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# Academic & Career Advising in Geosciences

Co-Founding Department of the  
School of Earth and Sustainability,  
College of Natural Sciences



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## Introduction

The Geosciences Department includes five undergraduate degree programs (Geography BA, BS, Earth Systems BS, Geology BA, BS), two MS degree programs (Geography, Geosciences) and one PhD program (Geosciences), and shares advising and mentoring responsibilities with a joint major in Environmental Science students. Currently, we maintain separate advising systems for our distinct departmental disciplines. Five tenured faculty take the lead in undergraduate advising: the Geology and Earth Systems undergraduate degrees share a Chief Undergraduate Adviser and a separate Honors Program Adviser who also assists with advising for non-honors Geology and Earth Systems; the Geography undergraduate degrees have a separate Chief Undergraduate Adviser and Honors Program Adviser; one faculty member is co-director of the Environmental Sciences BS degree. There are separate Graduate Advisers for the two MS programs; the Geosciences Graduate Adviser also serves as adviser for our shared Geosciences PhD program. Eleven faculty each advise a dozen or more undergraduates for our shared the Environmental Sciences program.

Our fields tend to attract students during their freshman/sophomore years; few students start their UMass careers in Geosciences majors, in part, because Massachusetts does not require Geology or Geography in high school. As a result, we place great importance on our entry-level and general education courses as a means of recruiting majors. The first point of contact for many of our majors is a course instructor. We continue to find this frustrating given that energy is sourced from fossil as well as renewable fuels, surface and ground water resources are geologically sources, as are building and construction materials, not to mention the intrinsic value of geological landscapes. Geologists are the source if rare earth economic minerals like diamonds, and lithium that fuel the cell phone industry. So the MA standards for science are extremely short sighted for the sustainable material and resource management fields that the geosciences has to offer. Sustainability is key to all aspects of the Geosciences.

Our degree programs are quite distinct and each attracts a different set of students. In general, the majority of Geology undergraduates, and all Earth Systems undergraduates, choose a BS degree; the majority of Geography undergraduates choose a social science oriented BA degree. Similarly, the Geosciences MS is a physical science degree; most Geography MS students are social scientists.

Advising in our department occurs in many settings. The advising strategy should recognize multiple roles – faculty, professional staff, and student peers – and provide for appropriate expectations, guidance training and evaluation. In addition, information and interaction with employers to find the appropriate intersection between education and workforce needs, and better alignment with career preparation and curricula should be occurring. One way of supporting students is to take advantage of technological advances that now permit effective institution-wide curricular tracking and advising systems. Below the original prompts we were given are **highlighted in green**.

### **Part One. Analysis of the Current Landscape, “A [Deeper] Look in the Mirror”**

What are the strengths and weaknesses of the ways in which **Academic Advising** is currently performed at the School/College level, at the Departmental level (with the student experience as the unit of analysis). As you think about the various touch points where/when academic advising is done (from the declaration of majors to changes from one major or College to another), where do you feel we are doing well and what needs to be improved? What different approaches/processes do you have in place to respond to the needs of freshmen students vs. transfer students?

The primary strength of all undergraduate advising in Geosciences is personal contact with faculty advisers. We devote considerable time and care to one-on-one course option and career advising. This personal approach allows for adjustment depending on whether the students are incoming freshmen, current UMass undergraduates, or transfer students. We currently do not require, but strongly encourage all of our students to meet with their advisor at least twice a year, usually during the period prior to preregistration.

The current weakness in the structure of our academic advising is in not requiring that students meet with their advisor every semester. This is partially due to the fact that many Geosciences faculty already serve as advisors for Environmental Science students and only five faculty advise all Geology, Geography, and Earth Systems students. Soon, as part of this evaluation, we will implement a plan to engage all Geosciences faculty in undergraduate advising and require all of our majors to meet with an academic advisor twice a year.

· How is **Career Advising** currently performed at the School/College level, at the Departmental level (with the student experience as the unit of analysis) and what do you see as the strengths and weaknesses of your current approach? It will be important to identify for the student and their respective academic “major”, the various touch points where/when career advising is provided. What specific approaches/processes are in place specific to assisting students with internship possibilities and employment? Where do you feel your department/college “gets it right” and where is there need for additional or alternative approaches?

In the Geosciences career advising takes place in several key locations:

- Career information included in Intro course texts/lectures – all of our Intro courses include some content (in textbooks and lectures) on what career opportunities are available in geography and geology.
- Career/internship information posted on our Geosciences and Geography program web pages.
- Regular emails highlighting job and internship opportunities are shared with all of our undergraduate majors.
- Career talks by alumni and local residents. The undergraduate Geosciences and Geography clubs both invite alumni and local residents to make career presentations.
- Extended career/internship exploration, counseling, and resume/job letter writing practice in the Geography Junior Year Writing course (Geography 314) and CNS Junior Year Writing course (Nat Sci 387).
- One-on-one career counseling in each semester's advising appointments.
- New efforts in "speed dating" career night.

In addition, the geography program has had great success in offering courses that provide discussion of discipline-specific career opportunities.

- Discussions of options for professional geography careers/internships in its IE course (Geography 486). Because the geology IE course also serves environmental science majors, this equivalent course doesn't provide a suitable venue for discussing geology careers.
- Extended career/internship exploration, counseling, and resume/job letter writing practice in the Geography Junior Year Writing course (Geography 314).

The geology students do not receive discipline specific career advice in the equivalent courses within their curriculum because the geology IE course (Geo 494) also serves environmental science majors and the CNS Junior Year Writing course (NatSci 387), serves a wide range of disciplines.

Our strengths in these areas are in the "personal attention" which is the hallmark of our departmental approach to advising. However, more could be done, particular in terms of establishing a career and internship advising office for the School of Earth and Sustainability which would serve as a clearing center for some of these functions.

Within Environmental science, career advice is offered within several 1-credit seminars taken throughout the curriculum. These are outlined in a separate section at the bottom of the document.

• **Division of Labor/Usage of Personnel:** Professional staff, faculty, and peers are all involved in supporting students' academic and career advising.

- o How involved and in what way is the School/College central advising office used for a) academic advising, and b) career advising. In what areas (i.e., academic advising, internship placement, career advising,

student programming in these areas, employer interactions) should the central office be more engaged or is decentralization more appropriate? What is the optimal balance?

The CNS Advising Office is a great resource for all Geosciences majors but we think it is under utilized. Geography BA majors use the CNS Advising Office for help with the College language requirements. For most Geography majors, career/internship advising is best left to the department advisers; most of the natural science-oriented opportunities advertising through CNS are not relevant for the BA students.

- Does the School/College/Department have academic advising *professional* staff and if so, how are they used (what are their primary roles and responsibilities)? Is this the optimal way to draw on their talents and time?

Advising within the Environmental Science program is coordinated with a professional staff member who also teaches 1-credit career planning seminars for the major. But otherwise, the Geosciences lack any professional advising. We have no staff for this. Moreover, the Campus Advising office in Goodell is not effective for our students. Very few use the Goodell office as a resource because they are so far removed from the immediate needs. Moreover they are removed from our alums and the companies we represent. Rather, we do it ourselves with only limited funds. We recognize the need for a major push in career planning without the CNS office, unless there are changes in resources here. See section on the new School of Earth and Sustainability.

- Does the School/College/Department have career advising *professional* staff and if so, how are they used (what are their primary roles and responsibilities)? Similarly, is this the optimal arrangement or would you recommend alternatives for consideration?

The Department of Geosciences lacks staff dedicated to advising and career planning. We use only our faculty! The new School of ES provides the best opportunity for joint collaboration with advising, corporative sponsors and careered management. To date, we have not been supported for career development except through the university advising office that host staff who are too far removed from our discipline.

- How are faculty advisors used in terms of academic advising, career advising? Where could they be used most effectively? Where are they being used in ways that are not as optimal?

