The University of North Carolina Systemwide Professional Science Master’s Program

Progress Report
January 2009 – December 2011

Appalachian State University
East Carolina University
Elizabeth City State University
Fayetteville State University
NC A&T State University
NC Central University
NC State University
UNC Asheville
UNC Chapel Hill
UNC Charlotte
UNC Greensboro
UNC Pembroke
UNC Wilmington
UNC School of the Arts
Western Carolina University
Winston-Salem State University
NC School of Science and Mathematics
Greetings From the UNC System PSM Director

The Professional Science Master’s (PSM) Program is one of the University of North Carolina (UNC) System’s ways to close the existing skills gap in the workplace. Together with local employers, we design graduate education and training regimens to match employers’ needs. The UNC System has undertaken a collaborative effort to develop these new programs in key areas of importance to North Carolina’s local economies.

I am pleased to report that 16 PSM programs (plus two concentrations) are now offered. Two of these programs are pending PSM affiliation. Many new programs are at various planning stages, and numerous central resources and services are available or under way for these programs.

A special milestone in 2010 was the establishment of the UNC System PSM Operations Group. Members of this group include deans and faculty from all the UNC campuses that currently offer PSM programs or are planning to offer them in the future. The UNC System PSM Operations Group plans the future strategy for the PSM programs in North Carolina. At NC State University the PSM Council was formed. This group develops innovative methods for all UNC campuses and assists with universitywide PSM planning. Another important milestone was the award of a new UNC System grant from the Alfred P. Sloan Foundation and support from the UNC General Administration for multiple online tools.

I am greatly indebted to the many employers, deans, professors and students who contribute to the collective success of the UNC System’s PSM Program. Other premier universities in North Carolina are now joining the UNC PSM effort. Together, we will continue to create interdisciplinary education and fuel both important cultural changes within the universities and economic growth in North Carolina.

Lisbeth Borbye, PhD
Assistant Dean for Professional Education
Director of the UNC System PSM Program

Kristen Rice-Gira
PSM Coordinator
THANK YOU to the professionals affiliated with more than 190 companies, government agencies and nonprofit organizations who have contributed to the success of the UNC System PSM programs

NC State University is dedicated to equality of opportunity. The University does not condone discrimination against students, employees, or applicants in any form. NC State commits itself to positive action to secure equal opportunity regardless of race, color, creed, national origin, religion, sex, age, or disability. In addition, NC State welcomes all persons without regard to sexual orientation. 1,200 copies of this public document were printed at a cost of $2.04 per copy.
# Table of Contents

Introduction ...................................................................................................................................6  
   a. The Professional Science Master’s  
   b. The Importance of PSM Programs  
   c. The University of North Carolina Systemwide PSM Program  

Academic PSM Planning for North Carolina: A Geographical Tool .........................7  

Current PSM Program Landscape in North Carolina .....................................................8  

UNC Systemwide PSM Operations Group ...................................................................9  
   a. Monthly Phone Conferences  
   b. PSM Training Sessions  
   c. Annual Meeting With Key Employers  

UNC System Grant From the Alfred P. Sloan Foundation and Other PSM Grants .........10  
   a. Funding for the UNC Systemwide PSM Program  
   b. Funding for Individual PSMs  

UNC System PSM Portal ....................................................................................................11  
   a. Website  
   b. PSM Program Data Management  
   c. Progress Report  
   d. Program Catalog  
   e. Employer and Alumni Testimonials  
   f. Student Online Portfolio  

PSM Program Sustainability Model .............................................................................13  

Educational Materials for PSM Directors and Students ..........................................14  
   a. Guidance for Starting and Managing a PSM Program  
   b. Essential Professional Skills  
   c. Employer Alliances and Projects  
   d. Teaching and Assessing Essential Professional Skills  
   e. Sustainable Innovation  

Workshops on Demand for Deans, Professors and Students .......................................16  
   a. How to Start a PSM Program  
   b. Creating Alliances and Educational Projects With Industry Partners  
   c. Improving Performance Through Professional Self-Awareness and Self-Care  

Online Mentoring Program .........................................................................................17  

Interdisciplinary Internship Placement ......................................................................18  

