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ACADEMIC
DEVELOPMENT PLAN



2003
2004
2005



UNIVERSITY OF ALASKA FAIRBANKS ACADEMIC DEVELOPMENT PLAN

As the only arctic university in the United States, the University of Alaska Fairbanks takes seriously its responsibility as a world leader in teaching, research and public service, with a particular focus on issues relating to the Circumpolar North.

Technology and innovation are essential elements in our quest to solve problems that are unique to the North and yet have global implications. The Academic Development Plan serves as a guide for us as we prepare future scientists, engineers, policy makers and leaders for a globalized society. Elements of this plan were developed at an academic retreat in December 2000, and included UAF deans and directors, along with the Presidents of the Faculty Senate and Staff Council.

The plan is dynamic in nature. In May 2003, a second academic retreat was held to evaluate and refine the plan. This updated version of the UAF Academic Development Plan reflects input from retreat participants and serves as a road map to guide and shape future decision-making for UAF, as well as at the school, college, center, institute, and individual unit levels.

UAF's planning is driven by two documents. The mission statement provides the context for UAF programs and activities:

University of Alaska Fairbanks Mission
The University of Alaska Fairbanks, as the nation's northernmost Land, Sea, and Space Grant university and international research center, advances and disseminates knowledge through creative teaching, research, and public service with an emphasis on Alaska, the North and their diverse peoples.

The strategic plan, UAF 2005, highlights our six institutional goals:

UAF 2005

- Be a world leader in arctic research and related graduate education
- Provide high quality undergraduate education for traditional and non-traditional students
- Form active collaborations with communities, organizations, businesses and government to meet identified state, national, and global needs
- Be an educational center for Alaska Natives
- Be a model that demonstrates how gender, racial, and cultural diversity strengthen a university and society
- Be an academic gateway to the North Pacific and the Circumpolar North

While these documents give significant and meaningful direction to UAF's programs and also outline academic areas of particular importance to the institution, they provide relatively little guidance for the allocation of scarce resources among high priority programs. Yet, in the short term, these allocation decisions are the ones on which faculty, staff and administrators most often focus their attention. The elements of the plan that follow are intended to provide useful guidance for these decisions.

Identifying three "programs of distinction" and seven "areas of emphasis" does not imply that they are UAF's "best" or "most

important" programs; instead it identifies them as areas where judicious enhancements in the near future are judged to have the best potential for moving UAF toward the goals in UAF 2005. UAF decision-makers recognize that we have many programmatic strengths and will continue to look for opportunities to enhance a broad spectrum of programs. However, the following areas that seem particularly ripe for immediate, significant development in that they build upon existing strengths, have immediate opportunities for development and address critical needs, particularly within the university and the state, have been identified.

ACADEMIC PRIORITIES AND CHARACTERISTICS

UAF seeks to include certain "threads" in as many of its programs as possible. We seek to be known first and foremost as a university that focuses on students (certificate to Ph.D.) and their connections to UAF's research and outreach programs. We will encourage interdisciplinary approaches to programs, problems and instruction. We anticipate that our efforts will result in meaningful contributions to healthy Alaskan and circumpolar societies and environments. Finally, we will conduct our work in a way that both recognizes and participates in the globalization of society.

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PROGRAMS OF DISTINCTION

UAF has many strong programs that have earned excellent reputations. However, we now aspire to create a number of programs that are widely acknowledged as among the best in the world. Based upon assessment of the strengths of existing programs and the immediate opportunities for developing or solidifying a position of distinction, the following programs have been identified as the first three candidates for developing into “programs of distinction.”

ALASKA NATIVE PEOPLES:

Program development and coordination along with increased student involvement are among the most critical needs for gaining this type of distinction for our programs dealing with Alaska Native peoples. By building upon recent program and infrastructure improvements, UAF can create a set of programs dealing with Alaska Native issues that would make us a model for an institutional approach to issues related to indigenous peoples.