Geography, Geology, and Earth Systems students are advised by the Chief Undergraduate Advisors, or Honors Program Advisors, all of whom are full time tenured faculty members. They have taken on the role of advising but we seek a different model to make this work more effectively.

- Does the School/College/Department use peer advisors to support academic and/or career advising? If so, please describe how peer advisors are used and what you see as the potential strengths that could be better developed?

Significant peer advising takes place in Geography formally through group projects/interaction in the Geography IE and Junior Year Writing courses, and informally in the undergraduate Geography club. This culture of informal peer advising is also probably true among most Geosciences majors. But we see a significant need to expand on this! This is something we plan to improve on.

- **Data Analytics/Tracking:** What type/level of tracking of students is happening at the School/College/Department levels (i.e., flow of students in/out of the School/College/Department, academic progress including GPA and timely progress toward degree completion, etc.)? Describe how students are identified for various outreach campaigns/activities/programming that support students in need of assistance (i.e., identifying an appropriate major, experiencing academic difficulty, not progressing in a timely fashion toward degree completion, unsure as to a potential career, etc.). What specific intervention tools/programs/communications do you have in place and when are they performed? Do you know what percentage of your students see an academic advisor, a career advisor on a yearly basis? Are there data sources you wish you had that are not presently available?

The Chief Undergraduate Advisers review students each semester and meet with/emails/calls any students who appear to be having difficulty. This is done through a review of SPIRE records and the GPA information available in the SSC database.

- **Experiential Opportunities:** How does the School/College/Department currently support matching students with appropriate opportunities such as double majors, minors, certificates, honors, individualized programs, internships, international opportunities, research experiences, community service, etc. Does the School/College/Department include internship and/or employment-related practicum/experiential opportunities as part of the credit-bearing curriculum requirements? If not, are there ways to pursue this in the School/College/Department field of study that makes sense and helps facilitate career opportunities?

Each year, our Geosciences Honors Program Directors identify students with qualifying GPAs and invite them to consider departmental honors. This system has had some success in increasing the numbers of students completing departmental honors within the Commonwealth College. We are not aware of any wider College effort so it is done completely in house.

We share internship, research and other career opportunities with students via email, personal meetings, and advising. About 2/3 of Geography majors participate in either domestic exchange or study abroad, an experience that also enhances their

resumes/career profiles. Many Geology and Earth Systems majors apply for summer internships, and a number do domestic exchange or study abroad each year.

- **Informational Data/Resources:** [Due to a secure website, access to data and student survey responses in the tables below can be accessed by copying and pasting the following, [umass.edu/oir-dept-review](http://umass.edu/oir-dept-review), into your web browser and then sign in to the secure site using your netid and password]. Moving beyond general questions of effectiveness and the “division of labor” in academic advising and career support, we are interested in specific metrics that various stakeholders are interested in seeing improve. Based on key data metrics and student responses found in the following sources, what would you describe as your School/College/Department strengths with academic and career advising? What would you describe as areas needing attention and/or in need of improvement?

These data are provided in our earlier prompts on undergraduate education and do not need repeating here, given the administration is consistently reviewing what we have written before. Our analysis was presented earlier. We have highlighted in reports of the last 2 years the need for additional resources in career advising to fill in what is completely missing from the CNS or college resource center in Goodell. We find that the Goodell advising office is disconnected from our student needs and from our faculty.

Our advising strength is in personal contacts and providing those contacts for our students. However we strive to develop a stronger tie with alumni and the workforce. We have requested this personnel support and have not received it. Because of the workforce freeze we have not been able to reallocate state line positions to career management and alumni development that are both tightly linked with careers. We seek means to break the hiring freeze to open up these positions to develop our programs.

## **Part Two. Goals for Academic and Career Advising and the Student Experience**

- A. . Part Two is asking you to develop specific goals in these areas:
- Academic Advising
  - Career Advising
  - Division of Labor/Usage of Personnel
  - Data Analytics/Tracking
  - Experiential Opportunities

Each college should formulate specific ambitions and pathways to move toward their realization. Here are some that the deans and the campus leadership as a whole, embraces as worthy objectives:

- 1) Every first year student will know during their first semester the “routes” (where to go, who to speak with) on campus to receive academic and career advising.

- 2) School/Colleges are asked to identify their goal for % of students who perform an internship or career preparation practicum/experience prior to graduation, and provide plans on how to reach that goal.
- 3) School/Colleges are asked to identify their goal for increasing student satisfaction with Senior Survey items on Academic Advising and Career preparation and guidance in their major (i.e., goal of increasing by XX), and provide plans on how to reach that goal.
- 4) School/Colleges are asked to identify their goal for utilization of the EAB SSC advising tool by their advising faculty and staff.
- 5) By a certain point in time (i.e., a student's junior or senior year) the student can articulate curricular and co-curricular preparation they have received to an employer. What goals does the School/College have in supporting all of our students in how to articulate their undergraduate experience and preparation to a potential employer.
- 6) What are other goals/ambitions and pathways to get there that have been identified within the School/College in the areas of academic and career advising.

B. What types of information/data would each School/College/Department like to be able to monitor so that we can collectively hold ourselves accountable for the work being done in academic and career advising (i.e., % of students seeing an academic advisor on a semester/yearly basis, success/failure rate of early intervention programs that may be in place, student internship placement, job placement, student satisfaction, etc.)? Please identify.

*We would like to collect information on:*

- *the frequency of student contact with advisers,*
- *student placements in internships, REU's, and other extra-curricular activities related to their education*
- *success rates for interventions with at-risk students*
- *career paths of young alumni*

### **Part Three. Academic and Career Advising Action Plan**

- 1) What specific actions can you take now, within existing resources, to address the aspects you have identified in need of improvement? Identify a timeline for implementation. (see below).

The Department of Geosciences has spent much of the past academic year discussing the means of revising our undergraduate curriculum. In both of geology program and the geography program, this has involved specifically the development of tracks within the major, designed around a set of core courses followed by electives that provide areas of concentration. This “deep dive” into our learning goals and student expectations has evolved along with recognition for the need to completely retool our relationships with alumni but also with the business sector applied fields and where our students could benefit from internships and other forms of work experience.

Without any budgetary requirements, we have discussed the desire to move away from having only 3-4 specific undergraduate advisors to having the entire faculty participate equally in the mission of advising students. This would require the training of the faculty in aspects of SPIRE, general education requirements, and the like. Moreover it requires the assignment of new majors to a member of the faculty to promote a positive experience for all majors. We favor the idea of having a “hold” placed on student course enrollments to encourage students to seek those “one on one” appointments that would enhance their experience with the faculty and vice versa. Our broader goals are laid out within the framework of the new School of Earth and Sustainability.

The University of Massachusetts at Amherst has taken action to create a new School of Earth and Sustainability (SES). As discussed on the Faculty Senate proposal (Sen. Doc. No. 16-031):

“SES is a partnership within the College of Natural Sciences between the Department of Environmental Conservation (ECo), Department of Geosciences (GEO), and the Stockbridge School of Agriculture (SSA).

SES brings together a suite of undergraduate and graduate degrees that provide students with the knowledge and professional training to address the environmental challenges of the 21st century. (The School) provides students, faculty, the campus community, and the Commonwealth with a central hub for innovation, research, education, and outreach related to earth, sustainability, and environmental sciences.”