Professional Skills Certificate ......................................................................................18  

Web-Based Assessment of Professional Skills ..........................................................19  

National and International PSM Outreach .................................................................20  

News Highlights ..........................................................................................................21  

Recent PSM Publications ............................................................................................22  

Opportunities for Interaction With the UNC Systemwide PSM Program ....................23
Introduction

The Professional Science Master’s

Professional Science Master’s (PSM) programs are graduate degree programs that provide interdisciplinary coursework in the natural sciences, technology, engineering, mathematics and/or computational sciences in combination with professional trade-specific management training essential for careers in industry, government or nonprofit organizations. Students and faculty in PSM programs typically enjoy a high level of interaction with working professionals through courses, projects, internships and networking opportunities.

The Importance of PSM Programs

PSM programs make a positive impact on the economy; graduates have relevant and globally oriented workforce training. PSM programs create alliances among students, educators, employers and society and offer significant value to all involved. The dynamic interface between working professionals and university faculty creates the opportunity to readily respond to employers’ needs.

The University of North Carolina Systemwide PSM Program

Many of the 16 universities are currently developing and implementing PSM programs as part of “UNC Tomorrow,” the strategic plan for the University of North Carolina (UNC) System. The UNC System PSM programs interact with more than 190 professionals from local and international companies, government agencies and nonprofit organizations. The UNC System PSM director (located at NC State University) offers multiple services to these UNC campuses and provides statewide and national outreach. One of the goals is to develop and implement a need-based plan for establishing individually competitive PSM programs while also ensuring coordination of campus and geographic resources for statewide economic gain.

The PSM Program offers economic and educational benefits to the following groups:

Employers

• Co-create graduate education to meet their needs
• Gain access to university resources and out-of-the-box student expertise
• Interact with potential future employees (and hire the best of them)

UNC System Faculty and Staff

• Gain access to employer networks and resources
• Offer employment-relevant education for students choosing careers outside the university environment (approximately 80 percent of graduates)
• Fulfill part of the University of North Carolina’s mission

Students

• Gain competitive, employment-relevant education and employer networks
• Learn essential professional skills and the newest technology
• Increase likelihood of obtaining employment

Society

• Gains the economic benefits of an employment-ready workforce
A Web-based academic strategic planning tool has been developed by the Geospatial Information Science and Technology PSM program at North Carolina State University. The tool features interactive mapping of North Carolina’s potential for PSM development by visualizing where PSMs can connect to industry clusters, individual companies, nonprofits and government entities as well as individual UNC campus strengths and existing PSM programs. The intent is to ensure that academic planning is well-coordinated, all relevant industries have access to PSM programs, duplicate efforts are avoided, and resources are shared in an equitable and effective manner. The following example shows some of the information needs that the interactive map can satisfy.

Typical queries for a UNC administrator may be:

- Which universities have PSM programs, and how many of each kind are needed?
- What does the local graduate market base look like, i.e., bachelors within a given field, and where is it sufficient to support a new graduate program?
- Where are the areas of high unemployment/poverty that could benefit from a PSM program?

Typical queries for a PSM director:

- Do other universities have this program and/or faculty/strengths within the field?
- Where are the relevant companies, and are there other organizations that support this field?
# Current PSM Program Landscape in North Carolina