ARCTIC CLIMATE:

Unprecedented interest in arctic climate change provides UAF with an unparalleled opportunity to become a major focal point for the study of this phenomenon. The most critical need is to enlarge the cadre of UAF faculty and graduate students involved in arctic climate research.

FISHERIES AND FISHERY OCEANOGRAPHY:

The four endowed chairs whose endowments will mature over the next decade or so and the construction of a new arctic research vessel provide UAF with the opportunity to occupy a pre-eminent role in this area. Space, both in Juneau and Fairbanks, is the most critical need.

AREAS OF EMPHASIS

ARTS, HUMANITIES AND SOCIAL SCIENCES

EMPHASIS

The arts, humanities and social sciences provide bases of critical knowledge for Alaska's future. Education in these subjects fosters social responsibility, individual wellbeing and the development of qualities that go beyond technical training. An educated citizenry is one that approaches life's challenges with insight, creativity and originality. These are the strengths of this emphasis area. In addition to offering courses that fulfill core requirements for all students, UAF offers more specialized opportunities. We are the artistic center for the Interior's writers, visual artists, musicians and actors. We also excel in our contributions to the understanding and development of Alaska's particular social and cultural traditions, in all of their creative diversity.

OPPORTUNITIES:

“Alaska Native Peoples” has been identified as one of three Programs of Distinction that will move UAF towards these goals, as specified in our Strategic Plan 2005. Existing programs and strengths in Alaska Native Studies, the Alaska Native Language Center, anthropology, northern studies, the expanding UA Museum and the Rasmuson Library form the groundwork for development in this area. A President's Professor in Alaska Native studies enhances this opportunity. UAF is poised to build faculty expertise, especially teaching and research capability, through development of an infrastructure that promotes interdisciplinary exchange in the arts, humanities and social sciences, with particular attention to Alaska's Native peoples.

In addition, the selection of UAF as the location of the secretariat of the International Arctic Social Sciences Association (IASSA) has presented a unique opportunity to build this capacity on a circumpolar level. In combination with our student exchange programs, the presence of Northern Momentum Teacher/Scholars, the Interdisciplinary Graduate Education and Research Training (IGERT) program and our long-standing record of northern research, IASSA provides an opportunity to enhance UAF's international prominence in arctic studies.

Writers and creative artists at UAF represent Alaska to the world. Students are drawn to Alaska because of its natural features and vibrant society, and our programs offer them the opportunity to translate that attraction into artistic expressions. Our renowned musicians, painters, actors and writers commonly choose Alaskan themes, presenting opportunities for public exhibition and performance, as well as student development.

NEEDS:

- There is a need to support the core curriculum in the arts, humanities and social sciences. The core is, by definition, basic to the general education of UAF students. Specific core requirements include courses that give students the

intellectual tools to understand and appreciate tradition, diversity, cultural expression and social change.

- There is a need to create and develop an infrastructure to coordinate programs and research efforts centering on northern indigenous peoples and languages. A coordinating structure would respond to emerging statewide public and university priorities by focusing resources and attention on this area and increasing awareness and education in relation to contemporary and historic Alaska Native peoples.
- Preservation, documentation and revitalization of Alaska's Native languages remain critical needs in this area of emphasis. Languages are central to the identity of Alaska's Native peoples and the expression of many traditions.
- UAF needs to recruit and retain Alaskan students. The enhancement of broad, quality programs in the arts, humanities and social sciences will allow us to compete more effectively with liberal arts educational institutions elsewhere.
- Alaska needs trained social service providers. Enhancement of UAF's programs in psychology, social work and justice will ensure that this need is met.

ECONOMIC AND WORKFORCE DEVELOPMENT

EMPHASIS:

In partnership with the private sector and public agencies, UAF will enhance academic programs that assist Alaska's businesses and address continuing and emerging workforce needs, with special attention on e-commerce, high-technology industries appropriate for Alaska and workforce shortages identified by the Alaska Department of Labor.