SES brings together the following undergraduate and graduate programs:

#### *Undergraduate Programs*

- Arboriculture & Community Forest Management (AS)
- Building and Construction Technology (BS, minor)
- Earth Systems (BS)
- Environmental Science (BS, minor)
- Equine Management (AS)
- Geography (BA, BS)
- Geology (BA, BS, minor)
- Landscape Contracting (AS)
- Natural Resources Conservation (BS, minor)
- Plant and Soil Science (minor)



- Plant Pathology (minor)
- Plant, Soil and Insect Sciences (BS)
- Sustainable Food and Farming (online certificate, AS, BS)
- Sustainable Horticulture (AS, BS)
- Turfgrass Science and Management (AS, BS)

### *Graduate Programs*

- Environmental Conservation (MS/PhD)
- Geography (MS)
- Geosciences (MS/PhD)
- Plant and Soil Sciences (MS)
- Sustainability Science (MS)

Career development and workforce/alumni engagement are important to the faculty and staff of the new School for Earth and Sustainability, as well as for students, alumni, parents, legislators and taxpayers. With this in mind, SES leaders have engaged in a series of actions aimed at assuring that new school devotes time and resources to the development of effective career development, workforce engagement, and alumni support services.

To launch the SES Workforce Initiative, the three partnering departments secured the services of Kevin Doyle/Green Economy to facilitate a faculty/staff discussion about workforce engagement, followed by development of a draft strategy for consideration by the people of SES.

The facilitated discussion session was held on March 4, 2016. Notes from the March 4 session can be found online at ([link URL here](#)).

Below is a brief summary of the specific short, medium and long-term actions that will be proposed in the Workforce, Employer and Alumni Engagement Strategy from Kevin Doyle/Green Economy. It its being used as a discussion document for use by SES as a whole, and by individual SES departments, undergraduate majors, and graduate programs.

### **A Vision of the Future**

Positive career outcomes for students, and effective engagement with the workforce development community, will be among the important metrics for measuring the success of the new School for Earth and Sustainability. Achieving these outcomes requires the active involvement of students, faculty, career-focused staff, employers, and alumni.

One way to think about a “vision of the future” related to career development is to imagine agreement among everyone involved on the roles and responsibilities of the different parties involved with the Workforce Initiative. To spark discussion, roles and responsibilities within one possible “vision of the future” are presented below.

*Students will:*

- Understand that s/he is ultimately responsible for his/her career decisions;
- Understand that career development is only one goal of higher education;
- Understand that effective career development usually involves a creative combination of classroom study, lab and field work, internships and jobs, team projects that connect with employer needs, job shadowing, and direct engagement with employers of interest.
- Take full advantage of career development offerings such as career fairs, alumni panels, employer guest lecturers, and field trips to employers, job search workshops, job posting services, and career advising from faculty and staff.
- With assistance from faculty and staff, create a career development vision to help guide decisions about classes to take, and skills/experience to develop with pursuing a degree through SES.
- Stay in touch with SES after graduation to receive - and offer - career development assistance.

*Faculty members will:*

- Understand that career development is an important goal for students;
- Understand that providing skillful career guidance is a faculty responsibility;
- Seek out, and share, information about available career services;
- Seek out, and use, creative ways of involving employers in the life of SES;
- Join with other faculty in incorporating internships, class projects, work experience, and other non-classroom forms of learning into the structure of degree programs.

*Administrators/Department Heads will:*

- Formally incorporate student career outcomes into SES success metrics;
- Support budgets and fundraising that pays for SES career staff and services;
- Actively seek out the counsel and advice of employers and alumni;
- Develop strong relationships with leadership of UMass Career Services;
- Support long-term tracking of alumni career outcomes and review results;
- Incorporate time spent on career advising and other career development assistance to students into metrics for faculty advancement.
- Share information, and seek out creative partnerships, with other UMass campuses and Massachusetts community colleges.

*Employers will:*

- Understand that career development is only one goal of higher education;
- Understand that internships and employer-engaged projects are instruments for learning (involving employers as co-instructors) and not just “jobs”;

- Participate creatively in the life of SES as advisors, employers, instructors, mentors and more;
- Encourage their professional and trade associations to engage with SES;
- Provide financial support for scholarships and internships, as they are able.

2) If there is a specific action or need(s) identified that can only be addressed with additional resources? Describe what you would like to do and what resources would be needed.

### **Core elements for SES career development/workforce strategy**

Under the umbrella of the new School of Earth & Sustainability (SES), we will be supplementing existing academic and career advising offered within our department with shared school services and tools that benefit all our undergraduates. SES is launching a Workforce Engagement Initiative to develop improved mechanisms for connecting with public and private employers, our alumni, and other representatives in the workforce community. This initiative is one of the cornerstones for the new school. By leveraging the professional experience of our diverse alumni and workforce contacts, we better position our students to identify internship opportunities, make meaningful professional connections, and launch their careers after graduation.

This spring and over summer 2016, SES is finalizing an engagement plan to guide workforce engagement and career development efforts. With the school launch just announced, we intend to implement a set of practical opportunities for faculty, staff and students to connect with alumni and the workforce community. Some of the potential engagement strategies may include: career fairs, alumni mentoring, career panels, class speakers, service learning projects, and professional development workshops. SES is also considering the creation of online database or career opportunities webpage to serve as a centralized information source for our students. One of our longer-term goals is to improve career preparation for students, by establishing a SES workforce and career development unit. We see this unit being essential for maintaining relationships with alumni and the workforce community, enhancing our advising services, and improving our overall student success.

To support something like the vision of the future, above, we suggest that SES invest time, energy and funding in the following core elements:

- (1) *A SES career development staff that grows to include at least two professionals and one or more student assistants.*

The proposed staff would involve one “outward focused” professional to actively encourage employers and alumni to become involved in the life of SES as guest speakers, internship and job employers, career fair exhibitors, “mentors”, Advisory Group members, and financial contributors.

The second staff person would be more “inwardly focused” on coordinating, managing (and sometimes directly providing) career services for currently enrolled students.

The professionals in this SES Career Services Office would hold the primary responsibility for the creation and management of career services and employer/alumni engagement, like those proposed in the short, medium and long-term actions detailed later in this draft strategy.

These career professionals would be paid salaries commensurate those paid to similar professionals at UMass Career Services, or within individual schools and departments at UMass Amherst.

*(2) Creation and support of an SES employer and alumni advisory group*

This group would be made up of selected executives and professionals at public and private employers that regularly hire the type of workers and professionals being educated at SES. The Advisors would meet (in person or virtually) on a regular schedule. Other similar groups meet 3 times a year.

The purpose of the group would be to provide advice to SES on issues that include: curriculum design, structure and requirements around internships and other non-classroom forms of learning, alumni career outcomes, and general engagement with employers and the workforce community.

*(3) Creation and support of an SES faculty career development working group*

This faculty group would have the primary responsibility for creating and formalizing faculty responsibilities relating to student career outcomes; and for proposing and formalizing the terms of non-classroom learning opportunities as part of overall SES curriculum design discussions.

*(4) Creation and ongoing support for alumni career outcome tracking*

Ongoing survey tracking of alumni career outcomes is an essential part of a successful career development/workforce engagement program. It provides not only the data needed to guide internal discussions and decisions regarding service offerings; but also the information that supports external requests for data to verify the value of SES education from a career enhancement point of view.

## **Proposed Action Steps**

### **A. Short term actions (6-9 months)**

- Meet with UMass Amherst Career Planning and Placement Office
- Create an SES workforce and alumni engagement working group

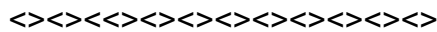
- Agree on structure and inaugural invitees for workforce advisory group
- Establish an SES-wide online portal for posting jobs and internships
- Gather existing names and contacts toward SES-wide employer database
- Create plan and budget for long-term tracking of alumni career outcomes

**B. Medium term actions (9-18 months)**

- Launch workforce advisory group with first meetings
- Plan and implement SES-wide career conference and exhibit fair
- Provide funding for an SES-wide career services support staff person
- Assist each SES school in offering a credit-earning career planning class
- Expand SES-wide online career portal to offer additional content
- Develop and launch career advising training sessions for interested faculty
- Provide training to faculty in incorporating employers as guest educators
- Launch first SES-wide survey of alumni career outcomes

**C. Long term actions (18+ months)**

- Expand SES “Career Services” to two staff, plus at least one student assistant
- Continue to build out career development online portal
- Hold annual SES-wide career conference and exhibit fair
- Expand number of students in career class and/or making “career plans”
- Institutionalize ongoing tracking of alumni career outcomes
- Hold regular meetings of Workforce Advisory Group and act on advice
- Develop and launch “mentor matching” service
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Below we have added a separate section concerning the advising of our shared Environmental science majors. This program is directed by Deb (nee Picking) Henson who does a heroic job for both ECo and Geosciences with her leadership!