<table>
<thead>
<tr>
<th>University</th>
<th>Program</th>
<th>Program Status*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appalachian State University</td>
<td>Engineering Physics (Instrumentation and Automation concentration)</td>
<td>Active</td>
</tr>
<tr>
<td>Appalachian State University</td>
<td>Engineering Physics (Nanoscience for Advanced Materials concentration)</td>
<td>Active</td>
</tr>
<tr>
<td>Appalachian State University</td>
<td>Nutrition and Food Systems</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>Appalachian State University</td>
<td>Environmental Science and Hazard Mitigation</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>Appalachian State University</td>
<td>Entrepreneurial Information Technology</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>East Carolina University</td>
<td>Health Physics</td>
<td>Planning Phase</td>
</tr>
<tr>
<td>East Carolina University</td>
<td>Medical Physics</td>
<td>Planning Phase</td>
</tr>
<tr>
<td>Elizabeth City State University</td>
<td>Applied Mathematics</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>Meredith College**</td>
<td>Health Informatics</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>Meredith College**</td>
<td>Clinical Research</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>North Carolina A&amp;T</td>
<td>Energy Systems</td>
<td>Planning Phase</td>
</tr>
<tr>
<td>North Carolina A&amp;T and University of North Carolina at Greensboro (Joint School of Nanoscience and Nanoengineering)</td>
<td>Nanoscience</td>
<td>Active</td>
</tr>
<tr>
<td>North Carolina Central University</td>
<td>Pharmaceutical and Chemistry Sciences</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Financial Mathematics</td>
<td>Active</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Microbial Biotechnology</td>
<td>Active</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Geospatial Information Science and Technology</td>
<td>Active</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Analytics</td>
<td>Active</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Biomanufacturing</td>
<td>Active</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Nutrition (Human Nutrition concentration)</td>
<td>Active</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Nutrition (Feed Science concentration)</td>
<td>Active</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Electric Power Systems Engineering</td>
<td>Active</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Environmental Assessment</td>
<td>Active</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Crop Management and Improvement</td>
<td>Coming Soon</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Advanced Medical Technologies</td>
<td>Planning Phase</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Computer Networking</td>
<td>Coming Soon</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Computer Gaming</td>
<td>Planning Phase</td>
</tr>
<tr>
<td>North Carolina State University</td>
<td>Forensic Science and Engineering</td>
<td>Planning Phase</td>
</tr>
<tr>
<td>North Carolina State University (and UNC Asheville)</td>
<td>Climate Change and Society</td>
<td>Active</td>
</tr>
<tr>
<td>University of North Carolina at Chapel Hill</td>
<td>Ecology and Environmental Biology</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>University of North Carolina at Chapel Hill</td>
<td>Geology and the Environment</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>University of North Carolina at Chapel Hill</td>
<td>Applied Mathematics</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>University of North Carolina at Chapel Hill</td>
<td>Applied Computer Science</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>University of North Carolina at Chapel Hill</td>
<td>Geology and Petroleum</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>University of North Carolina at Chapel Hill</td>
<td>Plant Biology</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>University of North Carolina at Chapel Hill</td>
<td>Molecular and Cellular Biology</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>University of North Carolina at Chapel Hill</td>
<td>Toxicology</td>
<td>Feasibility Stage</td>
</tr>
<tr>
<td>University of North Carolina at Charlotte</td>
<td>Mathematical Finance***</td>
<td>Active</td>
</tr>
<tr>
<td>University of North Carolina at Charlotte</td>
<td>Bioinformatics</td>
<td>Active</td>
</tr>
<tr>
<td>University of North Carolina at Charlotte</td>
<td>Health Informatics</td>
<td>Active</td>
</tr>
<tr>
<td>University of North Carolina at Charlotte</td>
<td>Biotechnology</td>
<td>Planning Phase</td>
</tr>
<tr>
<td>University of North Carolina at Wilmington</td>
<td>Computer Science and Information Systems</td>
<td>Active</td>
</tr>
<tr>
<td>University of North Carolina at Wilmington</td>
<td>Clinical Research &amp; Product Development***</td>
<td>Active</td>
</tr>
</tbody>
</table>

* "Active" means the program is fully approved and students are enrolled. "Coming Soon" means the program is in the final approval stages. "Planning Phase" means the program has not yet entered the final approval stages, and major components, such as the assembly of the advisory board, the final curriculum and the necessary paperwork for approval, are still underway. "Feasibility Stage" means the decision to plan a program has not yet been made. ** Not a University of North Carolina campus. *** Pending PSM affiliation.
Monthly Phone Conferences
The UNC Systemwide PSM Operations Group consists of deans and PSM program directors from the UNC campuses. The members attend phone and video conferences monthly and discuss a range of important issues relating to campus and systemwide PSM program operation. Examples are:

- Systemwide academic planning and sustainability
- Incentives for faculty to develop PSM programs
- Course-sharing
- Intra- and interuniversity PSM organization
- Central services
- Outreach to industry

