the geospatial workforce, providing both specialized knowledge and advanced technical skills:
Ecological Applications concentration (18 to 20 cr) includes a thorough foundation in biological and ecological sciences and the GIS tools and practices used in natural science fields. Because this pathway includes multiple field courses, it is not available in an online-only format.
Community Applications concentration (18 cr) combines coursework in community studies and related social sciences with tools and practices used in community and regional planning, government, and land records management. This pathway is available in both on-campus and online formats.
Spatial Data Science concentration (17 to 18 cr) incorporates quantitative analysis and programming skills necessary for work in application development and research or conservation analytics. This pathway is available in both on-campus and online formats.

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a. **Outline of required and/or elective courses**

Program Core (55 - 57 cr)

Note: Program includes 19 to 20 credits in gen ed core.

First Year Seminar 1 – 2
(Select one; waived for transfers with 15 or more credits)
FYS 101 - Science Bridge (1)
ENV 102S - Atlantic Salmon Conservation Projects (2)
BIO 114 - Careers in Fisheries & Wildlife Biology (2)
GIS 1XX - Intro to Geospatial Careers (online) (1)

Environment & GIS 27
ENV 112 – Environmental Issues (3)*
ENV 213 – Environmental Ethics and Values (3)*
Scientific Inquiry (4)*
(Select one)
BIO 117 – This is Life!

ELA 113 – Natural Environments
GIS 1XX – Our Digital Earth
GIS 204 - Intro to GPS (change to Intro to Satellite Positioning & Navigation Systems) (2)
GIS 300 - Geographic Information Systems I (4)
GIS 400 - Geographic Information Systems II (4)
GIS 420 - Remote Sensing and Image Analysis (4)
GIS 428 - Web-Based Maps, Applications & Services (3)

Geography 6
GEO 101 - Introduction to Geography (3)*
GEO Elective (choose one GEO course 200 level or above) 3
Note: These can be taken through UMM, USM, UMF, or UM. USM and UMF frequently offer geography field courses that make heavy use of GIS & GPS and would make attractive electives. Also, this requirement may be met by UM graduate courses in Spatial Information Engineering, Spatial Informatics, and (proposed) Data Science Engineering 4+1 programs

Computer & Data Science 9
CIS 150 - Introduction to Data Science (UMA) 3
CIS 255 - Database Design (UMA) 3
GIS 2XX - Python Scripting for GIS (UMA) 3

Design & Communication 8 (or 9)
ART 101 – 2D Fundamentals of Art (3)*
Or
ART 106 – Art Fundamentals (3)*
ART 213 - Graphic Design I (3)
ENV 224 - Scientific Writing and Presentation (2 or 3)

GIS Capstone 4
GIS 424 - Advanced Projects in GIS (4)
OR
GIS 426 - Community Applications in GIS (4)

CONCENTRATIONS (choose one)

Ecological Applications Concentration 18 to 20cr
(NO ONLINE PATHWAY)

BIO 118 - Animal Life (BIO 117 is a prereq) 2
BIO 119 - Plant Life (BIO 117 is a prereq) 2
BIO 245 - General Ecology 4
MAT 215 - Applied Statistics 4*
OR
GIS 431 - Introduction to Geostatistics 4

Choose one:

BIO 227 - Invertebrate Zoology 4
ENV 103 - Oceanography 4
BIO 212 - Ornithology 4
BIO 216 - Mammalogy 4
BIO 223 - Marine Mammals & Pelagic Birds 4
BIO 229 – Plant Systematics 4
BIO 313 - Ichthyology 4
BIO 333 – Plant Ecology 4
BIO 235 - Introduction to Fisheries & Wildlife Management 3
REM 412 - Interpretation of Natural & Cultural Resources (Jr standing) 3

Choose one:
GIS 312 - Municipal Applications of GIS (UMM) 3
CIS 449 - R (UMA) 3
CIS 355 - Sensors (UMA)
GEO 340 - Digital Mapping (USM) 4
GEO 445 - Drone Mapping (USM) 3
Other GEO or GIS course, as approved by division 3 or 4
Options, including field courses, available through UM, UMF & USM. Also, this requirement may be met by UM graduate courses in Spatial Information Engineering, Spatial Informatics, and (proposed) Data Science Engineering 4+1 programs

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Community Applications Concentration 18 cr
(ON-CAMPUS & ONLINE PATHWAYS)

CMY 101 - Introduction to Community Studies 3
GIS 312 - Municipal Applications of GIS (UMM) 3
MAT 113 - Introduction to Statistics 3*
OR
MAT 124 - Statistics for Social Sciences 3*
GEO 343 Community Planning (UMF) 3
OR
GEO 340 Sustainable Land Use (UMF) 3

Choose one:
GIS 429 - Geographic Information Systems Internship (UMM) 3
CIS 352 - Data Visualization (UMA) 3
GEO 445 - Drone Mapping (USM) 3
Other GEO or GIS course, as approved by division 3 or 4
Options, including field courses, available through UM, UMF & USM. Also, this requirement may be met by UM graduate courses in Spatial Information Engineering, Spatial Informatics, and (proposed) Data Science Engineering 4+1 programs

Choose one:
SOC 101 – Introduction to Sociology*

SOC 301 - Rural Sociology 3
ANT 212 - Environmental Anthropology 3
BUS 111 - Introduction to Business & Entrepreneurship 3
ECO 223 - Environmental Economics 3
MAN 301 - Management 3
POS 305 - Environmental Policy 3
REM 412 - Interpretation of Natural & Cultural Resources (Jr standing) 3

Spatial Data Science Concentration 17 to 18 cr
(ON-CAMPUS & ONLINE PATHWAYS)

CIS 218 - Introduction to SQL (UMA) 3
MAT 126 - Calculus I 4*
GIS 431 - Introduction to Geostatistics (UMM) 4
CIS 353 - Human Computer Interaction/User Design (UMA) 3

Choose one:
CIS 352 - Data Visualization (UMA) 3
MAT 127 - Calculus II 4
CIS 461 - Spatio-Temporal Information Science (UMA) 3
CIS 355 - Sensors (UMA) 3
CIS 449 - R (UMA) 3
Other CIS, GEO or GIS course, as approved by division 3 or 4. Also, this requirement may be met by UM graduate courses in Spatial Information Engineering, Spatial Informatics, and (proposed) Data Science Engineering 4+1 programs

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NOTES ON RELATIONSHIP BETWEEN THIS PROGRAM AND THE GENERAL EDUCATION REQUIREMENTS

This curriculum includes a number of courses that also meet general education requirements. These are denoted by an * in the course list. As a result, the number of credits required by the program are reduced by 19-20 credits depending on the math course selected. The Community Applications also requires SOC 101 Introduction to Sociology as a prerequisite to SOC 301 Rural Sociology. SOC 101 also meets a gen ed requirement in Social Contexts & Institutions.

To meet the Quantitative Literacy requirement of the UMM Gen Ed:

Select one:
- MAT 103M Algebraic Models in Our World (Community Applications concentration) 3 or 4
- MAT 111M College Algebra (Ecological Applications or Data Sci concentration) 3 or 4
- Or establish equivalence by:
  - Score at least 530 on SAT MSS exam or at least 21 on ACT math exam. (no credit is awarded, but the requirement is satisfied)
  - Score 50 or better on CLEP College Mathematics or College Algebra exam taken after 7/1/2001 or 500 or better on the same exam taken before that date

The Gen Ed requirement for a second math course is met within each concentration

b. **Development of new courses and/or what they may displace**

The proposed program will require only two new courses: GIS 102 - Our Digital Earth and GIS 101 – Intro to Geospatial Careers. Both courses will be available on-line and the Our Digital Earth course will be designed to fulfill the Scientific Inquiry requirement in the UMM General Education curriculum. These new courses have already been approved and added to the UMM catalog. The Ecological Applications concentration and the Community Applications concentration both rely predominantly on courses that are already required in other programs at UMM. This should reduce the need to run small classes since the requirements across programs should bolster enrollments rather than introduce competition. The proposed program core and concentrations will rely on UMA, USM and UMF to supply additional courses in areas where UMM lacks expertise and/or capacity. Availability of the courses is already assured through the Maine Geospatial Institute that includes all seven UMS campuses.

c. **Research activity and experiential learning opportunities for students**

A hallmark of the existing GIS programs at UMM is experiential learning and undergraduate research opportunities (see examples in Appendix A). These will continue and expand with the new program. Each UMM GIS course includes real-world, applied projects, often connected to faculty research initiatives. The UMM GIS Service Center employs interns over the summer and during the academic year, and EGIS students will have the option of earning internship credit as a GIS elective. The capstone courses in the program, GIS 424 Advanced Projects in GIS and GIS 426 Community Applications in GIS, are centered on in-depth, professional-level projects for faculty research initiatives and/or community partners.

d. **Impact of program on existing programs**

The proposed program will replace UMM's Environmental Studies program, requiring some shifts in faculty loads and some additional adjunct faculty to cover courses (this is addressed in greater detail below).

As outlined above, the structure of the program relies on incorporating courses from other UMS campuses, leveraging the support and coordination offered by MGI. If we reach our admissions targets, the result will be a net increase in enrollment in GIS courses offered by all of the partnered institutions.

Currently, there is no four-year GIS program in the UMS. USM offers a geography program with a GIS concentration, and we have worked to minimize potential competition between the programs by emphasizing data science and focusing on environmental applications in the proposed EGIS program.

e. **A statement on the extent to which the program would be appropriate for online and hybrid delivery**

The core of the proposed EGIS program is accessible in an entirely online format. Two of the three concentrations, Community Applications and Spatial Data Science, can be completed entirely online. Because the Ecological Applications concentration requires field courses, it is currently not possible to complete that pathway online. However, it will be possible for students in the Ecological Applications concentration to complete their third and fourth year courses entirely online if they finish the field courses by the end of their second year.

f. **Ways the program could lend itself to the delivery of micro-credentials, stackable pathways, and specific skill sets and competencies**

The UMM just adopted an early college GIS certificate and already has an undergraduate certificate program that will be stackable with the proposed EGIS program. Also, EGIS students who meet the minimum qualifications may apply to the UM Spatial Information Engineering, Spatial Informatics, and (proposed) Data Science Engineering 4+1 programs in their junior year. If accepted, they may take a five-course sequence of graduate courses that count as electives in their program before transferring to UM to complete a master's degree in one year after graduation.

The proposed EGIS program learning objectives and course requirements are aligned with the US Department of Labor Geospatial Technology Competency Model and the National GeoTech Center for Excellence model courses.

A near-term goal of the MGI Curriculum Committee is the development of workforce education initiatives. These would be short, credit-bearing educational programs leading to micro-credentials that may be stackable to meet EGIS program requirements.