## ENVIRONMENTAL SCIENCE ACADEMIC & CAREER ADVISING

This document provides a focused look at the Environmental Science program, which is co-administered by the Department of Environmental Conservation (ECo), the Department of Geosciences (GEO), and the Stockbridge School of Agriculture (SSA). It serves as an addendum to each of the department’s individual plans.

### Part I. Analysis of the Current Landscape

The Environmental Science (ENVSCI) major at the University of Massachusetts is an interdepartmental program administered by ECo, GEO, and SSA under the banner of the new School of Earth & Sustainability.

The partnering units share the responsibilities to provide faculty-centered advising. In addition, ENVSCI also has the support of a faculty program manager to oversee the administration of the major, coordinate across departments and faculty advisors, and provide overarching support and guidance to ENVSCI students.

### **Program Background**

In 2012, there was a major restructuring of ENVSCI program, which included its redesign as a truly interdepartmental program with a faculty program manager to coordinate academic advising and course offerings. Concurrent with this redesign, specific concentration areas (in policy, biology, and toxicology) were eliminated in favor of an approach that helps guide students towards identifying possible career directions and planning their course work and co-curricular activities accordingly. Critical to the success of this plan are three mandatory seminar classes (each 1 credit) which were put in place to provide a strong centralized advising component for all students in the major across their first two years in the program. Major requirements were also modified to include two “praxes,” or practical experiences for each student prior to graduation. More detail is provided in later sections about these changes.

These changes were first implemented in Fall 2012 and the improvements to our student experience are starting to be reflected in the UMass Senior Survey results. The upcoming class of 2016 will be our first crop of students who entered as incoming freshmen under the new program organization. The 2015 results include a large percentage of students who entered the major as sophomores or juniors (both internal and external transfers), and you can see that the results of that survey were higher than previous years.

### **Career Avenues and Options**

The needs of our students shape our approach to academic and career advising. A large proportion of graduating seniors in ENVSCI plan to enter the job market after graduation (Table 1), while approximately one quarter will head directly to graduate school. However, the number of students planning to pursue graduate work within the next five years is roughly equivalent to those who will do so immediately. So we aim to provide students with a firm foundation for this possible pathway. Consequently, our advising is designed to meet the dual demands of the workforce needs of employers (in both private and public sectors), while providing our students with the advice and training to continue their education via graduate school if they so choose.

Recent Environmental Science graduates have enrolled in graduate programs as varied as conservation biology, hydrogeology, environmental soil science, wetland science, environmental chemistry, ecotoxicology, environmental policy, and law.

The career outcomes from ENVSCI are as varied as the major itself, but several possible employment tracks are emphasized to students: private-sector environmental consulting, environmental regulation (state and federal levels); and non-governmental environmental organizations.

<b>Unit</b>	<b>Full-time employment</b>	<b>Part-time employment</b>	<b>Graduate or prof school</b>	<b>Volunteer</b>
ENVSCI	69%	7.1%	21.4%	0%
CNS	53%	10%	31%	2%
Campus	65%	9%	21%	1%

Table 1. Post graduation plans of ENVSCI graduating seniors compared to CNS and campus wide undergraduate students. Source: 2015 UMass senior survey data.

## **Environmental Science: Undergraduate Education**

UMass Amherst's Environmental Science Program is an interdisciplinary academic program, providing students with training in biological/ecological and geophysical sciences. The curriculum includes innovative course offerings that extend the traditional classroom experience to outreach activities including environmental applications and problem solving in off-campus community settings. As part of the undergraduate training, ENVSCI majors also enroll in special seminars tailored to assist with curriculum planning and career development. Students benefit from a program manager and an interdisciplinary team of faculty committed to their long-term success.

Currently, we have approximately 260 students in the Environmental Science major.

### First-year seminars

All entering students (regardless of status) must enroll in an ENVSCI seminar with the Program Manager, who also serves as the Chief Undergraduate Advisor (CUA). (ENVIRSCI 191A in Fall, and 194A in Spring). Students take both seminars regardless of which term they enter. The first-year seminar series is designed for students in their "first-year" in the major –regardless of how many credits they may have already earned.

The Fall seminar (ENVIRSCI 191A) is designed as a coordinated group advising session that meets for one hour weekly with the CUA. Guest speakers are invited from across campus to introduce students to the many programs and opportunities available to them, including: International Programs, Domestic Exchange and Five-College Interchange, Interdisciplinary Concentration in Science (iCons), Career Services-and Career Connect, Library Services, Center for Counseling and Psychological Health, etc. When it is time for preregistration for the coming semester, the CUA reviews major requirements, how to read the SPIRE Academic Requirements Report (ARR), and how best to sequence required classes. This presentation is timed to occur just before registration actually begins when students will be meeting with their individual faculty advisors.

The fall first-year seminar also includes a "Kick-off Celebration" which brings together students and program faculty for a festive event (held in the Student Union Ballroom), with refreshments, faculty introductions, and a guided dialogue about a pertinent environmental issue. All students in the major are invited, but the event is purposely scheduled to take place during the class period for the first-year seminar class to ensure that these students will be in attendance.

**(In a typical fall semester, this class will include nearly 40% of the 260+/- students in the major.)**

The Spring seminar (ENVIRSCI 194A) is subtitled, "Flavors of Environmental Science." Each week a different ENVSCI faculty member presents his/her research to the class. Students learn about cutting-edge science and are encouraged to think about whether they want to take upper-level electives about that topic, and students are encouraged to speak to the individual faculty about possible research positions. Faculty are drawn from the three departments in the new School of Earth and Sustainability, as well as Environmental Health Sciences and Environmental Engineering. The CUA reserves one class period to discuss preregistration planning.

### Curriculum & Career Planning Seminar

A second spring seminar is targeted for sophomores (although many students take this as juniors –if it is their first year in the major). This class (ENVIRSCI 294A) is entitled, "Career and Curriculum Planning." This class is designed to help students plan and organize their remaining time at UMASS Amherst – based on their intended career focus.

The seminar introduces students to:

- the availability of various related Minors and Certificates,
- 5th year Masters and other Professional Masters degrees offered by UMASS Amherst.
- Finding REU and other research opportunities,
- Strategies for research oriented graduate programs
- Study exchange opportunities. The CUA organizes a study exchange student panel where upper classmen in ENVSCI each give a short presentation regarding their international or domestic exchange experience.
- Career Services and Career Connect. Nessim Watson is invited to talk about “Resume Writing” and “Using Social Media for Networking.”
- Possible career directions, with guest speakers from the private environmental consulting sector, State and/or Federal Environmental Regulatory agencies, and non-governmental conservation organizations. (UMASS/program alumni are invited whenever possible.)

Students are tasked with developing a curriculum plan for their remaining undergraduate time at UMASS, clearly indicating their remaining requirements and how they are going to fill them, term by term. Just prior to preregistration time, the CUA makes a presentation regarding major requirements, reading the ARR, available IE courses, etc. Students are prepped for meeting with their individual faculty advisors.

If one considers the combined population of majors enrolled in one or both of these spring seminars (ENVIRSCI 194A and/or 294A), the **CUA is meeting with roughly 50-55% of the students presently declared in the major on a weekly basis.**

## Current Academic & Career Advising Strategies in ENVSCI

### Faculty-Centered Advising

The Environmental Science program provides faculty-centered advising in which every student is assigned to an individual faculty advisor, who is based in one of the three partnering departments. Students are matched by the CUA with faculty advisors according to their stated interests as expressed during NSO or at an intake advising meeting. Our goal is to have every incoming student meet with the CUA as they enter the major. The only exception we find is those students who declare the major during summer NSO and are initially advised by another program.