OPPORTUNITIES:

Intense public and private sector attention is being directed toward Alaska's financial future, diversification of the state's economy and development of healthy Alaskan communities. Alaska's unique geographic position and associated location economics combine to create a set of attractive opportunities that could expand Alaska's economy on several fronts. The current development of a large international transportation and communications infrastructure in Alaska provides the foundation for a new expansion of the state's economy that is independent of traditional natural resource extraction.

Recent technological developments provide Alaskan entrepreneurs with the means to access state, national and global markets in a manner that was unimaginable a decade ago. E-commerce and the rapidly expanding internet economy provide Alaskans with the tools to overcome problems associated with a limited local market and geographic isolation. The basic character of both retail and business-to-business economic activity will dramatically change in the coming decade. In order to take advantage

of these opportunities the university must expand and develop its expertise related to the new economy.

Basic and applied research in the areas of science and engineering also present important opportunities for UAF to contribute to the economic development of Alaska. From cold weather engineering applications to developments in satellite data acquisition and manipulation, UAF faculty will be an important part of the process of technology transfer that will provide the foundation for new high technology industries in Alaska.

UAF's professional and workforce development programs have a long history of providing expertise and support to a wide range of economic development projects. Whether in new, emerging portions of the economy or in traditional areas, UAF will continue to provide ideas and employees for Alaska's economy.

NEEDS:

The fundamental need to diversify Alaska's economy provides the primary motivation for work in this area. Although Alaska's oil and gas industry is healthy and presents continuing opportunities, the state must encourage the development of a wide range of diverse industries to complement, and in the long-term replace, oil and gas as the main economic engine of the state. Although no areas of economic activity ought to be ignored, particular attention must be given to those existing and potential areas of the economy that present opportunities for high labor efficiency coupled with a small environmental footprint.

The need to fill existing jobs with Alaskans provides a second motivation for renewed UAF efforts in economic development. Many important, well-paying jobs presently are filled by “immigrants” because qualified Alaskans are not available. The resulting employee turnover is costly and a transient population does not foster healthy community development. Attention to workforce development in some key professions (e.g., nursing, allied health, process technology, social work) will pay big dividends in the form of a competent, resident workforce that will provide the basis for healthy communities throughout the state.

UAF will play an important role in this effort by providing environments in which faculty and private sector entrepreneurs

can work together with state and federal agencies in creative ways to develop and apply expertise and intellectual property to the task of encouraging the formation and development of numerous industries and professions. While the state needs research on the impact of e-commerce on Alaska’s economy and well-reasoned policies on economic development, undoubtedly its greatest need is for new members of the Alaska workforce with backgrounds in e-commerce, high-technology industry and selected professions where the labor force has historically been characterized by high turnover.

ENGINEERING

EMPHASIS:

UAF will begin a systematic expansion program of engineering teaching and research that will selectively move our engineering programs to a position of comparable national strength with UAF’s many fine science programs. UAF’s engineering departments offer special opportunities to enhance Alaska’s economic development, provide a valuable technical education for its students and provide for a strong increase in research.

UAF’s engineering programs will continue to be favorably situated to focus on student involvement in research programs and industry collaborations through internships and cooperative programs while addressing a strong state and national demand for engineering graduates.

Engineering programs will continue their strong interdisciplinary focus with especially strong ties to the other UAF Areas of Emphasis including Natural Resources, Environment and Human Health, Global Science and Economic and Workforce Development. Engineering will be a key contributor to healthy Alaskan and northern societies through design, construction and operation of a safe and efficient infrastructure.

OPPORTUNITIES:

Alaska is critically dependent on a modern and efficient public and private infrastructure to serve local, state and private economic development. Alaska’s remote northern location presents challenges and opportunities that can be addressed with high quality engineering graduates, appropriate research and professional development offerings.

It is clear that millions of dollars likely will be spent in Alaska in coming years in the capital design, construction and operation industry throughout the private, state and federal sectors.

Key projects currently underway, or those with a high potential for future development, include multi-modal transportation systems for rural and urban areas, development and transportation of petroleum resources, mining resource development, rural sanitation and energy systems, development of wireless communication, fisheries industry support and design and construction of a national missile defense system.