V. **Program resources**

a. **Personnel.**

i. **Vita of existing faculty:**

Current faculty include (vitae are included in Appendix B):

- Dr. Tora Johnson, Associate Professor of GIS, UMM: Dr. Johnson coordinates the UMM GIS program and teaches GIS courses.
- Dr. Matthew Dube, Assistant Professor of Computer Information Systems, UMA: Dr. Dube will teach most of the data science courses in the proposed program, cross listed with UMA.
- Robert Bistrais, Adjunct Professor of GIS, UMM and UMA/ Senior Programmer-Analyst, Maine Office of GIS: Mr. Bistrais teaches web GIS, introductory GIS, and programming courses.
- Judy Colby-George, Adjunct Professor of GIS/ Principal, Spatial Alternatives: Ms. Colby-George teaches municipal applications of GIS.

ii. **Specific effect on existing programs of faculty assignments to new program, with a description of necessary faculty workload adjustments.**

The number of new courses in the proposed program is limited because it incorporates numerous courses from other campuses. So, no additional faculty hires will be required in the near term. An existing full-time GIS faculty member will teach 12 credits per semester, however, as she is currently serving as division chair some of this load will shift to adjuncts or graduate assistants. Additional course offerings will be supported by new adjuncts (one will be required beginning in the fall of 2020), and UMaine has committed to providing funding for a graduate teaching assistant for at least two years. With the suspension of the ES program, the Environmental Issues and Actions sequence (ENV 114/214/314/414)

will be eliminated. This will require reassignment of one faculty member who will take on an additional chemistry course instead.

Some Environmental Studies courses will be repurposed for the EGIS program, taught by existing faculty. These include ENV 224 Scientific Writing & Presentation, ENV 112 Environmental Issues, and ENV 213 Environmental Ethics and Values. Two of these courses, ENV 112 and ENV 213 satisfy general education core requirements, but ENV 224 is a dedicated course in the EGIS major. Other courses required in the EGIS program are multipurpose, serving multiple majors at UMM.

It is important to note that GIS courses also serve the UMM certificate and minor programs, as well as many students in other majors at UMM, UM and other UMS campuses. Enrollment in GIS 300 alone has been ~80 students per year. So, we run both at least two sections--campus and online--of GIS 300 and 400 concurrently each semester to meet this demand.

In the long term, as enrollment ramps up in the EGIS program, and if demand on the UMM introductory curriculum continues to grow at the current rate, a new faculty hire may be necessary to support the program.

Course rotations for GIS faculty are listed below:

GIS FT Faculty w/ Graduate Assistant							
Even Falls	**Credits**	**Odd Springs**	**Credits**	**Odd Falls**	**Credits**	**Even Springs**	**Credits**
GIS 101	1	GIS 101	1	GIS 101	1	GIS 101	1
GIS 300 2+ sections	4	GIS 300 2+ sections	4	GIS 300 2+ sections	4	GIS 300 2+ sections	4
GIS 400 2+ sections	4	GIS 400 1 section	4	GIS 400 2+ sections	4	GIS 400 1 section	4
GIS 420	4	GIS 204	2	GIS 204	1	GIS 431	4
				GIS Capstone	4		
GIS Adjuncts							
Even Falls	**Credits**	**Odd Springs**	**Credits**	**Odd Falls**	**Credits**	**Even Springs**	**Credits**
GIS 102	4	GIS 102	4	GIS 102	4	GIS 102	4
		GIS 428	4			GIS 312	3

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b. **Current library acquisitions available for new programs**

UMM's Merrill Library has extensive resources to support the proposed program. They employ two professional librarians, a library specialist, and a host of student clerks available for reference support, both in person and online. The library's collection includes more than 61,000 physical items and more than 400,000 electronic items, with access to relevant GIS, data science and geography materials. They

provide access to URSUS and MaineCat for interlibrary services, provide access to 191 electronic databases, more than 300,000 electronic books, and over 57,000 journals containing millions of articles. In addition, the Merrill Library and the UMM GIS Laboratory have large map and atlas collections, including many local items, that provide valuable materials for use in classes and research projects.

c. **New equipment necessary for new program and plan for its acquisition and implementation**

The UMM GIS Laboratory is fully equipped to support the program with:

- 12 new workstations with dual monitors and dedicated graphics processors
- Software licenses for ArcGIS, Global Mapper, Trimble Pathfinder Office, and Microsoft Office
- Diverse GPS and GNSS receivers and accessories for field data collection
- Video conferencing capability with 360º camera and microphone
- LCD projector and screen
- 42" HP map plotter
- Large format printer

d. **Additional space requirements, if any, including renovations**

No additional space or renovations will be required to support the program.

e. **Extent of cooperation with other programs, both on the initiating campus and other campuses.**

Cooperation with other campuses will be crucial to the proposed EGIS program. Many students from across the system already enroll in UMM's GIS courses, so coordination has already begun via the MGI executive and curriculum committees. MGI will continue to facilitate coordination. MGI maintains a database of planned course offerings, and faculty confer on scheduling of courses. Some UMA data science courses have already been adopted for cross listing to support the new program, and UMM and UMA have a long-standing record of sharing courses and collaborating. The program has been designed to align with the course rotations of shared courses. Additional courses will be cross listed as the program is implemented.

VI. Total financial consideration

The five-year budget for the program is in the table below. Estimated enrollments were developed in consultation with UMM Dean of Enrollment Management Marnie Kaler. Enrollment estimates for fall 2020 are modest given the short time frame for recruiting students into the new major with no out-of-state students expected to enroll. Marketing and admissions staff will work with program faculty to develop a marketing plan and materials in the summer and fall of 2020, and incorporate the program.

The budget is based on an average of 15 credits per year per student in the major at UMM (six of which meet both major and general education requirements) and an average of five credits per year in the major at other UMS campuses (these are not included in the budget). The budget as presented assumes a 3%

increase in tuition rates per year, a ~90% retention per year, and a four-year program completion for all graduates. The UM Graduate School has committed funding for a graduate teaching assistantship for two years, and the budget includes UMM support for an increasing share of the cost of the graduate assistant in years 3 through 5. Startup costs include curriculum development for the summer of 2020 for the GIS 102 Our Digital Earth course that will serve both EGIS majors and approximately half of all UMM students matriculated in other online majors.

It is crucial to note that current GIS courses taught by existing faculty and adjuncts already serve a large number of students in certificates, minors, and other majors at UMM, UM and other UMS campuses. In AY 2019-2020, GIS courses accounted for 393 credit hours, garnering over $100,000 in tuition revenue. Therefore, the budget includes a modest estimate of $90,000 in service course revenue for each year.

Enrollment & Revenue Projections	AY 20-21 Majors		AY 21-22 Majors		AY 22-23 Majors		AY 23-24 Majors		AY 24-25 Majors	
	New	Total	New	Total	New	Total	New	Total	New	Total
In-state	**5**	**5**	**12**	**17**	**15**	**30**	**18**	**45**	**21**	**58**
Credits in Mjr/ Student		15		15		15		15		15
In-state tuition		$239		$246		$254		$261		$269
Total in-state tuition		$17,925		$60,927		$113,529		$175,755		$235,554
Out-of-state	**0**	**0**	**2**	**2**	**4**	**6**	**6**	**11**	**8**	**18**
Credits in Mjr/ Student		15		15		15		15		15
OOS tuition		$475		$489		$504		$519		$535
Total OOS tuition		$0		$14,678		$43,842		$87,355		$145,132
Total EGIS Enrollment		**5**		**19**		**36**		**56**		**76**
Service Course Tuition		**$90,000**		**$90,000**		**$90,000**		**$90,000**		**$90,000**
Total Tuition Revenue		**$107,925**		**$165,605**		**$247,371**		**$353,111**		**$470,687**
Total 5 year Revenue		**$1,344,698**								

Cost Projections	AY 20-21	AY 21-22	AY 22-23	AY 23-24	AY 24-25
Startup Costs	$1,000				
FT Tenured Faculty (salary & benefits)	$90,000	$90,000	$90,000	$90,000	$90,000
FT Tenure Track Faculty (new hire)			$78,500	$78,500	$78,500
Adjunct Instructors for Electives	$7,000	$7,000	$8,000	$7,000	$8,000
Graduate Assistant			$10,000	$15,000	$20,000
Adjunct Instructor for Our Digital Earth	$4,000	$4,000	$4,000	$4,000	$4,000
Student Assistants	$1,000	$1,000	$2,000	$2,000	$2,000
Equipment	$300	$500	$1,000	$2,000	$2,000
Software licenses	$2,000	$2,000	$2,000	$2,000	$2,000
Marketing materials	$1,000	$500	$500	$500	$500
Total Costs	**$106,300**	**$105,000**	**$196,000**	**$201,000**	**$207,000**
Total 5 Year Cost	**$815,300**				

Net Budget	AY 20-21	AY 21-22	AY 22-23	AY 23-24	AY 24-25
Annual Net	**$1,625**	**$60,605**	**$51,371**	**$152,111**	**$263,687**
5 Year Net	**$529,398**				

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Five Year Program Budget

VII. Program assessment and evaluation

It is current practice for UMM's existing GIS courses and programs to conduct inventories of course and program content at least biannually to ensure they align with workforce needs outlined in the US Department of Labor Geospatial Technology Competency Model (GTCM) and emerging workforce needs compiled by the US Department of Labor. A GTCM inventory of GIS I and II courses is also performed periodically by collaborating faculty in MGI. These practices will continue for courses in the EGIS program.

Program faculty will convene an external advisory committee annually to review the program, discuss emerging workforce needs, and recommend program revisions.

Periodic program assessment and revision (as needed) is required by the university. EGIS program assessment will include surveys and interviews of current students and alumni, assessment of curriculum and student capstone projects via standardized rubrics, review by external reviewers, and compilation of student evaluation of courses. UMM, as a regional campus of the University of Maine is accredited by the New England Commission of Higher Education (NECHE) which imposes further data collection and assessment requirements (https://www.neche.org/resources/standards-for-accreditation/). The program will become part of the Programs for Examination annual process upon completion of its third full year to allow for capturing a three-year average of metrics for review.

APPENDIX A

Some Examples of Applied Projects Conducted by UMM GIS Students

Johnson, T., Rory Morgan, Katherine Pontbriand and McKenna Roden. (2019) Evaluating the Effectiveness of Shellfish Legal Notices. A report to the Maine Department of Marine Resources. https://docs.google.com/document/d/18jJCnUIE5Kum2BhamD3s4Qvif41cKiADOUd3R8c1zEo/edit?usp=sharing

Washington County Council of Governments; Baker Designs, Inc.; Town of Machias; and University of Maine at Machias GIS Laboratory. 2018. Machias Waterfront Resilience Study. Retrieved February 24, 2019, from http://www.wccog.net/machias-resilience.htm

Johnson, T., & East, J. C. (2014). *Climate Vulnerability Assessment for Washington County, Maine*. University of Maine at Machias and Washington County Council of Governments. Retrieved from http://gro-wa.org/assets/files/climate-change/CVA-Washington-County-June-2014.pdf

Fisher, J. H., J. C. East, **T. Johnson**, J. Gabrielson, M. Mytar, I. Lombardo, D. Lee, J. Connors, and T. DeWan. Downeast Coastal Scenic Inventory: Washington and Hancock Counties, Maine. Report prepared for the Maine State Planning Office Coastal Program by the Hancock County Council of Governments and Washington County Council of Governments, 2010. http://www.wccog.net/scenic-inventory.htm.