### Addressing the Needs of Different Populations

#### **Freshmen Orientation:**

The CUA meets with each group of entering ENVSCI students during summer NSO. The CUA gives a Powerpoint presentation highlighting the major with respect to its requirements, common career outcomes, research and internship opportunities, and includes a discussion of the basic advising structure and an introduction to unique academic opportunities (such as international and domestic exchange, and iCons). Students are asked about any specific goals or interests they may have so that they can be better matched with faculty advisors in the program.

Involuntary majors (whose first choice was Engineering, Computer Science, or ISOM) are advised by the CUA, who helps guide them until they are able to officially enter the major of their choice. In some cases, students decide to stay in the ENVSCI major even though it wasn't their first choice.



**External Transfers:**

The CUA meets with each student during transfer NSO (in either January or July). Each student's Transfer Credit Evaluation report is evaluated with respect to major requirements, and students are immediately advised regarding the length of time needed to graduate from the university under the ENVSCI program requirements. Preliminary course plans are sketched out for each student indicating where required course work must be taken and where room for electives exists.

**Internal Transfer Students (Change of Majors):**

The CUA meets with each incoming student before that student's change of major is processed. Initial meetings are approximately 30 minutes in length. Each student's SPIRE ARR is reviewed for course history and status of GenEd requirements. A preliminary course plan is developed for each student—showing where required course work must be taken and where electives can fit. Students are asked about their interest in study exchange (IP and NSE). Notes are made regarding the likely “best” semester for this exchange to occur. The student is given a copy of the course plan and a copy is made for the student's future faculty advisor. Students are asked about specific interests within the major/field. This allows CUA to match students with faculty advisors who have expertise in these areas.

**Overall Advising Framework**

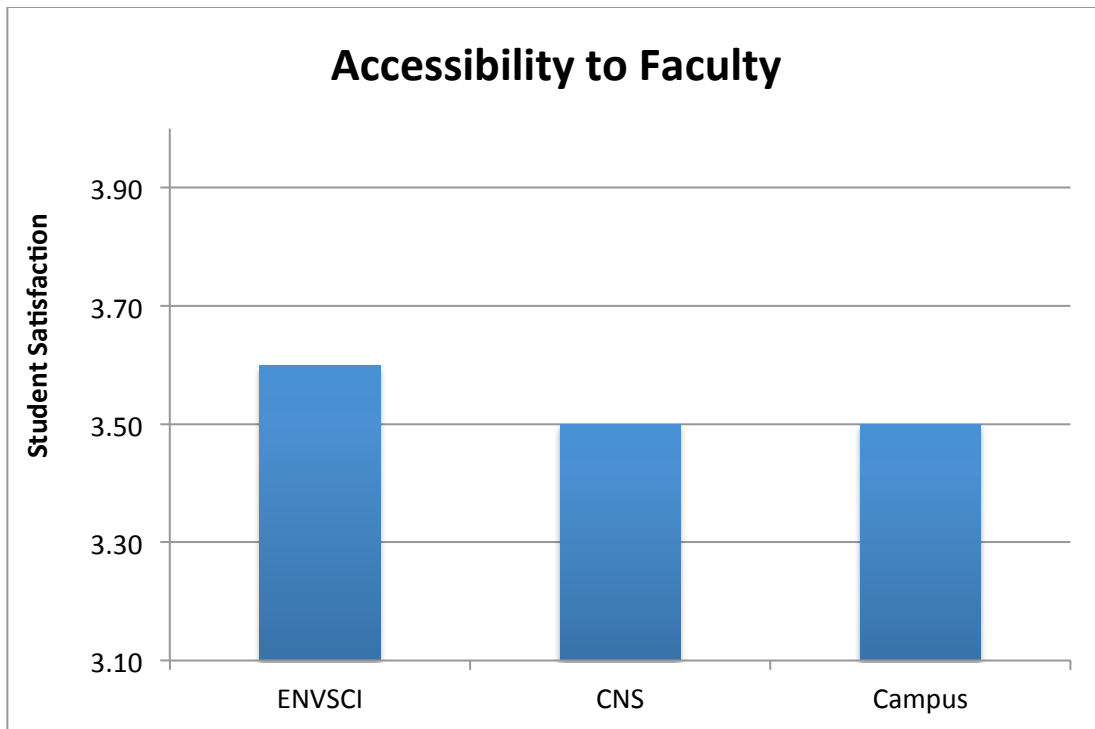
- Each student is assigned an individual faculty advisor.
- In addition to faculty advisors, the ENVSCI program has a dedicated faculty program manager, who coordinates across the three departments, is available to meet and advise current students, and serves as the primary contact for new students, transfers and change of majors.
- Registration holds are placed on all students (primary majors only per university standard), requiring that each student meet with his/her faculty advisor at least once a semester.
- Beyond the registration periods, ENVSCI faculty advisors remain readily available to meet with their advisees and other students throughout the year for academic and career advising, and students are encouraged to access their advisors whenever they need assistance.
- The CUA provides current advising materials to the faculty advisors via a Moodle site, including but not limited to:
  - checklist of major requirements, updates on course availability (for all required classes and popular electives), a schedule grid showing times of class meetings for all required classes and popular electives, a list of popular electives offered by a variety of related programs,
  - a primer on ‘advising best practices’ and ‘strategies for advising’, and a section on frequently asked questions dealing with academic regulations and policies.
- The CUA also offers faculty advising workshops each Fall, with at least two offerings of the material.
- There are three separate, required, 1-credit seminars in the major—taught by the CUA. All have a significant advising component.

- The CUA communicates with students via email to remind them of important academic deadlines.

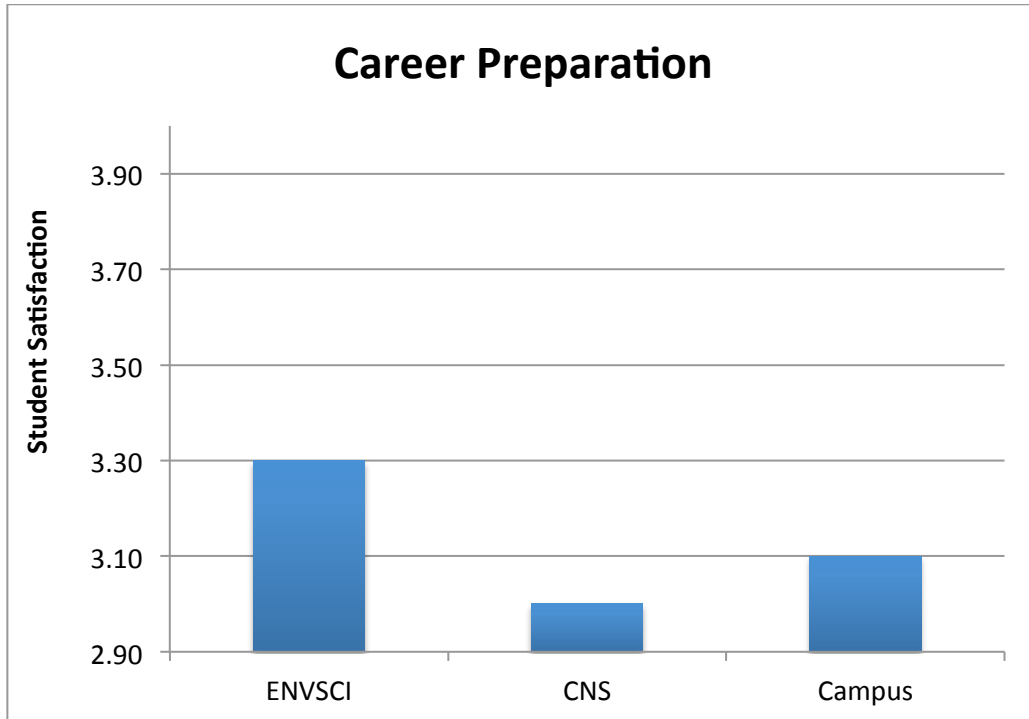
## How Are We Doing in Academic & Career Advising?