Civilian projects that will dominate Alaska’s engineering employment in the same time period include increased federal funds for highway and airport infrastructure, the planned natural gas pipeline, expansion within the petroleum industry, including gas-to-liquids activity, and increased development of Alaska’s rural and urban infrastructure.

NEEDS:

Expanded engineering instruction, research and outreach will be focused on meeting the demands for engineering graduates within the state, providing information and expertise necessary for the improvement of infrastructure, and conducting research that takes advantage of Alaska’s remote northern location. While these efforts will be focused on local problems, the graduates from instructional programs and the results from research will undoubtedly also address national and international needs.

Development of instructional and research programs in engineering will require additional instrumentation, support services and space. Expanded enrollments in undergraduate, masters’ and doctoral programs are key for continued growth and development. Instructional improvement efforts will include coordinated recruiting for all undergraduate engineering programs and an aggressive effort to acquire and maintain instructional equipment.

ENVIRONMENTAL AND HUMAN HEALTH

EMPHASIS:

A very broad but important area for Alaska and therefore, UAF, is a focus on Environmental Health and Human Health. UAF should continue its efforts to develop core faculty around themes including extreme environment, adaptation and global transport of contaminants. A focus on arctic animal models and comparative biochemistry and physiology at UAF has created a history and foundation to support future growth.

The maintenance and expansion of programs in basic science and engineering will give a proper foundation to students interested in this Area of Emphasis. In the area of human health, a stronger undergraduate neuroscience/human environmental physiology is needed. Toxicology and environmental chemistry courses should be offered more frequently. In addition to building appropriate expertise in science and engineering, programs in teacher preparation and community outreach should have enhanced components related to this Area of Emphasis.

Central to human health in Alaska are behavioral sciences. Courses and programs, including those at the graduate level, should be offered in an accessible manner to graduate students statewide. Workforce staffing is an important component of human health and delivery of social work, rural development, emergency medical technicians, nursing and public safety programs should be part of UAF's foundation.

OPPORTUNITIES:

UAF can become a leader in interdisciplinary integration of programs dealing with environmental and human health. We have the opportunity to fully integrate instructional and research programs in clinical psychology, neuroscience, bioinformatics, genetic components of disease, ecotoxicology and addiction. Graduate education should be emphasized as should relationships with basic science and engineering programs.

NEEDS:

UAF needs to build upon its established strengths in the basic sciences and engineering, the foundation in environmental and human health provided by the NIH and NSF infrastructure grants (SNRP¹, COBRE², INBRE³, EPSCoR⁴) and instructional programs in allied health fields. In order to do so, the institution will need a few additional faculty hires, maturation of the research and graduate programs started under the NIH and NSF grants, and expanded facilities for animal care, research and instruction. While additional faculty, grant-supported research and space represent important needs, there is also a critical need to integrate a number of programs that have begun as separate entities.

¹*Special Neuroscience Research Program*

²*Center of Biomedical Research Excellence*

³*Institutional Development Award Network for Biomedical Research Excellence*

⁴*Experimental Programs to Stimulate Competitive Research*

GLOBAL SCIENCE

EMPHASIS:

Global science at UAF is relatively well developed. Aligned with the Land, Sea and Space Grant status of the campus, research programs spanning the cryosphere, the earth's crust, oceans and atmosphere, global change and space sciences are in place. The challenge for the future lies in interdisciplinary developments through which the most important new scientific progress will be made. Special attention should be placed on aspects of these studies that relate specifically to our northern location.

Cryospheric studies focus on glaciers, snow, ice, soils, permafrost and environmental chemistry in an interdisciplinary approach to the cold environment at high latitudes. They also address the special conditions for pollutants at high latitude. The unique temperature, moisture and light conditions change the deposition rates and half-lives of anthropogenic compounds entering the Arctic.

Seismic signals provide data for reports and warnings, which are used to mitigate the dangers of earthquakes, tsunamis and volcanoes. Existing facilities, established to serve primarily

emergency needs, should also be playing a supporting role in UAF's teaching and research activities.