PSM Training Sessions
The UNC System PSM director conducts training workshops on demand. These workshops are currently available to the PSM community (deans, PSM directors and PSM students):

- How to start a PSM program
- Alliances and educational projects with employers
- Essential professional skills and how to learn, teach and assess these skills
- Improving performance through professional self-awareness and self-care
- Sustainable innovation

Annual Meeting With Key Employers
The UNC Systemwide PSM Operations Group convenes with key employers annually. The purpose is to further understanding about PSM programs and interactions between UNC and local industry, nonprofit organizations and government entities.
UNC System Grant From the Alfred P. Sloan Foundation and Other PSM Grants

Funding for the UNC Systemwide PSM Program

Alfred P. Sloan Foundation
The UNC Systemwide PSM Program received a grant from the Alfred P. Sloan Foundation in December 2010 in response to a proposal entitled “Expansion of the University of North Carolina Systemwide Professional Science Master’s (PSM) Initiative.” Funds were provided to begin 14 PSM programs, distribute PSM training materials to all campuses, and hold three annual meetings for the UNC PSM Systemwide Operations Group together with key industry leaders. The Alfred P. Sloan Foundation has been instrumental in supporting the UNC System PSM program effort since 2002.

North Carolina Biotechnology Center
The North Carolina Biotechnology Center has supported the production of PSM educational materials and numerous meetings. In 2009 the Center funded a highly successful workshop for deans and PSM program directors entitled “Creating Alliances and Educational Projects With Industry Partners.”

UNC General Administration
The director of the UNC System PSM Program received support from the UNC General Administration for the development of a suite of online tools for management, advertising, student promotion, strategic planning and economic impact assessment of PSM programs, all of which are described in this report.

Funding for Individual PSMs

The Alfred P. Sloan Foundation has provided support for development of many of the individual UNC System PSM programs. Several other entities have provided additional funding for PSM program development at NC State University:

- Electric Power Systems Engineering (Department of Energy: $3.5 million)
- Biomanufacturing (National Science Foundation: $700,000)
- Microbial Biotechnology (North Carolina Biotechnology Center: $55,200)
- Advanced Analytics (SAS Institute: $2 million)
- Financial Mathematics (SAS Institute: $141,744, Progress Energy: $229,859, Wachovia: $50,000 (estimate*), National Science Foundation: $50,000 (estimate**))

* Part of endowed fellowship. ** Part of grant funding.
UNC System PSM Portal

Website

A website has been developed for the UNC Systemwide PSM Program: www.ncsu.edu/grad/psm. The website includes a brief description of the UNC Systemwide PSM Program and links to all the PSM programs, news, publications and resources, workshops and more.

Several innovative tools have been developed, and these can be accessed by UNC System administrators, faculty and students through the PSM Portal:

- **PSM Program Data Management**
  Program data entry, management and report creation (see description p. 12)

- **Professional Skills Assessment**
  Teamwork-based performance measurement (see description p. 19)

- **Geographic Information Academic Planning Tool**
  PSM program demand and resource localization in North Carolina (see description p. 7)

- **Electronic Mentoring**
  PSM student engagement with working professionals (see description p. 17)
Electronic administration is essential in the quest to minimize resource consumption and the need for additional personnel when planning, developing, launching or managing PSM programs. Several innovative tools have been developed and are made available to PSM directors and PSM students through the new PSM information management system (PIMS). PSM directors can enter and update basic program descriptions in PIMS. PSM directors can also post employer project information, alumni feedback and relevant statistics. Users can browse the data and generate selective reports with information from one of more of the data collections. Since this information is accessible to all members of the UNC community, it serves as a method for sharing, publicizing and marketing the features and statistics of the PSM programs.
Progress Report
Each year the UNC System PSM director writes a progress report for the UNC Systemwide PSM Program describing the status of existing/upcoming programs and projects. The report is available electronically on the website and as a limited-edition hard copy.

Program Catalog
Descriptions of all PSM programs including employer projects are available electronically on the website, offered as a new service (please see the description of the PSM Portal). Individual or program clusters can be selected for download or print into hard-copy catalogs. A catalog of all PSM programs in the UNC System will be updated annually.