Awards for UMM GIS Projects and Faculty

- Maine Campus Compact Donald Harward Faculty Award to Dr. Tora Johnson for Service Learning Excellence, 2016
- Maine State Legislature Legislative Sentiment to Dr. Tora Johnson in Recognition of Service to Downeast Maine, 2015
- National Geospatial Technology Center of Excellence Lifetime Achievement Award to Dr. Tora Johnson, 2015
- Maine Association of Planners Project of the Year, 2014, for GroWashington-Aroostook Climate Resilience Project
- Northern New England Chapter of the American Planning Assoc. Project of the Year, with Judy East, 2014, for GroWashington-Aroostook Climate Resilience Project

Appendix B - Faculty CVs

Dr. Tora Johnson, PhD Curriculum Vitae

EDUCATION

PhD in Forest Resources focusing on human dimensions of natural resource management, 2015.
MPhil in Human Ecology, College of the Atlantic, 2003
BS in Biology, University of Oregon, 1988

AWARDS

- University of Maine Pen Award for volunteer work with the 4-H Program involving college student interns in youth activities, 2017
- Maine Campus Compact Donald Harward Faculty Award for Service Learning Excellence, 2016
- Maine State Legislature Legislative Sentiment in Recognition of Service to Downeast Maine, 2015
- National Geospatial Technology Center of Excellence Lifetime Achievement Award, 2015
- Maine Association of Planners Project of the Year with Judy East, 2014
- Northern New England Chapter of the American Planning Assoc. Project of the Year, with Judy East, 2014
- Barnes and Noble Discover Great New Writers list for fall, 2005
- Center for Applied Human Ecology Award, College of the Atlantic, 2003
- University of Oregon Institute of Marine Biology Alumni Award, 1987

COMMITTEES

- Maine Geospatial Institute, Executive Committee, 2018 to present
- Maine GIS User Group, Board of Directors, 2016 to present
- Downeast Salmon Federation, Board of Directors, 2016 to present
- Maine Academy of Modern Music, Board of Directors, 2014 to present
- Downeast Research and Education Network, Steering Committee, 2012 to present
- Downeast Coastal Conservancy, Advisory Board, 2014 to present
- National Geospatial Technology Center for Excellence, National Visiting Committee, 2010 to 2013
- EPA New England Climate Leaders Champion Working Groups: Adaptation for Municipal Government and Climate Communication, 2013 to 2015
- Maine GeoLibrary Board Education and Training Task Force, Chair 2010-2012; Member 2012-2013

WORK EXPERIENCE

Chair, Division of Environmental & Biological Sciences, University of Maine at Machias, July 2019 – Present
Tenured Associate Professor & Director of Geographic Information Systems (GIS), University of Maine at Machias, September 2017 – Present
Associate Professor & Director of Geographic Information Systems (GIS), University of Maine at Machias, September 2016 – September 2017
Assistant Professor: September 2015 – August 2016
Instructor: September 2011 – August 2015
Lecturer: January 2007 – August 2011
Adjunct: September 2004 - December 2004 and January 2006 - December 2006
Courses Taught: GIS Applications I and II, Remote Sensing and Image Analysis, Introduction to

Global Positioning System, Municipal Applications of GIS, Community Applications of Geographic Information Systems, Political Ecology, Introduction to Geography, Community and Place, Humans and Nature, Grant and Proposal Writing, First Year Seminars.

Additional responsibilities: Lead STEM education initiatives for underserved students; oversee service learning projects with community partners; advise students; collaborate with academic partners on statewide projects; perform laboratory upgrades and maintenance; assist development of articulation agreements; coordinate and teach summer camp and outreach activities for youth; plan curriculum; write and administer grants; build and maintain program websites.

GIS and Community Development Consultant/ Writer/ Educator, May 1995- present

Selected clients:

Cohen Milstein Law Firm, Washington, DC: Geospatial consulting and analysis, 2011-2014;

Spoleto Festival USA, Charleston, SC: By invitation, multidisciplinary collaboration on a project addressing challenges of development among African-American Lowcountry communities, 2004- 2008;

Lehigh County Conservation District, PA: Train staff in GIS applications, create a database management system and install software, provide technical support, February 2006- 2008;

School of the Art Institute of Chicago, IL: Provide technical support and training to faculty for new geographic information systems curriculum in community-based art courses, March 2005;

Adjunct Faculty/ Curriculum Design Consultant: Marine Advanced Technology Education (MATE) Center, Monterey Peninsula College, Monterey, CA

November 2005- December 2008

Course Taught: Ocean Careers

Additional responsibilities: Write, design, and teach an online course on ocean careers linked with MATE Center websites, databases, partners and other resources. The course package is still in use in Monterey and other marine programs across the nation.

13.1

Adjunct Faculty: College of the Atlantic, Bar Harbor, ME

January 2001- June 2002 (part time) and September 2002- June 2005 (full time, grant-funded)

Courses Taught: Geographic Information Systems 1; GIS for Arts, Science and Humanities; Piloting and Navigation; Applied Pre-calculus; Geostatistics Graduate Tutorial, Biology 1 and 2; Food Systems; advanced projects and independent studies in GIS and marine studies for undergraduates and a small number of graduate students.

Additional responsibilities: Develop and implement new geographic information systems, navigation, and mathematics hands-on service learning curriculum; advise graduate students and senior undergraduates on thesis projects and independent studies in GIS, marine studies, and community studies; evaluate GIS laboratory programs and recommend changes and upgrades; work with GIS laboratory director and Center for Applied Human Ecology staff to implement recommendations and oversee laboratory expansion.

Special Project: Re-imagining a Carolina Landscape: Intensive, advanced course on people and place, including a study trip to South Carolina to work with students from the School of the Art Institute of Chicago in an on-going community development project. Course culminated in a gallery exhibition of student work in winter 2005.

Adjunct Faculty, Cape Cod Museum of Natural History & Framingham State University, Brewster, MA

January- June 2006

By invitation, develop and teach a graduate level seminar course on conflict, resolution and solutions in marine environmental issues and among maritime communities.

Adjunct Professor of Environmental Technology: Cape Cod Community College, Barnstable, MA
September 1998- August 2002
Courses Taught: Introduction to Environmental Science; Physical Oceanography & Coastal Structures; Introduction to Water: Concepts & Technology; Geographic Information Systems, Survey of Environmental Technology.

Adjunct Professor of Environmental Science: Massachusetts Maritime Academy, Buzzards Bay, MA
September- December 2000
Course Taught: Wastewater Treatment Laboratory.

Shipboard Education Coordinator: Schooner Ernestina, New Bedford, MA
May- September 1995 & March - June 1996
Job Description: Develop and implement shipboard education programs for children and adults; supervise education staff and volunteers; serve as a deck officer.

Program Associate: The Catskill Center for Conservation and Development. Arkville, NY
February 1994- May 1995
Job Description: Develop and implement Streamwatch curriculum in area schools; write grants for and coordinate Kid's Watershed Summit project; conduct outreach and education on aquatics and water quality; coordinate the writing of regional proposal for United Nations Biosphere Reserve Status; lobby state and local legislators regarding local environmental issues.

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Education Specialist: Hudson River Sloop Clearwater, Poughkeepsie, NY
March 1992- December 1993
Job Description: Develop and implement shipboard education programs for children and adults; coordinate education staff and volunteers; write grants; serve as deck officer.
Special project: Kid's Clean Water Petition: Participation-in-government program for children.

Director, Shipboard Coastal Ecology Program: Voyager Cruises, Mystic, CT
March 1990- October 1991
Job Description: Develop and implement shipboard education programs for children and adults; write and administer grants; hire and supervise education interns; serve as deck officer.

Commercial Fisherman/ Deckhand, F/V Peppermint John, Ketchikan, AK
July- September 1991

Marine Science Assistant: Williams College-Mystic Seaport Maritime Studies Program, Mystic, CT
September 1989-June 1990

Graduate Teaching Fellow in Invertebrate Zoology: Oregon Institute of Marine Biology, Charleston, OR
June- August 1989 & June- August 1990

RESEARCH EXPERIENCE

"Best Practices in Geospatial Technology and Community Engagement to Support Sustainable Development in a Rural Region," research, develop, and pilot methods for supporting decision making, conducting analysis, and facilitating good governance in local in rural communities; 2011 – present.

"Role of Dignity in Rural Natural Resource Governance," dissertation research at University of Maine; 2011-2015

"Shoreland Zoning Model and Maps," developed a GIS model to generate shoreland zoning maps for more than forty Washington County towns. Worked with town officials, through regional planning agency, to revise and refine the maps and help towns comply with new state laws and retain local control over their zoning; 2009 – present.

"Geospatial Technology Education for Rural Regions," documenting the challenges and opportunities for providing geospatial technology education to serve a rural workforce within Maine and nationally. Conducting workforce assessment, convening and contributing to roundtable discussions, and compiling and disseminating resources and research, and building a national community of rural geospatial educators, 2007 – present.

"Downeast (Maine) Coast Scenic Inventory and Assessment," A collaboration among Washington County (Maine) Council of Govts., Hancock County Planning Commission and Univ. of Maine at Machias, conducted with funding from the Maine State Planning Office. Worked with regional planning agencies and a corps of volunteers to map, assess and document scenic resources in Washington and Hancock Counties, culminating in a website and report with maps, photos and documentation for use in land use planning, promoting tourism, and other important activities; 2009.

"Downeast (Maine) Regional Strategic Conservation Plan," Through partnerships with three local land trusts, Maine Coast Heritage Trust, The Nature Conservancy, and the Washington County Council of Governments, students and facutly worked directly with clients to develop a list of priorities then gathered data, created and revised GIS computer models, and provided maps to the land trusts showing areas with high conservation values as defined by the land trust's strategic plans; 2007/ 2008.

"Quoddy Regional Land Trust Strategic Planning Models," Through a grant from the Maine Coast Protection Initiative, students and faculty used advanced computer modeling techniques to map areas of high conservation priority. This served as a pilot for the regional strategic planning effort; 2007.

"Saving Seas: Conflict, Resolution and Solutions in the Marine Realm," a multi-disciplinary, results-based effort to understand and combat counter-productive conflict over ocean policy and marine resources in maritime communities. Independent research in association with College of the Atlantic; seminar course funded by Cape Cod Museum of Natural History and International Fund for Animal Welfare; June 2005- June 2006.

"Entanglements: The Intertwined Fates of Whales and Fishermen," a human ecological assessment of US and Canadian plans to reduce whale entanglement in fishing gear and ship strikes of whales in the Northwest Atlantic, considering biological, financial, cultural and political implications. College

of the Atlantic, Bar Harbor, ME; March 2001- June 2005.