Remote sensing facilities at UAF gather and process data from passing satellites to produce mapped geophysical data. Examples include the Alaska SAR (Synthetic Aperture Radar) Facility, the AVHRR (Advanced Very High Resolution Radiometer) and the MODIS (Moderate Resolution Imaging Spectroradiometer). The scientific applications of the data derived from these instruments/facilities provide excellent opportunities for research and should be found in many different aspects of teaching in a variety of disciplines.

Arctic science, comprising atmospheric and oceanic science, is fundamental to the understanding of global climate change. This interdisciplinary endeavor also employs expertise in fluid dynamics, physical chemistry and radiation physics.

Space weather, which applies the knowledge and techniques of space science to the forecasting of activity in the solar-terrestrial system, combines the study of the upper atmosphere with the plasma physics of the solar wind.

OPPORTUNITIES:

Prime opportunities for UAF in these areas exist in the development of new programs and expertise in climate research and in the acquisition of a new arctic research vessel. It is important to realize that, given the interdisciplinary approach and cross-unit participation in the International Arctic Research Center's research program, cultivating the strength of this unit will benefit the whole enterprise of global science within UAF. In the same manner, when a new arctic research vessel becomes available, it will provide an ocean platform for atmospheric and space observations as well as its major role in ocean studies.

NEEDS:

Short-term needs will be served by a combination of our existing global science programs within the areas of special opportunity:

- Arctic states need a circumpolar climate assessment in order to plan effective use and preservation of their land in upcoming years. This requires the expertise of faculty skilled in geophysical, ecological, oceanic and atmospheric

studies of the Arctic. The assessments will be used by engineers, legislators and the business community as the basis for decision and action.

- A localized example of this type of assessment is the identification of environmental aspects of gas pipeline construction and maintenance. Seismic, hydrological and geotechnical studies of any proposed pipeline corridor as well as general considerations of civil engineering in an arctic environment are necessary elements of any viable gas line proposal.
- Assessments of arctic pollution issues represent a more global need. For example, assessments of pollution transport impacts by a broad range of scientists are needed to inform the development of international treaties and agreements.
- A wide variety of mapped information is required by state and federal agencies in Alaska. Development of research and teaching programs in remote sensing techniques is required to support these efforts.

NATURAL RESOURCES

EMPHASIS:

The area of natural resources has long been a focal point of UAF. This area of traditional strength includes instruction, research and outreach in agriculture, fisheries, forestry, wildlife and minerals. Enhancements will emphasize sustainable, responsible development that enhances quality of life and economic opportunities for people and communities.

OPPORTUNITIES:

Agriculture: The return of the U.S. Department of Agriculture research service provides enhanced opportunities for expansion in the fields of entomology and weed science to serve not only the agricultural community but also all managers of public lands. Alaska's horticulture/landscape industry is rapidly increasing and new programs in horticulture and arboretum management will service this important new industry. Expanded soil science and water quality programs provide opportunities for statewide linkages in both arenas.

Fisheries: A recent endowment has established the Rasmuson Fisheries Research Center to support 10 graduate students per year. Research funding (Pollock Conservation Research Center) and four endowed chairs have been provided by Alaska's fishing industry. These developments and the prospect of a new state-of-the-art research vessel puts UAF in an excellent position to address critical fishery and oceanographic issues through research and education.

Forestry: The growing national interest in sustainability is raising new questions about the use and management of forest resources.

Wildlife: In addition to continued interest in management of Alaska's wildlife, there are exciting new possibilities for connecting traditional wildlife research and instruction to efforts in environmental and human health through studies of ecotoxicology and subsistence foods.

Minerals: The decline of petroleum production at Prudhoe Bay, projections of future demand for natural gas and newly discovered deposits of precious metals are changing the nature of the Alaska minerals industry.

NEEDS:

Agriculture: Solutions are needed to address weed and insect problems that have long plagued Alaska's agricultural industry and parks, where invasive plant species are rapidly making new inroads. Although the horticulture/landscape industry is the most rapidly growing segment of the agricultural industry in Alaska, needs extend far beyond traditional agriculture to roadside maintenance, arboretum management and even urban parks.