Based on the 2015 UMass senior survey data, ENVSCI is doing a very effective job of meeting the academic and career advising needs and expectations of our students, exceeding the average for all CNS units as well as the UMass campus.

- ENVSCI provides our majors with very high faculty accessibility (3.6/4), illustrating our strong commitment to our majors.

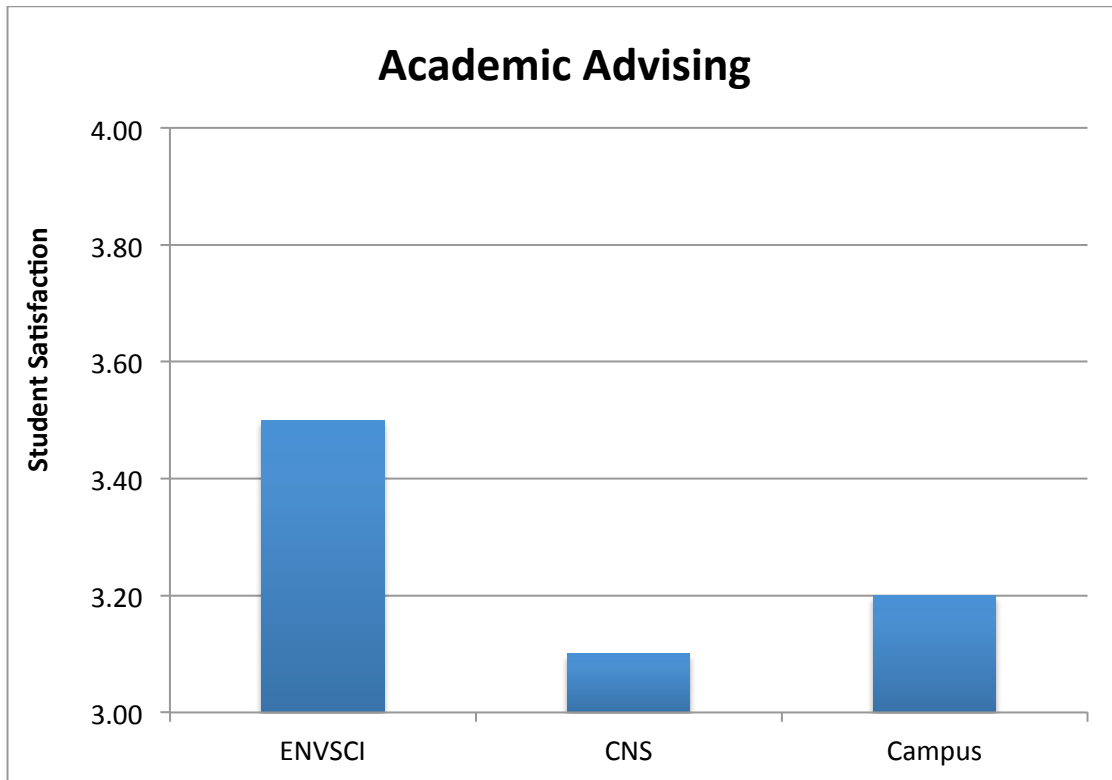


- For career preparation and guidance, ENVSCI majors indicated a moderately high level (3.3/4) of satisfaction in comparison to other CNS units and the campus. Breaking down these data, 50% of ENVSCI students responded that they were Very Satisfied (4/4), with 26% Somewhat Satisfied, and 24% Somewhat Dissatisfied.



- ENVSCI majors reflect higher student satisfaction in academic advising relative to other CNS units and the campus.

It is notable that when these data are broken down, more than 71% of students indicated that they were Very Satisfied (4/4), 14% were Somewhat Satisfied (3/4), and 12% were Somewhat Dissatisfied (2/4).



## Division of Labor/Usage of Personnel

Faculty advisors are drawn from the three partnering departments. There are presently thirty (30) ENVSCI faculty advisors, with varied roles and job descriptions. Most are tenured faculty, others pre-tenure faculty, others extension faculty, and lecturers. The ENVSCI Program Manager and CUA is also a faculty lecturer. The Program Manager has the highest advising load compared to other faculty with upwards of 60 students, whereas the typical advising load for other faculty ranges between 5-20 students (depending on individual departmental culture). ENVSCI does not have dedicated professional advising staff or peer advisors, but we are exploring the possibility of this supplemental support system.

## Data Analytics/Tracking

With our faculty-centered advising, every student is tracked by their individual advisor for academic progress, with particular focus on GPA and progress toward degree completion (using the ARR). Virtually, 100% of our students meet with their faculty advisor at a minimum of twice per year during pre-registration periods. In addition, the CUA provides over-arching tracking of student progress using the EAB Student Success

Collaborative (SSC). Various campaigns are run by the CUA and students are targeted for specific outreach activities throughout the semester.

### **EAB SSC Campaigns**

After grades are finalized each semester, the CUA uses SSC to identify students who have performed poorly in sequential required coursework (namely, BIOL 151, CHEM 111, and MATH 127). These students are emailed regarding the need to re-enroll in these courses for the following term, and individual faculty advisors are copied on this correspondence. If a student is identified who has performed poorly in more than one course, the student is invited in for a meeting to discuss the situation so that an assessment can be made about the likelihood of success upon repeating the course(s). Where appropriate, the CUA introduces the possibility of changing majors –and the students are given specific guidance regarding other possible programs and how their requirements and career outcomes compare/relate to the ENVSCI program.

SSC is also used to track whether students have registered for the proper ENVSCI seminar courses in the appropriate semester. Students who are “missing” these classes are contacted via email and told to register for the appropriate course (or to contact the CUA for a further discussion regarding specific circumstances).

At mid-semester times, additional campaigns are run to identify the “murky middle” of students with low (but still “in good standing” GPAs). These students are not always contacted (because they will be seeing their faculty advisor during preregistration), but a closer look is taken by the CUA to evaluate whether there has been any downward trend, and sometimes a recommendation is made simply to repeat a class in order to raise their GPA (or to request a repeat course substitution –when appropriate).

### **SPIRE ARR & Query Tool**

The Academic Requirement report (ARR) is treated as a “contract” with each student, and we strive to maintain its accuracy. The ARR is used to “clear” students for graduation. The CUA regularly processes ARR exceptions when needed to accept unique transfer credits or exchange courses towards major requirements. Student are encouraged to review their ARR with their faculty advisor and to alert the CUA of any suspected omissions or errors to the report.

The SPIRE Query Tool is used by the CUA to determine if all ENVSCI seniors have satisfied their Integrative Experience (IE) requirement prior to their last semester of expected enrollment. Students are contacted as needed to assure that graduation requirements are being met “on time.”

## **Experiential Opportunities**

### **Research and Internship Emphasis**

Research and internship opportunities are highly valued and this is stressed to the students starting with their initial NSO meeting and through the three required seminars.