"New Telemetry Analysis Tools for Entangled Whales," a geographic information systems analysis of protocols for satellite telemetry tracking of entangled whales. College of the Atlantic, Bar Harbor, ME, in cooperation with Center for Coastal Studies, Provincetown, MA; January 2002- June 2005.

"Transoceanic dispersal mechanisms of neritic phytoplankton: the role of ballast water in the distribution of coastal and estuarine diatoms." Research Assistant to Dr. James T. Carlton: Oregon Institute of Marine Biology, Charleston, OR; June 1988- September 1989.

"Effects of oyster culture on the benthic infauna of a National Estuarine Research Reserve (South Slough)." Assistant to Dr. Gregory Ruiz: Oregon Institute of Marine Biology, Charleston, OR; February- June 1989.

PUBLICATIONS AND REPORTS

Sylvan Johnson, Eileen, Esperanza Stancioff, **Tora Johnson**, Sarena Sabine, Haley Maurice and Claire Reboussin. (accepted) "Preparing for a Changing Climate: The State of Adaptation Planning in Maine's Coastal Communities." *Maine Policy Review.*

Johnson, T., Rory Morgan, Katherine Pontbriand and McKenna Roden. (2019) Evaluating the Effectiveness of Shellfish Legal Notices. A report to the Maine Department of Marine Resources.

Johnson, T., Leahy, J., & Kuntz, L.A. "The Theory and Practice of Dignity in Natural Resource Governance." (In Process)

Washington County Council of Governments; Baker Designs, Inc.; Town of Machias; and University of Maine at Machias GIS Laboratory. 2018. Machias Waterfront Resilience Study. Retrieved February 24, 2019, from http://www.wccog.net/machias-resilience.htm

Lichko, Lesley, Mindy Crandall, **Tora Johnson** and Adam Daigneault. 2018. Valuing the Economic Benefits of Conservation Land in Downeast Maine A technical report prepared for the Downeast Conservation Network. https://www.downeastconservationnetwork.org/wp-content/uploads/2018/10/Economic-Report-Full-10-23-18.pdf

Evans, Keith S., Kevin Athearn, Xuan Chen, Kathleen P. Bell, & **Tora Johnson**. Measuring the impact of pollution closures on commercial shellfish harvest: the case of soft-shell clams in Machias Bay, Maine. *Ocean and Coastal Management* (2016). http://dx.doi.org/10.1016/j.ocecoaman.2016.06.005

Johnson, Tora, "Role of Dignity in Rural Natural Resource Governance" (2015). *Electronic Theses and Dissertations.* Paper 2267. http://digitalcommons.library.umaine.edu/etd/2267

Stapp, J. R., Lilieholm, R. J., Upadhaya, S., & **Johnson, T.** (2015). Evaluating the Impacts of Forest Management Policies and Community-Level Institutions in the Buffer Zone of Chitwan National Park, Nepal. *Journal of Sustainable Forestry*, *34*(5), 445–464. http://doi.org/10.1080/10549811.2015.1025080

Johnson, T., & East, J. C. (2014). *Climate Vulnerability Assessment for Washington County, Maine*. University of Maine at Machias and Washington County Council of Governments. Retrieved from http://gro-wa.org/assets/files/climate-change/CVA-Washington-County-June-2014.pdf

Johnson, T. (2013) "Quantifying Land Cover Changes in Maine." Learning unit in GIS and remote sensing published in Integrated Geospatial Education and Technology Training (iGETT) Resources for Classroom Instruction. http://www.igettremotesensing.org/intermediate.html

Colgan, C., **T. Johnson,** V. Valentine and M. Bampton. Learning GIS in Maine: A study of the geospatial technology education needs of Maine's workforce. (2011) http://megischamps.org/workforce_summit.html

Fisher, J. H., J. C. East, **T. Johnson**, J. Gabrielson, M. Mytar, I. Lombardo, D. Lee, J. Connors, and T. DeWan. Downeast Coastal Scenic Inventory: Washington and Hancock Counties, Maine. Report prepared for the Maine State Planning Office Coastal Program by the Hancock County Council of Governments and Washington County Council of Governments, 2010. http://www.wccog.net/scenic-inventory.htm.

Johnson, T. *Entanglements: The Intertwined Fates of Whales and Fishermen*. University Press of Florida, 2005. Chosen by **Barnes and Noble** for their Discover Great New Writers list for fall, 2005.

Johnson, T. and R. Bowman. "'Churchill': The story of right whale #1102" in *Prototype Biophysical Maps of the Gulf of Maine.* Census of Marine Life, Gulf of Maine Area Program, 2003.

Johnson, T. "Marine Report," bi-weekly column and freelance articles on boats, shipping, and marine environmental topics for The *Martha's Vineyard Times*, Sept. 1998 through May 2000.

Johnson, T. "The Shellfish Game." With photos by Betsy Corsiglia; *Times of the Islands Magazine*, Winter 1999/2000.

de Strulle, A. and **T. Johnson**. *Guide to Freshwater Animals Without Backbones*. With Arlene de Strulle, The Catskill Center, 1997.

Johnson, T. "Toxics in Catskills Groundwater." *The Catskill Center News*, Fall 1995

SELECTED INVITED PRESENTATIONS

"Mapping the Future: How students are helping us plan for dignity, prosperity and sustainability." Keynote presentation to the Northeast Arc Users Conference Educators Day, 2019.

"Engaging Communities in Conservation in a Polarized Time." Keynote presentation to the Pennsylvania Statewide Conference for Watershed Organizations, 2019.

"Economic Value of Conserved Lands: Downeast & Acadia Region." Invited presentation to the Governor's Land Conservation Task Force, 2018

"Storm Surge and Sea Level Rise Threats to Downeast Maine Communities." Invited presentation to a workshop for Wabanaki environmental and administrative professionals, 2016.

"Building Buy-in By Engaging Local Stakeholders in Conservation Planning." Invited presentation to the Convergence Conference of the Down East Research and Education Network, 2016.

"Best Practices for Climate Change Education." Invited Lunch and Learn presentation to the Gulf of Maine Research Institute, 2016.

"Climate Change on the Edge: Visualizing and Planning for Storm Surges and Sea Level Rise in Coastal Downeast Maine." Presentation to Convergence Conference of the Down East Research and Education Network, 2016.

"21st Century Tools for Rural Maine: Grow Washington-Aroostook." Keynote presentation to the Maine Municipal Association Annual Technology Conference, 2014.

"Mapping Washington County's Food System." with Laura Teisl and Lisa Ravis, keynote presentation to the Washington County Food Summit, 2014.

"21st Century Tools for Rural Maine: Grow Washington-Aroostook." Keynote presentation to the joint conference of the Maine GIS Users Group and Maine GIS Educators, 2013.

"Collaboration Among Institutions to Bring Geospatial Technology to an Underserved Rural Region." Invited presentation to the American Geophysical Union, 2012

"Preparing Students for a Geospatial Workforce." Invited presentation for Supporting and Advancing Geoscience Education in Two-Year Colleges, 2012 (http://nagt.org/sage2yc/index.html)

"Supporting Technical Education Programs at Small and Rural Community Colleges." Invited to coordinate a workshop at the NSF Advanced Technological Education Principal Investigators Conference, 2010

National Center for Excellence in Geospatial Technology Education, "Supporting GIS Programs at Small and Rural Community Colleges" with Michael Rudibaugh. Invited presenter at national webinar, 2010

Johnson, T. "Inform or Inflame: Scientists and Fisheries Management Debates." Invited presentation to the Maritime History Symposium: Fisheries, Past, Present and Future, 2009.

ATE National Principal Investigators Conference, part of the workshop: Keep the Ball Rolling—Sustaining Projects through Dissemination. "Starting and Sustaining an ATE Project in Small, Rural and/or Inexperienced Institutions," 2009

Community for Rural Education Stewardship and Technology, NSF Funded Program of University of Maine at Machias and Island Institute at Darling Marine Center, Boothbay Harbor, ME. "Human Ecology and GIS in Maritime Communities." July 28, 2006.

Williams College, Williamstown, MA. “Entanglements: Racing to Save Endangered Whales and Endangered Fisheries in the Atlantic and Pacific.” December 2, 2005.

Gloucester Maritime Heritage Center, MA. “Entanglements: The Intertwined Fates of Whales and Fishermen.” December 1, 2005

Ocean and Coastal Law Journal and Environmental Law Society, University of Southern Maine School of Law. “Entanglements: The Intertwined Fates of Whales and Fishermen.” September 28, 2005.

Provincetown Center for Coastal Studies Summer Lecture Series, Provincetown, MA. “Entanglements: The Intertwined Fates of Whales and Fishermen.” July 26, 2005.

Maria Mitchell Observatory and the Nantucket Historical Association at the Nantucket Whaling Museum, Nantucket, MA. “Entanglements: The Intertwined Fates of Whales and Fishermen.” July 19, 2005.

Women's Fisheries Network. “Entanglements: The Intertwined Fates of Whales and Fishermen.” May 5, 2005.

International Women's Writing Guild Big Apple Writing Workshop & Open House, New York, NY. Panelist in discussion on the experiences of women writers. April 17, 2005.

Tufts University Cummings School of Veterinary Medicine, lecture sponsored by Wildlife, Aquatics, Zoos and Exotics. “Entanglements: The Intertwined Fates of Whales and Fishermen.” April 6, 2005.

Bowdoin College Environmental Studies Program in Brunswick, ME. “Entanglements: The Intertwined Fates of Whales and Fishermen.” April 5, 2005.

Vassar College, Poughkeepsie, NY. “Entanglements: The Intertwined Fates of Whales and Fishermen.” March 24, 2005.

Duke University Marine Laboratory in Beaufort, NC. “Entanglements: The Intertwined Fates of Whales and Fishermen.” March 21, 2005.

SELECTED PRESENTED PAPERS AND POSTERS

Johnson, T. "Dignity as an underpinning of responsibility in environmental governance." Paper presented to the Annual Meeting of the American Association of Geographers, 2019

Johnson, T., Andrew Howland and David Cisneros. "How much risk is too much? Geographic and economic analysis to support local decisions about flood resilience in a Downeast Community." Paper presented to the Maine Sustainability and Water Conference, 2019

Johnson, T., Rory Morgan and Katherine Pontbriand. "Evaluating the Effectiveness of Shellfish Legal Notices." Presentation to the Maine Fishermen's Forum Shellfish Focus Day, 2019

Johnson, T. and Olivia Streit. "Geospatial Models Aid in Shoreland Zoning for Rural Maine Communities." Paper presented to the Maine Sustainability and Water Conference, 2018

Johnson, T. "Climate-related beliefs, attitudes & involvement among those involved in rural municipal governance." Paper presented to the International Symposium on Society and Resource Management, 2017

Johnson, T. "Heuristic Problem Solving in GIS Instruction: Helping Students Confidently Meet Complex and Novel Challenges." Paper presented to the Annual Conference of the Association of American Geographers, 2011

Johnson, T., C. Colgan, C. Gregory, D. Markow, M. Bampton, S. Hood. "Education for a Rural Geospatial Workforce: The Maine Experience." Poster presented to the ESRI Education Users Conference, 2010

Johnson, T., J. C. East, M. Lachance and I. Lombardo. "From Conflagration to Consensus: Using Applied Geography to Diffuse Conflict and Support Improved Decision-Making for Shoreland Zoning in Rural Washington County, Maine, USA." Paper presented to the Annual Conference of the Association of American Geographers, 2010

Todd, S., **T. Johnson**, and E. Summers. "Managing endangered baleen whales in U.S. state waters: a multi-partner collaboration designed to facilitate fishing industry stewardship in conservation." Paper presented to the Society of Human Ecology, 2007.