Employer and Alumni Testimonials
Alumni and employers who have interacted with the PSM programs are asked to provide feedback regarding the value of their interactions. Alumni success stories and employer testimonials are posted on the UNC Systemwide PSM website regularly.

Student Online Portfolio
Students can develop personalized Web-based portfolios including all their professional training and experience. The Geospatial PSM Group at NC State University is providing the first template for this service.

PSM Program Sustainability Model
(Adapted from “Quick Guide to Starting Professional Master’s Programs”)

A PSM program sustainability model for use at NC State has been developed. Other campuses are encouraged to adopt this model or develop similar or new models. The NC State model is dependent on financial support from the Provost's Office (first two years) and is based on enrollment projections and formula funding per student credit hour in the current enrollment year (institutional funding only). Each program must negotiate with the Provost as there is no guarantee that all or any portion of these funds will be available to a program. An example of a program budget is shown below, and there are many other models. When a program becomes profitable, a portion of the profit may be returned to the program home.

<table>
<thead>
<tr>
<th>Budget item</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary PSM Director (25% FTE)</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
<td></td>
</tr>
<tr>
<td>Salary PSM Director (50% FTE)</td>
<td></td>
<td></td>
<td></td>
<td>$60,000</td>
<td></td>
</tr>
<tr>
<td>Salary Assistant (50% FTE incl. benefits)</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>PSM program planning and operational costs</td>
<td>$10,000</td>
<td>$10,000</td>
<td>$10,000</td>
<td>$10,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>Cost of buyouts of PLUS course components</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>Year subtotal costs</td>
<td>$40,000</td>
<td>$100,000</td>
<td>$100,000</td>
<td>$100,000</td>
<td>$130,000</td>
</tr>
<tr>
<td>Projected student revenue (purpose 101) and total enrollment (year 1 and year 2 cohorts)</td>
<td>0</td>
<td>$50,000</td>
<td>$100,000</td>
<td>$150,000</td>
<td>$200,000</td>
</tr>
</tbody>
</table>

(0 students) (5 students) (10 students) (15 students) (20 students)
Guidance for Starting and Managing a PSM Program

The Quick Guide to Starting a Professional Master's Program is available at the UNC System PSM website and answers the following questions:

- Why are professional master's programs important?
- How do we determine whether we want to start a professional master's program?
- Have we decided to start a professional master's program. Who should be involved?
- What is the logical process for creating a professional master's program?
- How do we best advertise the program to students?
- Which types of support does the Graduate School at NC State University provide?
- How do we contact others involved in professional master's programs?

Essential Professional Skills

Overview and audience: Description of the essential professional skills needed in the workplace for all PSMs, all fields, all new employees. This book is written with input from multiple professionals in the Research Triangle Park, North Carolina, and reflects what is needed to function well in the work environment.

Students are often surprised by the differences between the university and industry work environments when adjusting to their first jobs in industry. Such adjustment often takes nine to 12 months and is costly for the employer in terms of lost effectiveness. Students can improve their employment readiness and competitiveness by learning about the new workplace environment prior to entry. Topics include business goals and bottom line, leadership and teamwork, communication skills, marketing, discipline, flexibility, creativity and out-of-the-box thinking, ambiguity management, intellectual property, specialty technology and knowledge, quality, ethics, globalization, expectation management and career management.


Employer Alliances and Projects

Overview and audience: How to contact industry partners and how to build educational projects with them. Also contains reusable case studies in science and business. The method to contact industry is for all audiences; the specific case studies are for PSM audiences mostly in science and business.

Many students and university faculty are unfamiliar with industry workplace environments. Case studies developed in collaboration with working professionals can help students and professors bridge the gap between universities and industry. This book provides guidance on how to approach industry professionals and create educational alliances. The strategy of establishing contact with industry employers and the process of developing and teaching case studies are described. Eight reusable case studies are presented. Among the case studies are examples of how to identify biomarkers and new drugs simultaneously, prioritize and develop products in compliance with rules and regulations, commercialize products and
protect and manage the intellectual property, optimize processes and technologies for manufacturing and minimize human errors in production.