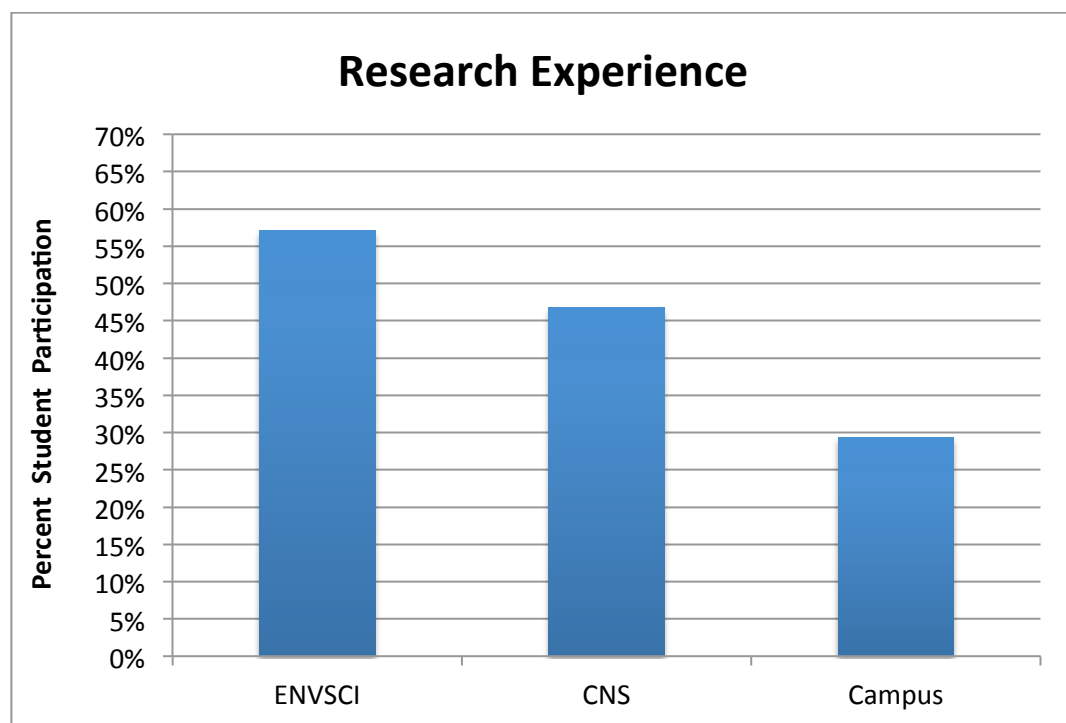
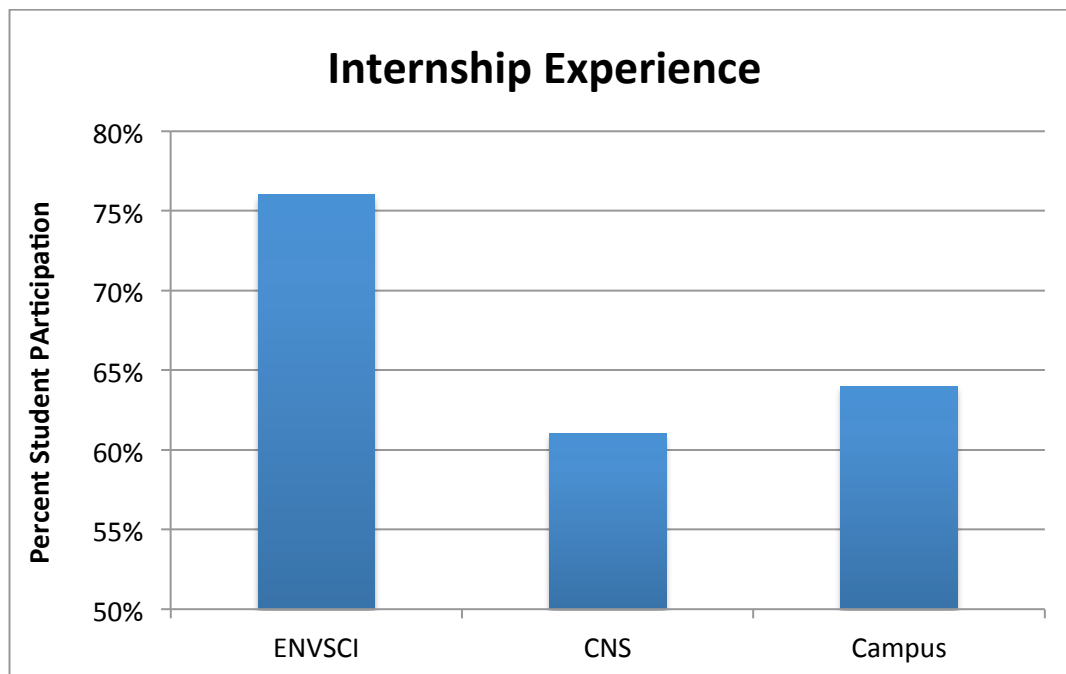
Starting in Fall 2012, ENVSCI students are required to complete two “praxes” – and these can be filled with either research or internship credits, or with specific courses that include a significant skills component (such as geographic information systems, environmental site assessment, plant identification, hazardous waste operations -OSHA 40-hour certification, etc.)

We recognize that our curriculum cannot provide all of the professional experiences our students need to be most competitive in the job market, so we strongly encourage and facilitate our students obtain additional experiences during the summer via internships and pre-professional summer employment. We stress the value of related volunteer experience (dove-tailed with other summer employment), when paid internships are not possible. Students are not typically encouraged to take summer classes (unless this is what is needed for timely graduation), but when this is appropriate, we encourage students to choose on-line classes that can be completed concurrent with an internship experience.

We also work hard to provide our students with opportunities to gain research experiences. There are multiple opportunities for gaining these research experiences, including:

- Working with individual faculty or graduate students on their research projects via independent studies, practica, and Honors projects. Each semester the ENVIRSCI CUA queries faculty and post-docs from across the three cooperating departments and compiles a list of available undergraduate research opportunities. This list is circulated via email to our ENVSCI students at the start of each semester and prior to summer as well. The list is then published on the program website. An average of two dozen or more opportunities are typically available in any semester.
- ENVSCI faculty also participate in the new CAFE Summer Scholars program. Beginning in summer 2016, the Center for Agriculture, Food & the Environment will offer upwards of 26 summer scholarships for undergraduate students to work with faculty with active MA Experiment Station Projects and UMass Extension Initiatives.
- Faculty also work with students in developing honors theses in conjunction with iCons, Commonwealth Honors College, and research experiences with NSF Research Experiences for Undergraduates (REU) programs.
- Individual faculty in ECO and GEO also circulate announcements of external internships, REUs or other opportunities as they become aware of them through their own professional networks.
- Due to the highly interdisciplinary nature of the major, many ENVSCI students also find research projects with faculty outside our immediate program (including Micro, Biology, VASCI, and Biochemistry).

Based upon 2015 UMass senior survey data, most of our majors gain valuable out-of-classroom experience through internships and other field-related experiences or research opportunities with a faculty member. Over 75% of ENVSCI majors participated in some kind of internship opportunity during their time at UMass, and more than 57% of ENVSCI majors completed a research experience. Both of these metrics well exceed the average for all CNS units as well as the campus.



#### Study Exchange Emphasis

The number of ENVSCI students participating in study exchange (domestic and international) is growing. Student exchange is highlighted in both the fall first-year seminar and the spring sophomore career and curriculum planning class. The CUA has worked extensively with UMASS International Programs on a Curriculum Integration project which preapproved over two dozen international sites and their course offerings for ENVSCI majors. Consequently, ENVSCI has its own Study Abroad literature and advertising for our students (and prospective students).

The 2015 Senior Survey reports that 14% of the ENVSCI respondents completed an International Exchange, and it is noteworthy that nearly this many students also completed a domestic exchange through the National Student Exchange (NSE), going to locales such as Hawaii and Montana. NSE experiences are promoted as a cost-effective solution for (in-state) students wishing to study in a different geographic region with a different climate and/or ecosystem to study. While these exchanges do not constitute international experiences, they do place students in very different cultural and academic settings that increase their professional skill sets. Unfortunately, the Senior Survey does not track NSE data.