Johnson, T. "No Boundaries: A Multidisciplinary, Project-Based GIS Curriculum for Higher Education." Proceedings of the ESRI Education Users Conference. August 2004.

Johnson, T. and S. K. Todd. "Entanglements: Understanding Conflicts and Contradictions in Efforts to Reduce Incidental Take of Whales in Fishing Gear." Poster presented at the 15th Biennial Conference of the Society for Marine Mammalogy, December 2003.

Johnson, T., R. Bowman and E. Lyman. "New Telemetry Analysis Tools for Entangled Whales." Paper presented to the 15th Biennial Conference on the Biology of Marine Mammals, December 2003.

Johnson, T. and S. K. Todd. "Entanglements: Understanding Conflicts and Contradictions among Fishers and Whale Advocates in the Eastern United States and Canada." In Proceedings of People and the Sea II: Conflicts, Threats and Opportunities, second international conference sponsored by Centre for Maritime Research, Amsterdam, The Netherlands, September 2003.

Johnson, T. "Entanglements: The Intertwined Fates of Whales and Fishermen." Paper presented to the Society for Human Ecology Northeast Regional Conference, April 2002.

Johnson, T. "Environmental Education Programs for Youth at Risk." Presented to the Annual Conference of Connecticut Environmental Educators Association, 1992.

Johnson, T. "Long Island Sound: A Study in Coastal Ecology." Field curricula for at-risk and special education students developed and piloted at Voyager Cruises Coastal Ecology Program. Grant funded by Connecticut Dept. of Environmental Protection, 1991.

Johnson, T. "Transoceanic dispersal mechanisms of neritic phytoplankton: the role of ballast water in the distribution of coastal and estuarine diatoms." Presented to Northwest Algal Symposium, 1989, and Pacific Ecology Conference, 1989.

ART EXHIBITS AND INSTALLATIONS

Johnson, T. and D. Colbert (curators) "In and Out of Place." Gallery exhibition of multi-disciplinary student work in community development, geographic information systems, cartography, and installation art, March 2005.

Whitehead, F. (principal artist) and **T. Johnson**. Collaboration on Design of Great Garden in Lincoln Park, Chicago, IL., part of Chicago's Art in the Garden Program. Included four 20ft. X 50ft. maps of Lake Michigan made entirely of living flowers. 2004.

Jacob, MJ (curator), W. Hood, K. Hamilton, E. Pujol, F. Whitehead, and T. Johnson. "Places with a Future: The Edisto River to the Santee River, South Carolina." 40ft. X 30ft. map displayed at Spoleto Festival USA (attendance: 85,000) as part of a collaborative art installation entitled "Water Table" created for the Evoking History Program. May 28- June 13, 2004.

SYNERGISTIC ACTIVITIES

External Advisor, "Opening Pathways to Employment through Nontraditional Geospatial Applications in Technical Education (OPEN-GATE)." Project funded by the National Science Foundations Advanced Technological Education Program, NSF #1601552, Robyn Lane, PI. 2016 to present.

Coordinator, Annual Maine GIS Educators Conference, 2007 to present.

Collaborator, with Maine Geographic Alliance, summer GIS institutes for K12 teachers in Maine, 2008 to present

Peer Reviewer, *Journal of Geography*, 2013 & 2016.

Panelist for Proposal Review, National Science Foundation, 2010 through 2018.

GRANTS

Co-Principal Investigator with Kristina Cammen (principal), Lauren Ross, Gayle Zydlewski, Jessica Jansujwicz, and Gabriella Marafino. Track 3: The Western Passage student research collaborative: Considering physical, biological, and social dynamics of a tidally energetic system in Eastern Maine, $30,000. University of Maine Research Reinvestment Fund Student Awards Competition, Track 3. Awarded. 2019 – 2020

Co-Principal Investigator with Cynthia Loftin (principal), Anthony Guay and Mary Kate Beard-Tisdale, An interdisciplinary approach to building data literacy in wildlife survey technologies, $145,000.

University of Maine Research Reinvestment Fund Student Awards Competition, Track 4. Awarded. 2019 – 2021

Co-Principal Investigator with A. Thomas (principal), W. Balch, D. Townsend & H. Xue: Multi- and hyperspectral bio-optical identification and tracking of Gulf of Maine water masses and harmful algal bloom habitat, $750,000. NASA EPSCoR Research Competition. Awarded. 2016 – 2019

Collaborator: Machias Waterfront Resilience and Renewal, $45,094. Maine Coastal Communities Grant Program. Awarded. 2017 – 2018

Principal Investigator: Machias Bay Initiative, $4,000. Supported evaluation of shellfish closure maps and notices. Maine Coastal Program. Awarded. 2016 – 2018

Collaborator with Downeast Conservation Network: The Value of Conservation Lands in Downeast Maine, $30,000. Supported shared master's student UM/ UMM. Elmina B. Sewall Foundation. 2017 – 2018

GRANTS, continued

Co-Principal Investigator with Mindy Crandall (principal) and Adam Daignault: The Value of Conservation Lands in Downeast Maine: A research collaboration of the University of Maine (UM), the University of Maine – Machias (UMM), and the Downeast Research and Education Network (DEREN), $27,822. Supported shared master's student UM/ UMM. University of Maine Research Reinvestment Fund Student Awards Competition. 2017 – 2018

Principal Investigator: Climate Change Education tools for Downeast Maine. Maine Community Foundation, $10,000. Awarded. December 2015.

Co-Principal Investigator with W. Otto (principal), E. Hostert, S. Swain & E. Jones: Machias Initiative for Science and Mathematics (MIST). National Science Foundation Improving Undergraduate STEM Education Program. $350,000. Awarded. August, 2014.

Co-Principal Investigator with E.R. Kindleberger (principal): What is Nature? National Endowment for the Humanities Enduring Questions Program. $25,000. Awarded. March 2012.

Senior Personnel: Washington Aroostook Regional Planning for Sustainable Development. US Dept. of Housing and Urban Development, Sustainable Communities Program. $800,000. Awarded. July, 2011

Principal Investigator: A New Collaborative Model for Geospatial Technology Education and Workforce Studies in a Rural Region. National Science Foundation Advanced Technological Education Program Award #0802417 $752,000. Awarded. May 2008.
Supplemental Award, 2009: $24,980: Mac Laboratory for Univ. of Maine at Machias Education Program
Supplemental Award, 2010: $48,000: Laptop Program for Teachers Terrified of Technology and Supporting New GIS Courses for Eastern Maine Community College

Co-Principal Investigator with M. Bampton (principal) and J. Szakas: Creating and Implementing a Concept Inventory-Based Diagnostic Tool to Improve Undergraduate GIS Education. NSF CCLI

Program 083729. $150,000. Awarded. November 2008.

SKILLS

- Geographic Information Systems, including advanced geoprocessing, raster analysis, satellite image analysis, modeling, field data collection, spatial statistics, and project management
- Qualitative and quantitative human studies research methods
- Facilitative leadership and conflict resolution
- Writing for grants and public education
- GIS software and hardware maintenance and upgrade, including large format printing
- GIS server administration and web-based mapping and basic application development
- Database management and maintenance, including a wide variety of geographic data formats
- Advanced coastal piloting and navigation, ship handling, sailing and marlinspike seamanship
- Mathematics instruction to college precalculus level
- Cartographic design for multiple media
- Basic web design and web mastering
- Proficient in Spanish

Matthew P. Dube - Curriculum Vitae

Note: Dr. Dube is a UMA faculty member who will teach most data science courses in the proposed program.

Assistant Professor of Computer Information Systems, University of Maine at Augusta
113 Art Building, Augusta, ME 04330
matthew.dube@maine.edu
http://www.uma.edu/directory/staff/matthew-p-dube

EDUCATION

The University of Maine
Ph.D., Spatial Information Science and Engineering
May 2016
Thesis: Algebraic Refinements of Direction Relations through Topological Augmentation
Advisor: Max J. Egenhofer

The University of Maine
Graduate IGERT Certificate in Sensor Science, Engineering, and Informatics
May 2011
Supervisor: Dr. Kate Beard

The University of Maine
M.S., Spatial Information Science and Engineering
May 2009
Thesis: An Embedding Graph for 9-Intersection Topological Spatial Relations
Advisor: Max J. Egenhofer

The University of Maine
BA in Mathematics and Statistics
August 2007
Focus on Mathematical Statistics

EMPLOYMENT

Assistant Professor of Computer Information Systems
University of Maine at Augusta College of Professional Studies, Augusta, ME
August 2016 - Present

- Develop courses from scratch in Database Design, Database Management, Data Science, Data Visualization, Data Mining, R, SQL, Algorithms and Data Structures, Visual Basic, Microsoft Office, Java, Software Engineering, Interdisciplinary Studies, and Geography
- Construct a new data science baccalaureate degree for the University of Maine System
- Conduct research in spatial data science, equine data science, and electoral data science
- Participate in the Maine Geospatial Institute and Emergency Management Committee
- Serve on the research and scholarship faculty committee

- Serve and chair the assessment faculty committee and the curriculum committee
- Serve on the civic engagement steering committee
- Serve on the intercollegiate and honors council
- Serve on the faculty senate as Secretary
- Served on three faculty hiring committees (Cybersecurity, Communications, Computer Information Systems)

Mathematics Instructor, Presentation Skills Instructor, Research Mentor
Upward Bound Math-Science Program, Orono, ME
June 2011 – Present

- Developed from scratch six-week intensive curricula for calculus, pre-calculus, statistics, geometry, and presentation skills courses
- Developed aspirations courses in data visualization (2018) and sensors (2019)
- Authored instruction manuals for calculus, pre-calculus, and statistics
- Mentored 3-5 students per program year through collegiate research experiences
- Trained fellow co-workers in statistical methodology to assist their research mentees, including experimental design, proper statistical test diagnosis, and statistical interpretation

Teaching and Research Assistant
University of Maine School of Computing and Information Science, Orono, ME
May 2008 – May 2016

- Instructed service courses in Microsoft Excel
- Lectured for classes in engineering databases, discrete structures, information systems, experimental design, and spatial reasoning
- Graded assignments ranging from conceptual schema design, coding, to SQL
- Developed real-world application lab assignments for concepts covered in courses
- Mentored research for junior graduate students
- Responded to student questions and needs for further clarification

Teaching Assistant
University of Maine Department of Mathematics and Statistics, Orono, ME
January 2014 – May 2014

