



**CURRENT**

**and EMERGING**

**MACROTHEMES**

THE UNIVERSITY  
OF NEVADA, LAS VEGAS

# *Current and Emerging Macrothemes University of Nevada, Las Vegas*

## *Executive Summary*

The University and Community College System of Nevada (UCCSN) Master Plan for higher education includes an improved and discrete mission differentiation for its member institutions. The UCCSN Master Plan defines the University of Nevada, Las Vegas (UNLV) as one of the System's Universities that are comprehensive research institutions offering education from the baccalaureate through the master's and doctoral levels. The mission is further defined accordingly:

*The universities will provide selected graduate and professional programs in niche areas, and doctoral programs will correlate to defined research strengths. The Universities will make significant contributions to new knowledge, economic development, and the culture of the State. Admissions policies will define specific preparation levels necessary to be successful.*

As part of this strategic planning process, as well as internal planning initiatives, senior leadership at UNLV has been working with a broad and diverse group of approximately 150 faculty members to identify major research strengths that characterize the contribution of UNLV to Nevada and the nation. Through this process, UNLV has identified a number of macrothemes or clusters that effectively describe current and emerging academic and research strengths on the campus. These Macrothemes are characterized by interdisciplinary teams on campus and with the community.

The process that led to the identification and development of the Macrothemes began during the 2000-01 academic year when President Carol C. Harter convened a series of "Think Tank" sessions with faculty and administrators. Those sessions were designed to explore emerging research opportunities for UNLV consistent with the ongoing UCCSN Master Plan development. Subsequently, at the Provost's Planning Retreat for the Academic Council in the Summer of 2001 the Macrotheme concept was discussed and the number of macrothemes expanded. Since that time, the Macrothemes have been further defined through campus discussion of the individual Macrotheme Working Groups. Each Macrotheme Profile includes general descriptions, relevant UNLV academic degree programs, specific research projects and external funding as well as strategic/tactical plans for future Macrotheme development. The *Summaries of the UNLV Current and Emerging Macrothemes* and *The Macrotheme Working Groups* are included as part of this Executive Summary

This First Edition of *Current and Emerging Macrothemes* is intended to be a living document subject to subsequent revision in text and composition of the Working Groups consistent with the development of new interdisciplinary themes at UNLV.

## ***Summaries of UNLV Current and Emerging Macrothemes***

***Hospitality, Gaming, Tourism, Recreation and Entertainment Technologies*** represents the efforts of the Colleges of Fine Arts, Hotel Administration, Engineering and Liberal Arts and centers on research and creative activity into the management and provision of services where current and emerging technologies support operations in hospitality management and the performing arts. Examples of technology-based efforts in the entertainment industry include design and control of lighting systems, robotics and animatronics, development of control systems and the use of virtual reality to enhance entertainment value. Examples of current partnerships with UNLV include the Entertainment Development Corporation and Citibank supporting the Professional Film Crew Training Program and Westwood/Viacom supporting student and faculty research in the creative use of computer technology in the arts and architecture.

***Arid Lands and Environmental Science, Policy, and Engineering*** currently is being conducted by a large and diverse number of faculty spanning at least 7 colleges, 10 departments and the Harry Reid Center for Environmental Sciences. This interdisciplinary effort focuses on the biotic and abiotic relationships that occur in the Mohave Desert of southern Nevada and by extension, to all arid lands on a global basis in order to assess existing interrelationships in the fragile desert landscape. Owing to the rapidly expanding urbanization of arid lands it is essential that there is an improved understanding of the impacts of population growth on natural resources. Examples of UNLV research efforts include critical analysis of seismic risk in the Las Vegas Valley, biotechnology programs for experimental propagation of exotic plant species, organically produced biofilms to reduce potential toxic materials in southern Nevada and watershed management as a tool to reduce flood-hazard potential.