**Teaching and Assessing Essential Professional Skills**

*Overview and audience: How to teach professional skills and how to simulate the work environment outside the university. Also contains a professional skills assessment tool to evaluate student skills levels. For all PSM audiences and all others who teach professional skills.*

This book describes a simple, common-sense method of how to include professional skills training in any curriculum without compromising academic rigor. It relies on introduction of unanticipated, yet manageable, crises simulating scenarios commonly experienced in the workplace. Examples include how to respond to a demand for innovation and teamwork, a layoff, a reorganization or switching jobs and projects. Preparing and practicing a mindful and healthy response is beneficial, and it serves as a platform for attitude training and character building prior to unexpected real-life events on the job and elsewhere. Also included are student reflections on learning and a rubric to assess the professional skills learning outcomes.


**Sustainable Innovation**

*Overview and audience: How to make innovation sustainable and how to introduce sustainable innovation regimens in teaching and research. For all PSM audiences and others wanting to teach sustainable innovation or improve innovation methods.*

This book offers a guide to dramatically improve the quality of innovation and solution-making through the respectful use of existing and abundant but often-ignored resources. Sustainable innovation is about creative combination of ideas, materials, methods and people, courage to derive value from opposition and diversity, integrative intelligence, virtuous planning, minimal consumption of resources and definition of alternative plans. Using the method successfully requires that we are truly interested in the common good of humankind, that we care about our environment and that we take time to think carefully about consequences before we act, invent or make decisions. It is a call for a much-needed collaboration between people of different backgrounds, skills and opinions with the intent to preserve individual and local integrity and adopt a win-win mindset.


*Please note that publishers and authors usually have a pecuniary interest in the sale and distribution of their published materials.*
Workshops on Demand for Deans, Professors and Students

How to Start a PSM Program

Concurrent workshop

In this workshop participants learn how PSM programs differ from traditional master's programs. The emphasis is on establishing employer alliances and educational projects, professional skills education, each step of the academic planning process and how to avoid common pitfalls. Instructional materials include those described earlier as well as an overview of the PSM affiliation criteria.

Creating Alliances and Educational Projects with Industry Partners

NC Biotechnology Center, November 2009

The UNC System PSM director joined with industry professionals from the Research Triangle Park to develop inquiry-based, industry-relevant educational materials that bridge the gap between the classroom and the workplace (described earlier). The purpose of this workshop was to disseminate these materials and to present a process that participants can use for engaging with industry — from contacting industry professionals to designing collaborative projects and teaching workplace skills — all with the aim of creating momentum for the statewide development and adoption of workforce-relevant curricula. A total of 18 participants from 11 universities and colleges in North Carolina learned to design projects with attending industry professionals and returned to their home institutions with instructional materials and basic project plans.

Quote from an attendee:

The “Creating Alliances” workshop was demanding and productive. I think this was one of the best workshops I have attended, since we were provided with timely and critical information, produced case studies with expert assistance, had a meaningful way in which to engage industry representatives and had outstanding networking opportunities. I suggest offering these again and letting institutions bring small teams (of three to four people) from the same institution to allow them to begin to build critical mass for building professional education opportunities.

Elizabeth Wolfinger
Dean, Meredith College

Improving Performance Through Professional Self-Awareness and Self-Care

NC State University, November 2010

Participants in this workshop learned about the difference between performance indicators in academic and corporate environments and how these indicators condition students and employees. A set of common and frequently occurring, yet often unexpected, changes were described, as was how being out of one's comfort zone may affect personal performance levels. Participants gained understanding about key aspects of professional self-awareness as a resource for sustainable resilience, peak performance and personal growth. A demonstration of Mindfulness Based Stress Reduction (MBSR) was given by a guest instructor from Duke Integrative Medicine.
Connecting with industry leaders is something that is expected to benefit all PSM students. Many years ago, the successful mentorship program entitled “Adopt a Professional Student” was started by the Microbial Biotechnology PSM program at North Carolina State University. The program serves as the model for a new updated version of mentor-mentee matchmaking, the “e-mentoring” program. It facilitates interaction between PSM students and industry personnel. The e-mentoring program is being launched soon on UNC Online, a platform that is developed and maintained by UNC General Administration and offers online course sharing and exam proctoring. PSM directors invite mentors into the program and manage the matchmaking to the extent they desire. The e-mentoring program is anticipated to improve retention rates and job creation/job offer frequencies, as well as to be a venue for the provision of “live professional skills training.”
Interdisciplinary Internship Placement