- Provided recitation material for three Calculus II sections
- Provided homework guidance for struggling students
- Developed examples of concepts applied in real world phenomena

IGERT Fellow
University of Maine Sensor Science, Engineering, and Informatics IGERT, Orono, ME
September 2009 – May 2011

- Developed client-motivated sensor solutions for indoor navigation in low-vision environments
- Participated in interdisciplinary coursework in sensor technologies
- Facilitated laboratory course for following cohort
- Advised following cohort through their client project: formaldehyde monitoring system

Assistant Training/Security Coordinator
University of Maine Office of Student Records
September 2007 – May 2009

- Developed and delivered training materials for system-wide implementation of MaineStreet academic management software
- Instituted standing SQL queries for academic personnel needs
- Developed out-of-system solutions for administrative staff needs in academic management
- Debugged and experimented with role combinations and modules within the new system

INSTRUCTED COURSES (INCLUDING AS TA)

University of Maine at Augusta (Assistant Professor)

Summer 2020 (Scheduled)

CIS 355 – Introduction to Sensors (Online)
CIS 449 – R Programming and Package Development (Online)
SSC 389 – Redistricting and the U.S. Census (Online)

Spring 2020
CIS 218 – Introduction to SQL (Online) Enrolled: 23
CIS 255 – Database Design (Live/Online) Enrolled: 42
CIS 352 – Data Visualization (Online) Enrolled: 17
CIS 353 – Human Computer Interaction and User Design (Live/Online) Enrolled: 13
CIS 354 – Algorithms and Data Structures (Online) Enrolled: 9

Fall 2019
BUA/CIS 450 – Data Mining (Live/Online) Enrolled: 10
CIS 100 – Introduction to Computer Applications (Live) Enrolled: 20
CIS 150 – Introduction to Data Science (Online) Enrolled: 10
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 20
CIS 218 – Introduction to SQL (Online) Enrolled: 1 (Directed Study)
CIS 255 – Database Design (Live/Online) Enrolled: 35
CIS 410 – Software Engineering (Online) Enrolled: 1 (Directed Study)
GEO 101 – Introduction to Geography (Live/Online) Enrolled: 20

Summer 2019
CIS 355 – Introduction to Sensation and Measurement Theory (Online) Enrolled: 11
CIS 449 – R Programming and Package Development (Online): Enrolled: 12

Spring 2019
CIS 100 – Introduction to Computer Applications (Live) Enrolled: 24
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 2 (Directed Study)
CIS 218 – Introduction to SQL (Online) Enrolled: 26
CIS 255 – Database Design (Live/Online) Enrolled: 24
CIS 312 – Advanced Visual Basic (Online) Enrolled: 1 (Directed Study)
CIS 352 – Data Visualization (Online) Enrolled: 9

CIS 353 – Human Computer Interaction and User Design (Live/Online) Enrolled: 9
CIS 354 – Algorithms and Data Structures (Online) Enrolled: 9
CIS 449 – R Programming and Package Development (Online) Enrolled: 1 (Directed Study)

Fall 2018
BUA/CIS 450 – Data Mining (Live/Online) Enrolled: 8
CIS 150 – Introduction to Data Science (Online) Enrolled: 5
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 24
CIS 255 – Database Design (Live/Online) Enrolled: 47
CIS 353 – Human Computer Interaction and User Design (Online) Enrolled: 2 (Directed Study)
CIS 410 – Introduction to Software Engineering (Online) Enrolled: 3
INT 208 – Introduction to Interdisciplinary Studies (Live/Online) Enrolled: 10
Summer 2018
CIS 352 – Data Visualization (Online) Enrolled: 3 (Directed Study)
CIS 353 – Human Computer Interaction and User Design (Online) Enrolled: 13
CIS 380/480 – Internship (Online) Enrolled: 6 (Directed Study)

Spring 2018
CIS 100 – Introduction to Computer Applications (Live) Enrolled: 22
CIS 255 – Database Design (Live/Online) Enrolled: 45
CIS 312 – Advanced Visual Basic (Online) Enrolled: 4
CIS 314 – Advanced Java (Live/Online) Enrolled: 8
CIS 352 – Data Visualization (Online) Enrolled: 19
CIS 354 – Algorithms and Data Structures (Online) Enrolled: 1 (Directed Study)
CIS 449 – R Programming and Package Development (Online) Enrolled: 12

Fall 2017
BUA/CIS 450 – Data Mining (Live/Online) Enrolled: 11
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 15
CIS 255 – Database Design (Live/Online) Enrolled: 59
CIS 350 – Database Management (Live/Online) Enrolled: 9
CIS 354 – Algorithms and Data Structures (Live/Online) Enrolled: 13

Summer 2017
CIS 135 – Introduction to Information Systems (Online) Enrolled: 24
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 1 (Directed Study)
CIS 255 – Database Design (Online) Enrolled: 1 (Directed Study)

Spring 2017
CIS 100 (2 sections) – Introduction to Computer Applications (Live) Enrolled: 24 (Online) Enrolled: 33
CIS 255 – Database Design (Live/Online) Enrolled: 44
CIS 312 – Advanced Visual Basic (Online) Enrolled: 12
CIS 352 – Data Visualization (Online) Enrolled: 2 (Directed Study)

Fall 2016

CIS 100 – Introduction to Computer Applications (Live) Enrolled: 22
CIS 212 – Introduction to Visual Basic (Online) Enrolled: 16
CIS 350 – Database Management (Live/Online) Enrolled: 28

University of Maine (Adjunct Professor, Teaching Assistant)

Summer 2020 (Scheduled)
GEO 100 – World Geography (Instructor of Record)

Fall 2019
BMS 625 – Computational Biology (Instructor of Record) Enrolled: 18

Summer 2019
COS 120 – Introduction to Computer Programming (Instructor of Record) Enrolled: 11

Summer 2018
COS 198 – Data Visualization (Instructor of Record) Enrolled: 18
Spring 2016
COS 213 – Advanced Excel Spreadsheet Design (Instructor of Record) Enrolled: 98

Fall 2015
COS 213 – Advanced Excel Spreadsheet Design (Instructor of Record) Enrolled: 93
COS 250 – Discrete Structures (TA) (Dr. Torsten Hahmann)

Spring 2014
MAT 127 – Calculus II (TA) (Paula Drewniany)
SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Summer 2013
POS 498 – Mathematics of Redistricting (TA) (Dr. Richard Powell)

Fall 2013
SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Spring 2013
SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Fall 2012
SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Spring 2012
SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Fall 2011
SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Spring 2011

ECO 493 – Calculus for Economics (TA) (Dr. George Criner)
INT 598 – Sensor Testbed (Advisor) (Dr. Kate Beard)
SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Fall 2010
INT 598 – Sensor Foundations (Lab Instructor) (Dr. Kate Beard)
SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Spring 2010
BUA 490 – Leadership for the Future (TA) (Dr. Scott Anchors)
SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Fall 2009
SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Spring 2009
SIE 554 – Spatial Reasoning (TA) (Dr. Max Egenhofer)

Fall 2008
SIE 550 – Engineering Databases and Information Systems (TA) (Dr. Max Egenhofer)

Upward Bound Math-Science

Bridge Seminar – 2016, 2017, 2018, 2019
Calculus – 2012, 2013, 2014
Computer Programming - 2019
Data Visualization – 2018
Garden Elective – 2018
Geometry – 2014
Pre-Calculus – 2011
Presentation Seminar – 2013, 2014, 2015
Statistics – 2013, 2014, 2015

PUBLICATIONS

Journal Articles

Powell, R., J. Clark, & **M. Dube** (2020) "Partisan Gerrymandering, Clustering, or Both? A New Approach to a Persistent Question." *Election Law Journal* 19(1): 1-22.

Dube, M. & M. Egenhofer. (2020) "Binary Topological Relations on the Digital Sphere." *International Journal of Approximate Reasoning* 116(1): 62-83.

Dube, M., M. Egenhofer, J. Barrett, & N. Simpson. (2019) "Beyond the Digital Jordan Curve: Unconstrained Simple Pixel-Based Raster Relations." *Journal of Computer Languages* 54(1): 100906

Poulin, A., M. Hutchinson, **M. Dube**, M. Stokes, S. Mitchell, A. Edwards, K. Harvey, A. Myer, & R. Causey (2018). "Abatement of Streptococcus Equi in Soiled Equine Bedding and Compost." *Journal of Equine Veterinary Science* 70(1): 117-122.

Dube, M. (2017) "Topological Augmentation: A Step Forward for Qualitative Spatial Partition Reasoning."

Journal of Spatial Information Science 14(1): 1-29.

Book Chapters

Clark, J., **M. Dube**, & R. Powell. (2020). "Stemming the Tide: The Impact of Redistricting on the 2018 Midterm Election." (in press)

Dube, M. (2016) "Beyond Homeomorphic Deformations: Neighborhoods of Topological Change." *Advancing Geographic Information Science: The Past and Next Twenty Years*, H. Onsrud & W. Kuhn (eds.), GSDI Association Press, 137-152.

Fully Refereed Conference Proceedings

Dube, M., J. Barrett, & M. Egenhofer. (2015) "From Metric to Topology: Determining Relations in Discrete Space." *Conference on Spatial Information Theory*, Santa Fe, NM. S. Fabrikant, M. Raubal, M. Bertolotto, C. Davis, S. Bell, & S. Freundschuh (eds.), *Lecture Notes in Computer Science 9368* 151-171.

Dube, M., M. Egenhofer, J. Lewis, S. Stephen, & M. Plummer. (2015) "Swiss Canton Regions: A Model for Complex Regions in Geographic Partitions." *Conference on Spatial Information Theory*, Santa Fe, NM. S. Fabrikant, M. Raubal, M. Bertolotto, C. Davis, S. Bell, & S. Freundschuh (eds.), *Lecture Notes in Computer Science 9368* 309-330.

Dube, M. & M. Egenhofer. (2014) "Surrounds in Partitions." *22nd ACM SIGSPATIAL 2014 GIS*, Dallas, TX. Y. Huang, M. Schneider, M. Gertz, J. Krumm, & J. Sankaranarayanan (eds.), *ACM Press*, 233-242.

Lewis, J., **M. Dube**, & M. Egenhofer. (2013) "The Topology of Spatial Scenes in R^2." *Conference on Spatial Information Theory*, Scarborough, United Kingdom. A. Galton, B. Bennett, T. Tenbrink, & Z. Wood (eds.), *Lecture Notes in Computer Science 8116*, 495-515.

13.1

Dube, M. & M. Egenhofer. (2012) "An Ordering of Convex Topological Relations." *GIScience 2012*, Columbus, OH. N. Xiao, M. Kwan, M. Goodchild, & S. Shekhar (eds.), *Lecture Notes in Computer Science 7478*, 72-86.

Egenhofer, M. & **M. Dube**. (2009) "Topological Relations from Metric Refinements." *17th ACM SIGSPATIAL 2009 GIS*, Seattle, WA. D. Agrawal, W. Aref, C. Lu, M. Mokbel, P. Scheuermann, C. Shahabi, & O. Wolfson (eds.), *ACM Press*, 158-167.