***Language, Literacy, Literature, and Communications*** combines the fundamental elements that are the basis of human communication, the transmission of knowledge, and the vehicles through which new knowledge is created and disseminated. This macrotheme assesses those literary strengths that are an important source of personal and community self-esteem that, in turn, deliver skills and inspiration for wider economic and social opportunities. This macrotheme's primary objectives include exploration of the concept of literacy in its many applications (reading/writing, visual, computer, media, etc.), and improving the quality of life by encouraging literacy and language fluency, promoting literate citizens with the ability to identify, access, critically evaluate and use information in its various formats, ensuring availability and creation of good literature, helping Nevadans understand cultural differences by improved communication, and preparing professional communicators that use a variety of media. Research and creative activities in the Colleges of Liberal Arts, Fine Arts, Education, and Urban Affairs include such programs as the Creative Writing Program in partnership with the Peace Corps, the International Institute of Modern Letters, the English Language Center, Arnold Shaw Center for Popular Music, the Literacy Development Center, and programs in the Hank Greenspun School of Communication.

***Social and Urban Issues: Outreach and Collaborations*** work with and in a diverse community to address the critical social and urban problems that arise in a dynamic environment. Such issues may include child welfare, provision of health services, urban growth and development, public leadership, assessing public programs and projects, and criminal justice practices. Led by the Colleges of Urban Affairs and Liberal Arts, the goal of this effort is to reach out to the public and collaborate with community partners to identify and resolve contemporary social and urban issues. Examples of UNLV research and creative activity include the Animal Shelter Program, Nevada Institute for Children, M.A.S.H. Project for Counseling and Psychology, the Center for Individual, Couple, and Family Counseling, Metro Mental Health Task Force, and the Safe Communities Partnership.

***Informatics*** connotes a convergence of information, data, and communications technology. This convergence is evident in integrated personal devices for telephone and video communication that are reshaping society not only in electronic commerce but in entertainment, health and lifestyle changes. Many exciting new developments are driven by computing and information science and now are becoming essential within virtually all academic disciplines and societal sectors. Such research and creative activity are either based in or dependent upon informatics at UNLV and involve the humanities, the social sciences, professional schools, the arts and sciences. Examples include the use of computer graphics in media and film, information overload and data visualization, electronic journals, information security, synthesis of bio- and information technology in smart chips that detect toxic substances, use of geographical information systems (GIS) to improve local and regional planning, remote consultation and diagnosis in medicine and dentistry (telemedicine) enabled by Internet2, and data mining to unravel behaviors so complex that computer processing is the only means to achieve understanding.

***The Analysis and Preservation of History, Culture and Society*** will serve to analyze and document social, cultural, economic, and historical patterns enhancing our ability to understand the past, present and future. Primarily involving the Colleges of Liberal Arts, Fine Arts, Engineering, Urban Affairs, Hotel Administration, and the Lied Library Special Collections these programs emphasize the collection of data and the subsequent management/archiving of that data. Examples of current programs include the Women's Research Institute of Nevada, oral history projects about Las Vegas, Lake Mead, Nevada Veterans, Nevada Women and the Nevada Test Site, the Center for Democratic Culture, the Gaming Studies Research Center, Nevada Desert Cultures Curriculum, History of the American West, Las Vegas, the local and regional environment.

***School Improvement, Assessment of Learning and Educational Research*** will provide leadership in understanding the role of education and learning in developing individuals across their lifespans. Emphasis will be placed in developing the potential of Nevada citizens to be informed and self-sufficient learners living in and contributing to the development of healthy learning communities. This macrotheme is based on preserving and enhancing a seamless view of education from pre-school through higher education

and from students learning in schools to the preparation of teachers, school leaders and university faculty. In all of these activities there is a natural intersection between efforts to improve education practices, assessing learning, and conducting systematic research and evaluation studies to determine what makes a difference in teaching and learning in the variety of disciplines such as science, math and English. Primarily led by the UNLV College of Education, this effort also includes research and creative activity with the University Teaching and Learning Center and the Clark County School District such as the Paradise Professional Development School, Urban Teaching Partnerships, Special Education Cohort Program, the Principal Cohort Program, the Center for Accelerating Student Achievement, development of Literacy Specialists associated with the Nevada Reading Excellence Act, the Center for Educational Research and Planning, and Project THREAD (integrating technology into preservice teacher education and field experiences).

***Biomedical and Health Sciences/Biotechnology*** has emerged as a rapidly developing macrotheme. Based upon the foundation of existing academic programs in the Colleges of Health Sciences, Engineering, and Sciences, as well as unique programs in the Colleges of Urban Affairs and Liberal Arts, the relatively recent organization of the UNLV Cancer Institute and the UNLV School of Dentistry (that includes viable partnerships with the University of Nevada School of Medicine and the University of Nevada, Reno) this area provides a broad array of research and creative activity into understanding the causes, treatments, and cures of human diseases as well as development of strategies promoting and maintaining human health. Examples of current research and creative activity include mechanisms underlying the development and treatment of cancer, applications of biotechnology to forensic science, innovations in prosthesis design, forensic dentistry and mobile testing of student oral health, environmental toxicology and health, and environmental health promotion.