The UNC System PSM director is currently working with Research Triangle Institute (RTI) and the Small Business and Technology Development Center (SBTDC) in North Carolina to establish a coordinated project and internship placement model. RTI is located in the Research Triangle Park and conducts research and assistance to the business community in a wide range of fields. The SBTDC has offices throughout North Carolina and has the potential to connect all UNC campuses to local small and medium-sized businesses. A similar service is already provided by the SBTDC to M.B.A, J.D. and graduate engineering students.

Professional Skills Certificate

Not all UNC System campuses have the resources to offer “professional skills” courses. That is why NC State University is developing a set of online courses that may constitute a separate professional skills certificate when completed. The certificate and related courses can serve as integral parts of a PSM program or as additional proficiencies added to existing PSM curriculum:

- Management Foundation – 3 CRH. This course is provided by the Poole College of Management at NC State. Students will gain an understanding of a variety of business and management disciplines, including basic accounting and finance.

- Project Management – 3 CRH. This course is provided by the Poole College of Management at NC State. Students will learn how to manage various project dimensions and their dynamics.

- Interpersonal Communication in Science/Technology Organizations – 3 CRH. This course is provided by the College of Humanities and Social Sciences at NC State. Students will acquire knowledge about how to interact effectively and professionally in individual and group interactions using a combination of pedagogical methods, including case studies.

- Communication and Globalization – 3 CRH. This course is provided by the College of Humanities and Social Sciences at NC State. Students will learn how economic, political and cultural dimensions of globalization impact the communication practices of science and technology organizations and professionals.

- Field-Specific Elective(s)
Web-Based Assessment of Professional Skills
(Excerpt from Borbye and Edelman [2011], p. 22)

Resembling the peer performance assessment often carried out by companies, the Professional Skills Assessment tool is a comprehensive application based on the model currently used by the Analytics PSM program at North Carolina State University. PSM directors and PSM students can use this tool to measure student performance of work performed in teams and enhance essential skills such as effective communication, teamwork and leadership. Program directors create teams and evaluation rubrics, and they generate reports to assess individual student professional skills levels. The Detailed Report displays individual student assessment scores. Another report, the Class Report, provides self evaluation and peer evaluation average scores for the class. Scores are evaluated statistically and deviations are marked to encourage action. Students increase awareness about their professional capabilities and are incentivized by their peers to excel.
National and International PSM Outreach

Each month the UNC System PSM director conducts a national phone conference with colleagues involved in systemwide, statewide and regional (SSR) planning of PSM programs. The following states and organizations are currently represented: Arizona, California, Middle Atlantic Historically Black Colleges and Universities, New York, Connecticut, Maryland, Massachusetts, North Carolina, Washington, Illinois, Pennsylvania, Florida, Oregon, Texas, Minnesota, the Council of Graduate Schools and the Alfred P. Sloan Foundation. A wide range of topics related to the operations of national and SSR PSM programs are discussed. Examples are:

- Systemwide and statewide planning and operation
- Assistance to start and manage PSM programs
- Incentives for faculty
- Sustainability plans
- Grants
- PSM degree registration
- New educational materials and workshops for students and faculty
- Professional skills courses
- Intercampus course sharing
- Central program teaching and administration tools
- Performance assessment
- Marketing and outreach to employers
- Employer alliance coordination
- Mentoring
- Alumni tracking
- Interaction with economic development entities
- Economic impact
- National collaboration
- Internship placement

Students from the Appalachian State University PSM program are occasionally including classes at European universities as part of their global preparedness. One student has studied at the Center for Electron Nanoscopy (CEN) at the Technical University (DTU) in Denmark and at the University of Trieste in Italy, and other students are preparing to study at University of Angers in France.
News Highlights