Dube, M. & M. Egenhofer. (2009) "Establishing Similarity Across Multi-Granular Topological-Spatial Relation Ontologies." *QuaCon 2009 – First International Workshop on Quality of Context*, Stuttgart, Germany. D. Fritsch & K. Rothermel (eds.), *Lecture Notes in Computer Science 5786*, 98-108.

Abstract-Refereed Conference Presentations

Gleason, K. & **M. Dube**. (2019) "Geographic Needs Assessment for Rural Homeless Services in Maine." *Society for Community Research and Action 2019 Biennial* June 2019

Honda, H., T. Surrette, & **M. Dube.** (2018). "Assessing and Improving Vocational Relevance in Professional Studies." *New England Educational Assessment Network Fall Forum*, Worcester, MA, November 2018.

Dube, M., D. Pacciamonti, L. Underhill, & R. Causey (2018). "Differences in Foaling Rates of Thoroughbred Mares with Different Histories." *International Symposium on Equine Reproduction* July 2018.

Powell, R., J. Clark, & **M. Dube**. (2017) "Assessing the Causes of District Homogeneity in U.S. House Elections." American Political Science Association, San Francisco, CA, August, 2017.

Powell, R., **M. Dube**, & J. Clark. (2017) "Mathematical Characteristics of District Boundary Lines as Indicators of Partisan Gerrymandering in U.S. House Elections." *Midwest Political Science Association Conference*, Chicago, IL, April, 2017.

Dube, M. & J. Clark. (2016) "Beyond the Circle: Measuring District Compactness Using Graph Theory." *Northeast Political Science Association Conference*, Boston, MA, November, 2016.

Powell, R., J. Clark, & **M. Dube**. (2015) "Determining an Expected House Majority through Pattern Analysis." *Northeast Political Science Association Conference*, Philadelphia, PA, November, 2015.

Dube, M. (2014) "Partitions to Improve Spatial Reasoning." *1st ACM SIGSPATIAL Ph.D. Symposium*, Dallas, TX, November, 2014.

RESEARCH SUPERVISED

University of Maine

University of Maine Doctoral Dissertation Committee Member – Colin Bosma (Ph.D. Clinical Psychology) (January 2019 – present)

Determining an Expected House Majority Using Pattern Analysis[1]* – Jesse Clark (Honors Thesis Co-Advisor, 2015-2016) – *Massachusetts Institute of Technology Ph.D. Program in Political Science*

The Effects of Racing Surface and Turn Radius on the Occurrence of Front Limb Injuries in Thoroughbred Race Horses from 2009-2012[2]** – Chelbie Aube (Animal and Veterinary Science Capstone, 2014-2015)

The Effects of Racing Surface on the Occurrence of Hind Limb Injuries in Thoroughbred Race Horses from 2009-2012 – Jordanne Woodbury** (Animal and Veterinary Science Capstone, 2014-2015)

13.1

Upward Bound Math-Science

Predicting the Redistricting of 2020 and 2030 – Garrett Caruso (2019) – *attending the University of Maine for B.S. Computer Science*

The Correlation between the Period of Sound Waves and Galvanic Skin Response (GSR) Readings – William Curtis (2019) – *Senior at Mattanawcook Academy*

A Study on the Behaviors Exhibited by the Composition Operator in Context of Topological-Spatial Relations between Lines and Regions – Cody Norris (2019) – *attending the University of Maine for B.S. Computer Science*

Spectral Interference? Optimal Light Settings for Colour Sensor Calibration – Nickolas Millett (2019) – *Senior at Mattanawcook Academy*

The Impact of a Horse's Age and Sex on Start Lag Intervals – Lauren Underhill (2018) – *attending the University of Maine at Augusta for B.S. Veterinary Technology*

Confirming the Efficacy of Even Swing through the Use of Election Data – Kyle Watson (2018) – *attending Princeton University for B.S. Engineering*

Man vs. Machine: Who is Better at Making Competitive Congressional Districts? – Cody Hall (2017) – *attended Husson University for B.S. Entertainment Production*

Relative Strength of Shape, Size, Color, Saturation, and Motion as Visual Preattentive Attributes in

[1]* Accepted to *Northeast Political Science Association Conference*

[2]** Submitted to journal

Adolescents – Jarek Munson (2017) – *attended Nokomis Regional High*

The Effect of Age and Breeding History on Thoroughbred Foaling[3]*** – Lauren Underhill (2017) – *attending the University of Maine at Augusta for B.S. Veterinary Technology*

Perception of Rotational Motion: The Influence of Control and Goal on Angular Accuracy – Cody Hall (2016) – *attended Husson University for B.S. Entertainment Production*

Perception Bias in Interpersonal Relationships based on Personality Types – Krystina Martinez (2016) – *attended Nokomis Regional High*

The Impact of Social Heterogeneity on Workplace Performance – Maryan Mukhtar (2016) – *attending Southern Maine Community College*

A Graph Theory and Statistics Approach to Gerrymander Identification – Garrett Rudge (2016) – *attended the University of Maine for B.A. Mathematics and Statistics*

Human Preference and its Influence on Canine Adoption Rates – Joseph Buzzell (2015) – *attending Atlantic Veterinary College for DVM*

Determining Missing Letters through Sequential Analysis – Jason Lewis (2015) – *attended Thomas College for B.S. in Computer Science*

Determining Effectiveness of a National Election Prediction Model – Maryan Mukhtar (2015) – *attending Southern Maine Community College*

Correlations between StrengthsFinder Assessment Strengths in UBMS Population – Kaylynn Rice (2015) – *attended Nokomis Regional High*

Raster Relations for Connected Regions[4]**** – Noah Simpson (2015) – *attended the University of Maine for Pre-Engineering*

Determining Topological Relations between Digital 3D Objects[5]***** – Jordan Barrett (2014) – *attending University of Nebraska for Ph.D. in Mathematics*

Partitioning New England to Represent Republican Populations – Justin Chan (2014) – *attended Northeastern University for B.A. Political Science*

Discrimination of Equally Tempered Tones and Chords – Beverley Guay (2014) – *attended College of the Atlantic for B.S. Environmental Science*

Raster Relations Revisited: Expanding Spatial Possibilities through Constraint Relaxation – Noah Simpson (2014) – *attended the University of Maine for Pre-Engineering*

Solving Hydroelectricity's Fish Problem – Marianna Angelo, Breanna Batchelder, Jonathan Haddad, Austin Nantkes, Joshua Wheeler, and Caleb Wursten (2013) – *attending/attended the University of Maine (B.S. Mechanical Engineering), Colby College (B.S. Computer Science), Husson University (B.S. Physical Therapy), Babson College (B.S. Business and Entrepreneurship)*

Identifying Viable Symbols within 3D Qualitative Direction Partitions – Jordan Barrett (2013) – *attending University of Nebraska for Ph.D. in Mathematics*

Merit of the Judging/Perceiving Pole – Courtney Burris (2013) – *attending University of Buffalo for Ph.D. Industrial Systems Engineering*

Identifying Languages based on Conditional Probability and Frequency Distribution – Mia Campbell (2013) – *attended Bangor High School*

Detectability Levels of the Human Ear: Using a Range of Frequencies, Octaves, and Tones – Beverley Guay (2013) – *attended College of the Atlantic for B.S. Environmental Science*

Biocapacity: The Earth's Natural Countdown – Odom Lim (2013) – *attended Massachusetts College of Pharmacy and Health Sciences for Pharm. D.*

[3]*** Accepted to *International Symposium on Equine Reproduction (ISER)*

[4]**** Accepted to *Journal of Computer Languages*

[5]***** Accepted to *International Conference on Spatial Information Theory (COSIT)*

Exploring the Methods of Differential Calculus through the Brachistichrone Problem – Courtney Burris (2012) – *attending University of Buffalo for Ph.D. Industrial Systems Engineering*

Of Ecology and Climate Change: Past, Present, and Future – Jordan Barrett, Stephanie Decker, Dustin Ewer, Patrick Nason, and Labiba Shaheed (2012) – *attended or attending the University of Maine (B.S. Clinical Lab Sciences, B.S. Social Work), University of Massachusetts-Lowell (B.S. Biology), University of Nebraska (Ph.D. Mathematics)*

The Gerrymandered States of America: An Attempt to Reverse the Election of 2008 in Favor of the Minority Candidate – Odom Lim (2012) -- *attended Massachusetts College of Pharmacy and Health Sciences for Pharm. D.*

An Algorithm for Determining Convexity within an Arbitrary Network[6]****** – Brian Lopez-Cornier (2011) – *attended University of Massachusetts-Boston for B.S. Computer Forensics*

Using Taylor Series to Approximate an Indefinite Integral (Anti-derivative) - Chhing Tiv (2011) – *attended University of Massachusetts-Amherst for B.S. Psychology*

FUNDING

"BS Data Science Degree" – UMS Collaborative Program Support Fund (Curriculum Author) - $177,177 (2018)

"How do Adult Students Relate their Academic Studies with their Work Experiences and Career Aspirations" – Presidential Research Innovation Grant, University of Maine at Augusta (Co-Investigator) - $10,570 (2017)

13.1

COLLEGIATE SERVICE

Campus Service

University of Maine at Augusta Policy Scholars Joint Advisor (October 2018 – present)
University of Maine at Augusta Faculty Senate (October 2017 – present; Secretary June 2018 – present)
University of Maine at Augusta Curriculum Committee Member (September 2019 – present, Chair)
University of Maine at Augusta Intercollegiate Honors Council Member (February 2017 – present)
University of Maine at Augusta Data Science Hiring Committee Member (2018-2019 AY)
University of Maine at Augusta Communications Hiring Committee Member (2018-2019 AY)
University of Maine at Augusta Cybersecurity Hiring Committee Member (2017-2018 AY)
University of Maine at Augusta Assessment Committee Member (September 2017 – May 2019; Chair June 2018 – May 2019)
University of Maine at Augusta Advocating Wicked Scholarship in Maine Committee Member (August 2016 – May 2018)

Scholarly Service

Treasurer of Maine Geospatial Institute – 2019 - present
Travel Coordinator for the 2011 Conference on Spatial Information Theory – 2011
Reviewer for many international journals and conferences, including *International Journal of Geographical Information Science*, *Journal of Visual Languages and Computing, Journal of Spatial Information Science, Future Generation Computer Systems, International Journal of Geo-Information, Journal of Knowledge and Information Systems,*

[6]****** Accepted to *International Conference on Geographic Information Science (GIScience)*

Computers, Environments, and Urban Systems, *Conference on Spatial Information Theory*, and *Geographic Information Science, Commonwealth: A Journal of Pennsylvania Politics and Policy*

Student Organizations

Alternative Breaks Trip Advisor – 2008 – 2016, 2018 – present
Chapter Counselor, Maine Alpha Chapter of Sigma Phi Epsilon – 2013 – present
Sigma Phi Epsilon Carlson Leadership Academy Faculty, Northeast Region – 2012 - 2014
Balanced Man Steward, Maine Alpha Chapter of Sigma Phi Epsilon – 2009 – 2013
Vice President of Alumni Relations, Maine Alpha Alumni and Volunteer Corporation – 2007 – 2009