***Business and Economic Development, Diversification and Management*** evaluates the factors and processes within a community that determine job creation, increase job skills and wages within the labor force and promote development in regional industries and businesses. Not only does the University itself generate significant jobs, additional spending and increased tax revenues for local and regional economies, but groups working within this macrotheme provide critical analysis, business advice, and technological expertise about economic trends and technical needs to local and regional stakeholders such as city, county, and state governments, development authorities, enterprise corporations, and area chambers of commerce. Led by the Colleges of Business, Education, and Engineering, examples of such groups at UNLV include the Center for Energy Research, Center for Workforce Development and Occupational Research, Nevada Manufacturing Research Center, Nevada Small Business Development Center, Center for Business and Economic Research, Lied Institute for Real Estate Studies, Cannon Center for Survey Research, Center for Health Information Analysis and the UNLV Research Foundation.

## ***Energy and Materials Science***

- A. Renewable Energy and Alternative Fuel Sources*** explores the richness of Nevada's natural energy resources including wind, solar, biomass, and geothermal that can be used to meet the energy needs of the region and nation. Led by the Colleges of Engineering and Sciences, faculty and students are involved in research activities and in academic programs related to the development of alternative fuels, energy conservation, energy-efficient transportation systems, enhanced fuel cycles and environmentally friendly energy production.
- B. New Materials and Composites*** involves experimental, analytical and theoretical work on the component materials of natural and man-made systems ranging in size from the micro size (organic light-emitting devices, chemically specific sensors and stockpile and waste-form materials) to the macro size (construction materials, composites, smart materials, explosives and geologic formations). Primarily conducted in the Colleges of Engineering and Sciences, this focus serves to evaluate factors influencing disposal of hazardous materials, optimize manufacturing practices, enhance performance of components in industrial processes, and contribute to Nevada's economic diversification through development of sophisticated technologies such as nanotechnology.

## ***Macrotheme Profile Working Groups***

### ***Hospitality, Gaming, Tourism, Recreation and Entertainment Management***

Jeffrey Koep (Dean of the College of Fine Arts) and Stuart Mann (Dean of the William F. Harrah College of Hotel Administration), Group Leaders

Sean Clark (Fine Arts), Shannon Sumpter (Fine Arts), Audrey McCool (Hotel), Patti Shock (Hotel), David Schwartz (Lied Library), Fred Preston (Liberal Arts), Larry Mullen (Urban Affairs)

### ***Arid Lands Environmental Science, Policy and Engineering***

Fred Bachhuber (Interim Dean of the College of Sciences), Group Leader

Stan Smith (Sciences), Brenda Buck (Sciences), Spencer Steinberg (Sciences), Aimee Govett (Education), Mark Hoversten (Fine Arts), Mark Rudin (Health Sciences), Alan Simmons (Liberal Arts), Helen Neill (Urban Affairs), Penny Witten (Library)

### ***Language, Literature and Communication***

Barbara Cloud (Associate Provost for Academic Affairs), Group Leader

Stephen Caplan (Fine Arts), Kai Murphy (Fine Arts), Tom Burkholder (Urban Affairs), Maria Meyerson (Education), Vicki Holmes (ELC), Dmitri Shalin (Liberal Arts), Douglas Ferraro (Liberal Arts), Douglas Unger (Liberal Arts), Ellis Pryce-Jones (Fine Arts), Chris Sugnet (Library), Cathie Kelly (Fine Arts), George Urioste (Liberal Arts), J. Michael Stitt (Liberal Arts), Dick Gerdes (Liberal Arts)

### ***Social and Urban Issues/Community Outreach: Services to Diverse Populations***

Martha Watson (Dean of the Greenspun College of Urban Affairs), Group Leader

Jeanne Brown (Library), Roberta Williams (Sciences), Porter Troutman (Education), Walter Vodrazka (Engineering), Ann McDonough (Fine Arts), Pat Markos (Urban Affairs), Dolores Tanno (Urban Affairs), David Hassenzahl (Urban Affairs), Ramona Denby (Urban Affairs), Terry Miethe (Urban Affairs), Ann Lukemeyer (Urban Affairs), Mark Hoversten (Fine Arts), Martha Knack (Liberal Arts), Cynthia Carruthers (Hotel)