December 2011
- Second UNC Systemwide PSM Report
- Launch of numerous PSM Quick Tools
- Launch of e-mentoring pilot

November 2011
- Publication of a new PSM resource: Automation of Systemwide PSM Program Management, Advertising, Professional Skills Assessment, Academic Planning and Electronic Mentoring

October 2011
- UNC System PSM Operations Group meeting at UNC Wilmington: marketing plan

June 2011
- Distribution of seven PSM planning subgrants from the Alfred P. Sloan Foundation to multiple UNC campuses

May 2011

December 2010
- Grant from the Alfred P. Sloan Foundation for expansion of the UNC Systemwide PSM Program

November 2010
- Grant from the UNC General Administration for development of multiple online tools for the UNC Systemwide PSM Initiative
- “Be at Your Best: Improving Performance through Professional Self Awareness and Self Care” workshop for deans, PSM directors and PSM students

October 2010
- Launch of a national Systems, State and Regional (SSR) PSM Operations Group

September 2010
- Formation of NC State University’s PSM Council

- Establishment of the UNC Systemwide PSM Operations Group

May 2010
- Publication of a new PSM resource: “Integrating Professional Abilities and Interaction With Employers in an Outcomes Assessment Plan: An Example From Professional Science Master's Programs”

March 2010
- First UNC Systemwide PSM Progress Report

January 2010
- Publication of a new PSM resource: Out of the Comfort Zone: New Ways to Teach, Learn, and Assess Essential Professional Skills

November 2009
- “Creating Alliances and Educational Projects with Industry Partners,” workshop for deans, PSM directors and aspiring PSM directors

July 2009
- First PSM focus group (geospatial/geographical information science and technology, members from NC State University and UNC Charlotte)

June 2009
- Publication of a new PSM resource: Quick Guide to Starting a Professional Master’s Program

March 2009
- Distribution of 13 PSM planning subgrants from the Alfred P. Sloan Foundation to multiple UNC System campuses

January 2009
- Grant from the North Carolina Biotechnology Center for development of a workshop for PSM directors
- UNC General Administration transfers the leadership for the UNC Systemwide PSM Program to NC State University
Recent PSM Publications


Opportunities for Interaction With the UNC Systemwide PSM Program

**UNC System PSM Employer Board**
The UNC System PSM Employer Board is currently being assembled. Nominations are welcomed. Please contact the UNC PSM director.

**PSM Program Advisory Boards**
All PSM programs have external advisory boards. Typical members are employers in relevant fields as well as the PSM program director and relevant university staff. Programs may also include members from the U.S. Department of Commerce, government agencies, collaborating programs or focus groups. Please contact individual program directors for more information.

**Projects and Case Studies**
Many programs offer professional projects or case studies. Employers determine most of the logistical parameters, while the project or case study content is tailored in collaboration with the PSM program director. Students may work on projects or case studies on-site or in the classroom. Please contact individual program directors for more information.

**Seminars**
Working professionals from relevant fields often contribute seminars in PSM programs. Please contact individual program directors for more information.

**Internships**
Most PSM programs encourage students to work in professional organizations during their time in the program. Some students may intern as full-time employees during the summer, others may work part-time during the academic year, and still others may participate in co-op programs. Please contact individual program directors for more information.

**Professional Mentorship Program**
PSM students benefit from personal interaction with working professionals. Mentoring a student means meeting with the student regularly (for example, monthly or bimonthly) to help the student understand what is required to be successful outside the university environment. Please contact the UNC System PSM director to learn more about this program, or visit UNC Online to become a mentor.

**Professional Student Fellowships**
The ability of PSM programs to offer students fellowships benefits both the programs and the students. Fellowships enable programs to attract excellent students who might not otherwise be able to enroll. Please contact the UNC PSM director to provide fellowships.

**Employment**
All employers are encouraged to request information about individual PSM programs in their fields of work. Often employers will contact PSM directors before graduation to look for potential new employees.

**Sponsorships and Program Development**
PSM programs may be sponsored by individual donors, employers or a set of employers. Employers may even request an entire program for their own purposes. Please contact the UNC System PSM director to be involved in sponsoring or developing a PSM program.