CONFERENCES ATTENDED

MELMAC 202 – Orono, ME (February 2020)
CUE.NEXT: Envisioning the Future of Undergraduate Computer Science Education – Denver, CO (January 2020)
Census and Electoral Geospatial Data – Boston, MA (November 2019)
American Elections Symposium – Manchester, NH (March 2019)
Maine Education Opportunity Association Annual Conference – Orono, ME (January 2019)
New England Educational Assessment Network Fall Forum – Worcester, MA (November 2018)
International Symposium on Equine Reproduction XII – Cambridge, UK (July 2018)
Maine Education Opportunity Association Annual Conference – Orono, ME (January 2018)
The International Emergency Management Society USA Meeting – Orono, ME (June 2017)
Midwest Political Science Association – Chicago, IL (April 2017)
Maine Education Opportunity Association Annual Conference – Orono, ME (January 2017)
International Conference on Spatial Information Theory – Santa Fe, NM (October 2015)
Advancing Geographic Information Science: The Past and Next Twenty Years – Bar Harbor, ME (June 2015)
ACM SIGSPATIAL – Dallas, TX (November 2014)
International Conference on Spatial Information Theory – Scarborough, UK (September 2013)
Geographic Information Science – Columbus, OH (September 2012)
International Conference on Spatial Information Theory – Belfast, ME (October 2011)
ACM SIGSPATIAL – Seattle, WA (November 2009)
Quality of Context – Stuttgart, Germany (June 2009)

INVITED LECTURES

Glory, Glory Pareidolia: A Method for Addressing Gerrymandering using Topological rather than Geometric Means. *Spatial Data Science Institute*, Orono, ME (March 2020)
The Spatial Nature of Poverty and Educational Gaps. *Maine Educational Opportunity Association Conference*, Orono, ME (January 2019)
The Role of Computer Science in Solving Governmental Issues Surrounding Redistricting – Bowdoin College (October 2018)
The State of Affairs in Federal and State Redistricting Processes – WERU Community Radio (March 2018)
A Data Scientist's View on Sensation and Perception – The University of Maine (October 2017)
Data and the Quest for Truth – The University of Maine at Augusta Convocation Faculty Address (September 2017)

Data Science in an Emergency Management Setting – The International Emergency Management Society USA Meeting (June 2017)
Swiss Canton Regions: Defining an Object Model for Complex Spatial Objects – The University of Maine (February 2017)
A Data Scientist's View on Sensation and Perception – The University of Maine (October 2016)
60 in 60: Life Lessons from Mathematics – Computer Science Education Week, The University of Maine (December 2011)

AWARDS AND HONORS

Research, Teaching, and Academic Awards

Distinguished Scholar Award – September 2019, presented by the administration of the University of Maine at Augusta
Faculty Member of the Month – September 2015, presented by the sisters of the Maine Alpha Chapter of Pi Beta Phi Sorority
Vespucci Initiative Top Mock Research Grant Proposal – July 2015, Vespucci Initiative, Bar Harbor, Maine
Advancing Geographic Information Science: The Past and Next Twenty Years Junior Scholar – July, 2015, Vespucci Initiative, Bar Harbor, Maine
Michael J. Eckardt Doctoral Dissertation Fellowship – August 2014 – August 2015, University of Maine, Orono, Maine
NSF Travel Scholarship for ACM SIGSPATIAL – November 2014, Dallas, Texas
COST Young Researchers Forum – Moving Objects and Knowledge Representation, August 2011, University of Ghent, Ghent, Belgium
NSF Integrated Graduate Education and Research Trainee – September 2009 – May 2011, University of Maine, Orono, Maine
Top Graduate Award –May 2009, Department of Spatial Information Science and Engineering, University of Maine, Orono, Maine

Mentoring and Service Honors

Michael Morin Award for Fraternity Advisor of the Year – 2019, University of Maine, Orono, Maine
University of Maine at Augusta Faculty Gardener of the Year – 2018, University of Maine at Augusta, Augusta, Maine
University of Maine at Augusta Faculty Gardener of the Year – 2017, University of Maine at Augusta, Augusta, Maine
Distinguished Volunteer Award – 2016, Sigma Phi Epsilon Fraternity, Richmond, Virginia
Michael Morin Award for Fraternity Advisor of the Year – 2015, University of Maine, Orono, Maine
Michael Morin Award for Fraternity Advisor of the Year – 2014, University of Maine, Orono, Maine
All Maine Women Honor Society Distinguished Mentor Award (Kate McKeown) – April 2014, University of Maine, Orono, Maine
Nominee for the Dean Lucy Award – April 2009, University of Maine, Orono, Maine

MEMBERSHIPS

Professional

ACM
ACM Special Interest Group in Spatial Information Science and GIS
IEEE
Maine Geospatial Institute
Midwest Political Science Association

Honor Societies

Golden Key International Honor Society
Order of Omega
Pi Mu Epsilon National Honorary Mathematics Society – Maine Alpha Chapter
Phi Beta Kappa Society – Delta of Maine

Judy Colby-George - Resume

Note: Ms. Colby-George is a UMM adjunct faculty member who teaches online GIS courses related to community planning and land use.

Career Summary:

2001 – Present Principal, Spatial Alternatives, Yarmouth, Maine
Principal of geographic information systems consulting firm specializing in planning and environmental applications.

1991-2001 Geo-Systems, Yarmouth, Maine
GIS analyst for a small geographic information systems consulting firm.

Education:

M.S., Land Resources, University of Wisconsin-Madison, 1996
Degree program focusing on GIS and Coastal Planning
Master's Thesis: Developing an Integrated Marine GIS for the State of Maine

B.S., Geography, University of Wisconsin-Madison, 1989

General Professional Experience:

- Twelve years experience in the GIS field ranging from creating and updating GIS datasets, development of customized interfaces, and providing detailed analysis to solve client problems.
- Six years of experience created customized training to meet client needs.
- Ten years of experience working with municipalities using GIS data to enhance decision making.
- Extensive experience preparing maps for public presentation.
- Extensive experience customizing ArcView to meet client needs and add functionality.
- Use of CommunityViz software to assist municipalities in visualization and analyzing
- different growth strategies.
- Development of needs assessments to guide the implementation of GIS technology.
- Broad knowledge of GIS and related technologies for application to planning and environmental issues.

Software Expertise:

- ArcGIS
- ArcView/Avenue Programming
- Spatial Analyst
- 3D Analyst
- CommunityViz
- ArcInfo
- ArcCad
- AutoCAD
- Access
- Visual Basic

Professional Organization Memberships:

- Maine GIS Users Group
- URISA

Project Experience:

Town of Falmouth
Participation in community master planning process. Used CommunityViz software and other GIS tools to assist a citizen advisory panel in decision making about a variety of development options.

Town of Scarborough
Developed a build out analysis for Scarborough. Using current zoning and the parcel data to look at available land for development and determine the potential new lots which could be created under current zoning. Developed tax mapping program to produce tax maps from ArcView.

Town of Yarmouth
Developed a build out analysis for the town, similar in scope to that done in Scarborough. Developed customized interfaces for Public Works to input and access data about work orders, manholes, and sewer lines. Developed zoning coverage and other data sets for the town. Work with town staff to create a number of maps used in public presentations.

Harding ESE, Portland, Maine
Developed customized software applications allowing a variety of users to access chemical data results and to query the data spatially. This system has been implemented for a number of projects and used to provide analysis and mapping for a number of reports. Responsible for creating a large variety of maps for reports and client presentation.

Robert S. Bistrais, MA, GISP - Resume

Note: Mr. Bistrais is a UMM and UMA adjunct faculty member who teaches online GIS courses related to online GIS applications and programming.

Professional Experience

Senior Programmer-Analyst, State of Maine, Maine Office of Geographic Information Systems (MEGIS), Augusta, ME 5/1995-present

Provide all aspects of GIS support for state agencies and other parties. Responsibilities include GIS programming, creating and administering web services, supporting enterprise GIS environment, GIS support for Emergency Management, application development, cartographic design and production, and customer service. Primary technologies include ArcGIS Desktop, QGIS Desktop, ArcGIS Online, and ArcGIS Server.

Adjunct Professor, University of Maine at Augusta, 8/2010-present

Introduction to Geographic Information Systems: 300-level class introducing students to theoretical and practical GIS concepts using ArcGIS and QGIS software. Includes traditional classroom and delayed viewing sections. Responsibilities include preparing lesson plans and material, conducting lectures, preparing and grading assignments, mentoring students, and ensuring compliance with University policies and procedures.

Adjunct Professor, University of Maine at Machias, 1/2014-present

Web-Based Maps, Application and Services: 400-level class on web mapping and GIS. Class is conducted entirely online, using live video conference and delayed viewing technologies. Topics include server, client, mobile, and cloud concepts using major proprietary and open source solutions. Responsibilities include preparing lesson plans and material, conducting lectures, preparing and grading assignments, mentoring students, and ensuring compliance with University policies and procedures.

GIS Manager, Addison County Regional Planning Commission, Middlebury, VT 4/1992-5/1995

Provided all GIS services for a 20-town regional commission, using PC Arc-Info, Arcview, and Idrisi platforms. Prepared maps for town and regional plans. Digitized land use data for the region. Derived land cover layer from LANDSAT imagery. Prepared transportation plans. Collaborated on projects with County Forester's office, USDA/NRCS district office, US Forest Service, local non-profit conservation groups. Mentored graduate students from University of Vermont and Middlebury College. Served as ACRPC's representative at all GIS-related functions, including NEARC and VT Arc User's Group as well as statewide committees.

Professional Certifications

Commercial Pilot-Airplane, Single Engine, Land, Instrument-Airplane: 700+ hrs TT, includes Cessna 172, 152, Beechcraft C24R, C23, B19
Remote Pilot-Small Unmanned Aircaft Systems
Geographic Information Systems Professional (GISP)
GeoServer certified

Education

Master of Arts, Geography, University of Vermont, Burlington, VT, 1996
Attended on Fellowship while employed as Graduate Teaching Assistant

Bachelor of Science, Professional Liberal Studies, Dowling College, Oakdale, NY, 1988
Minored in Aeronautics

Associate in Applied Science, Mechanical Technology, Suffolk County Community College, Selden, NY, 1985

Continuing Education
Variety of IT and Geospatial subjects from various accredited institutions

Skills and Experience

ArcGIS Desktop
ArcGIS Enterprise, Server, Online
Collector for ArcGIS
PostGIS/PostgreSQL
Web Development
HTML/JavaScript/CSS
PHP
Python
Survey123
Quantum GIS (QGIS)
GeoServer/OpenGeoSuite
UMN MapServer/MapScript
Google Maps/Google Earth
Java
GDAL/OGR
SQL
LMS: Blackboard, Moodle
KoboToolbox