### ***Informatics***

Stephen Rice (Vice Provost for Research), Group Leader

Hal Berghel (Engineering), Tom Narkter (Engineering), Emma Regentova (Engineering), Shahram Latifi (Engineering), Paul Schulte (Sciences), George Miel (Sciences), Rik Orndorff (Sciences), Helga Watkins (Fine Arts), Randy Hale (Fine Arts), Paul Traudt (Urban Affairs), Soonhee Kim (Urban Affairs), Randall Boone (Education), Kendall Hartley (Education), Gary Palmer (Liberal Arts), Tim Fackler (Liberal Arts), Don Carns (Liberal Arts), Russ Hurlburt (Liberal Arts), Gurpreet Dhillon (Business), Joe Lombardo (Supercomputing Center), Lori Temple (Information Technology), Brad Eden (Library), Pearl Brewer (Hotel)

***Analysis and Preservation of History***

Jim Frey (Dean of the College of Liberal Arts), Group Leader

John Tuman (Liberal Arts), David Henry (Urban Affairs), Peter Michel (Library), Vicki Cassman (Liberal Arts), Barbara Luke (Engineering), Terry Knapp (Liberal Arts), Kate Hausbeck (Liberal Arts)

***Educational Research, School Improvement, and Assessment of Learning***

Gene Hall (Dean of the College of Education), Group Leader

Lisa Bendixen (Education), Robert McCord (Education), Sandra Odell (Education), Linda Quinn (Education), Greg Schraw (Education), Lee Bernick (Urban Affairs), Darva Campbell (Fine Arts), Louis Kavouras (Fine Arts), Bill Leaf (Fine Arts), Chris Kearney (Liberal Arts), Peter Starkweather (Sciences), Steve Rowland (Geosciences), Michelle Schultz (Sciences), Nancy Master (Library), David Hames (Business)

***Biomedical and Health Sciences/Biotechnology***

Stephen Carper (Director of the UNLV Cancer Institute), Carolyn Sabo (Dean of the College of Health Sciences), Group Leaders

Bryan Spangelo (Sciences), Jeff Shen (Sciences), Chuck Regin (Education), Marta Meana (Liberal Arts), Edward Neumann (Engineering), Susan Meacham (Health Sciences), John Mercer (Health Sciences), Steen Madsen (Health Sciences), Wes McWhorter (Health Sciences), Dianne Cyrkiel (Health Sciences), Lawrence Scheier (Urban Affairs), Susan Silverton (Dentistry), Penny Amy (Sciences)

***Business and Economic Development, Diversification, and Management***

Rich Flaherty (Dean of the College of Business), Group Leader

Teresa Jordan (Education), Dawn Neuman (Sciences), Ron Smith (Liberal Arts), Cory Tucker (Library), Skip Swerdlow (Hotel), George Stelluto (Fine Arts), Keith Schwer (Business), Steve Miller (Business), Alan Schlottmann (Business), Mike Clauretie (Business), Darryl Deale (Business), Michael Graham (Business-NBSBDC)

***Energy and Materials Science***

Darrell Pepper (Interim Dean of the Howard R. Hughes College of Engineering), Group Leader

***A. Alternative and Sustainable Energy and Fuel Cycles***

Bob Boehm (Eng), Y. Baghzouz (Eng), Bill Culbreth (Eng), David James (Eng), Bob Schill (Eng), John Farley (Sciences), Vern Hodges (Sciences), Adil Sharag-Eldin (Liberal Arts), David Hassenzahl (Urban Affairs), Kent Crippen (Education), Joel Wisner (Business)

***B. Materials Science Engineering and Design***

Ken Fridley (Eng), Gerry Frederick (Eng), Samaan Ladkany (Eng), Moses Kaarakouzian (Eng), Mohamed Trabia (Eng), Brendon O'Toole (Eng), Ajit Roy (Eng), Rama Venkat (Eng), Dennis Lindle (Sciences), Linda Sapochak (Sciences), Clay Crow (Sciences), Brackley Frayer (Fine Arts), John Catterall (Fine Arts)

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