Fisheries: Alaska's fisheries are in crises, and we need information on many issues related to changes in the biological productivity of Alaska's marine systems in response to environmental change and to human influence. It is critical to conduct research to understand the basic structure and function of these systems and to train scientists needed for research and management of these resources.

Forestry: Long-term ecological research and education as well as expansion in the fields of recreation and commercial forest product applications are examples of efforts needed to properly understand Alaska's forests and to utilize them in a sustainable fashion.

Wildlife: Increasing concerns about subsistence foods and diets, including potential contamination in wild animals, call for research that addresses the path of contamination through the wildlife and plants that make up the subsistence diet. Toxicology can provide the link between the animal/plant and human response to diet and foods that represent a way of life in subsistence communities.

Minerals: New approaches to fossil fuel production (e.g., coal-bed methane, gas hydrates, gas-to-liquid technology), transportation (e.g., gas pipeline) and conservation (e.g., cold weather housing) are needed as are cost-effective, environmentally sound techniques for developing mines in remote areas.

TEACHER PREPARATION

EMPHASIS:

In partnership with school districts and other education constituents across Alaska, UAF's School of Education is enhancing its capacity to: (A) prepare a much larger number of high quality beginning teachers; (B) support and mentor beginning teachers through their initial years of teaching; and (C) provide effective professional development opportunities for Alaska's current classroom teachers.

OPPORTUNITIES:

Alaska is in the midst of a comprehensive educational improvement effort, known as the Alaska Quality Schools Initiative (AQSI), as well as efforts to comply with the federal "No Child Left Behind" legislation. Through the standards on which the AQSI is based, Alaska education from preschool through advanced teacher training is being reconceptualized to improve the performance of Alaska's students, teachers and schools. As part of this coordinated effort, programs within the School of Education have evolved to capitalize on the opportunities presented by the AQSI. Our emphasis on rigorous standards-based preparation, professional accountability and culturally responsive teaching aligns precisely with the emphasis of the AQSI and is consistent with the philosophy behind the federal regulations. This program emphasis, along with rapid developments in distance education infrastructure, technology and pedagogy, provides unique opportunities for UAF to prepare and support a new generation of teachers for Alaska's schools.

Alaska's educational needs focus on three closely related problems; the highest teacher turnover and attrition rate in the nation, the highest percentage of teachers prepared outside the state and a severe teacher shortage, primarily in rural areas. Expanding our capacity to prepare more beginning teachers and to provide all teachers with ongoing professional development and support directly addresses all three of these problems.

NEEDS:

- Our state institutions of higher learning are currently able to meet only a small percentage of Alaska's annual need for new teachers. In 2000, UA programs prepared approximately 100 new teachers, while school districts had more than 1,100 vacancies to fill. Clearly, increasing our capacity to prepare significantly larger numbers of high quality beginning teachers must be a high priority.
- **Teacher Induction:** Along with the preparation of high quality beginning teachers is the need to support these teachers throughout their initial years of teaching. Research conducted by our faculty has already demonstrated the effectiveness of a formal mentored induction process in helping new teachers make the transition into this challenging profession. Effective induction programs will reduce the current unacceptable turnover and attrition rate for teachers (15 percent for teachers trained in Alaska; 35 percent for Alaska's teachers trained in other states). In addition, a mentored induction process – developed and implemented in partnership with local school districts – promises to reduce the time necessary for a beginning teacher to become an effective professional.
- **Master Teacher Development:** The third area of Alaska's needs being addressed by the School of Education is the development of a program to increase capabilities, effectiveness and professional recognition of Alaska's best experienced teachers. To do this, we are capitalizing on a model, which emerges from a partnership between the National Board for Professional Teaching Standards (NBPTS) and the National Council for Accreditation of Teacher Education (NCATE). In our iteration of this model, teachers can complete a Master of Education degree that is aligned with NCATE standards, with a specific focus on the development of the knowledge and skills emphasized in the NBPTS certification process.