## Communication

We invest greatly in our communication strategies, working with students in curriculum and career planning, including:

- Faculty-centered advising, in which every student is assigned a major advisor and must meet with every semester to pre-register for classes;
- Three, required seminars that provide students with weekly interactions with program manager/CUA – with approximately half the total major population enrolled in one of the three seminars in any given semester;
- Readily accessible printed and on-line materials on program requirements, major, learning goals, and career opportunities;
- Regular email communications from CUA alerting students to key deadlines, advising, courses, and campus events;
- Regular email circulation of available undergraduate research/field and scholarship opportunities;
- Current Academic Requirement Reports (ARR), so that students have ready access to their academic status and requirements;

## School of Earth & Sustainability

In partnership with the Department of Geosciences and Stockbridge School of Agriculture, ECo is launching a new School of Earth & Sustainability (SES) that joins together and unifies academic programs, research and outreach at UMass Amherst that share a common focus on earth, sustainability, and environmental sciences. Through the new school, the partnering departments are better positioned to promote transdisciplinary innovation, educational training, advising, student leadership, cross-campus collaboration, development, and engagement with diverse partners. One of the first initiatives of SES is development of a SES Workforce Engagement Initiative that will provide shared services focused on career development and workforce engagement, greatly enhancing undergraduate support and advising for undergraduates across all three departments.

## Part II. Goals for Academic and Career Advising and the Student Experience

On a whole, we are very proud of our commitment to high-quality undergraduate education. Through the curriculum, student support services, our undergraduates emerge from UMass Amherst well equipped to secure a meaningful professional position or go on to pursue an advanced degree. We also recognize areas of improvement and opportunity.

### Overarching Goals

Similar to goals set by other programs in SES, the general goals we have for the ENVSCI program include:



- Continue our long-standing commitment to faculty-centered advising in which 100% of our majors are assigned a faculty major advisor who guides their curricular and career planning.
- Under the new School of Earth & Sustainability, augment existing advising with shared services focused on career development and workforce engagement.
- Further improve our students' overall satisfaction in their major.
- Maintain sufficient access and availability to core required courses, and improve access to popular electives that are experiencing capacity and/or enrollment issues.
- Continue to grow the percentage of our students obtaining out-of-classroom, hands-on experiences via internships and research experiences with faculty. The goal is for 80-85% of our students to engage in out-of-classroom experiences.
- Increase the percentage of our students participating in enriching experiences such as the Honors Program, iCons, Eco-Rep, Sustainability Fellows, etc.
- Identify meaningful, practicable opportunities to nurture a sense of community among our students, faculty, and staff.

### Academic & Career Advising

There are also specific goals targeted to improve academic and career advising, and our students' overall preparedness for graduation and beyond.

- Understand what are the essential functions of department-level or major program advisors and identify how the new School of Earth & Sustainability can provide some overarching support and services to students and faculty.
- Develop and implement a SES career development and workforce engagement plan that includes strategies for building support internally, developing a framework, and providing a range of opportunities for engaging with the workforce.
- Work with students to understand that they are ultimately responsible for their education and career decisions. Supported by advising sessions, students plan how to tailor their undergraduate experience to combine classroom study, lab and fieldwork, internships, team projects, and service learning projects to enhance their career development.
- Expand work with faculty to share best practices for advising and aid them in providing skillful career guidance.
- Continue to work with students, individually and as a community of learners, to review degree requirements, monitor their progress, and find courses that align with their interests and career goals. Currently, this is provided by individual advising sessions with faculty advisors and through required career seminars. We envision providing other opportunities for students to gain access to academic and career planning support (e.g., advising seminars and workshops, peer advising, career panels, etc.)..
- Build stronger relationships with UMass Career Services and specifically the CNS Career Advisors.
- Increase student awareness of various experiential opportunities they can engage in during their time at UMass.

### Support & Tools

In order to enhance student support, ENVSCI and its partners need to clearly understand goals and priorities, identify roles/responsibilities, compile data and develop metrics for success, and implement priority actions.

- Within the SES career development and workforce engagement plan, identify roles and responsibilities. The plan should include what we can do now with existing resources and what can be done with additional funding and staff.
- Within each program, consider how to streamline advising and maximize the use of faculty time.
- Develop career-focused surveys for: 1) graduating seniors and 2) alumni. The intent of these surveys is to supplement existing data and provide a broader base of understanding regarding our alumni career outcomes. Ongoing survey tracking alumni is an important part of our plan to enhance student support.
- Find ways to stay connected with graduates (e.g., LinkedIn, UMass affinity groups)
- Develop schedule for assessing the best readily available data, summarizing it, and refining our approach. Additional information we would like to have:
  - Current students: assessment of advising sessions, what additional information/support/tools do they need, retention rate of majors, and how career development factors into their curriculum planning.
  - Alumni: job placement/satisfaction over the longer term (e.g., 3, 5, 10 years out), continuing education needs, and feedback on how we can improve the undergraduate experience.
- Consider developing additional metrics for success under the new School of Earth & Sustainability.

## Part III. Academic and Career Advising Action Plan

To achieve the goals outlined above, we've identified a number of actions. Some of these are achievable now, in the short-term, with existing resources; others are actions to consider over the next couple of years depending on resources and staffing. These actions are aimed at: SES, the ENVSCI program, faculty, students, and alumni/workforce contacts. Note: some of the goals and associated actions will be addressed by the individual program, jointly through SES, or in combination.

### Short-term actions (with existing resources)

#### *School of Earth & Sustainability*

- Prepare the SES Workforce, Employer, and Alumni Engagement Plan. Solicit faculty and advisor input.
- Convene an SES faculty career development work group
- Share “best practices” for advising
- Pool together online resources related to career development, job search engines, and student engagement events (e.g., conferences)
- Meet with the UMass Amherst Career Planning and Placement Office
- Develop a SES alumni and employer database
- Create a plan and budget for alumni engagement and career tracking
- Develop a comprehensive, systematic approach to marketing and communications to maximize our reach to prospective students, especially high school seniors, transfer students (especially from community colleges), and undecided majors within the university.
- Create and support an SES workforce and alumni advisory group

#### *ENVSCI Program / Faculty / Students*

- Develop program-based strategies for increasing contact with students post-graduation to build alumnae support, provide a mechanism to better track career success (e.g., job placement), and an opportunity to learn from graduates how to improve our curricula for career preparation.
- Expand work with faculty to disseminate “best practices” advising guidelines to provide consistent, effective advising practices across all faculty.
- Increase the cultural awareness for ENVSCI students to “prepare” for each of their faculty advising sessions. Students enrolled in the required seminar classes are already tasked with developing a course plan and articulating their career goals and how they plan to approach professional development while in school, and then discussing this with their faculty advisor.
- Better articulation to students that “Advising” in ENVSCI consists of all the components discussed in this document –and not simply the half hour each semester that they spend with their assigned faculty advisor.
- Construct a page on the program website that explains how advising is organized in the program –so that it is evident to current and prospective students (and parents).

- Better utilize electronic calendars and appointment tools in the CUA office, to facilitate and manage the 25-30 half-hour appointments that are scheduled each week during the month of preregistration advising that occurs each Fall and Spring.
- Create LinkedIn presence to better communicate and track program alumni.

**Mid- and long-term actions (some require additional resources)**

*School of Earth & Sustainability*

- Hire an engagement specialist, who will help to establish a peer advising centers and a comprehensive framework for disseminating internship and job opportunities.
  - ↳ Long-term action: Expand the SES “Career Services Office” to two full-time staff members with at least one student assistant
- Launch workforce advisory group
- Plan and implement SES-wide career conference and exhibit fair
- Develop SES-wide online portal for posting jobs and internships
- Develop and launch career advising training sessions for interested faculty
- Host career development workshops for students (e.g., internship search process, resume and cover letter writing, etc.)
- Launch SES-wide survey of alumni career outcomes and maintain ongoing tracking
- Expand the number of students enrolled in curriculum and career planning courses and the number making a “career development plan”