

**MINUTES  
of the  
FOURTH MEETING  
of the  
SCIENCE, TECHNOLOGY AND TELECOMMUNICATIONS COMMITTEE**

**September 22-23, 2016  
New Mexico State University Golf Course  
Las Cruces**

Meeting as a special subcommittee, the Science, Technology and Telecommunications Committee (STTC) was called to order by Senator Michael Padilla, chair, on September 22, 2016 at 10:01 a.m. at the Club House Meeting Room at the New Mexico State University (NMSU) Golf Course in Las Cruces.

**Present**

Sen. Michael Padilla, Chair  
Rep. Jason C. Harper  
Rep. Bill McCamley  
Rep. Debbie A. Rodella  
Rep. John L. Zimmerman

**Absent**

Rep. James E. Smith, Vice Chair  
Sen. William F. Burt  
Rep. Stephanie Garcia Richard  
Sen. Daniel A. Ivey-Soto  
Rep. Conrad James  
Sen. Bill B. O'Neill  
Sen. John C. Ryan  
Rep. Carl Trujillo

**Advisory Members**

Sen. Carlos R. Cisneros  
Rep. Kelly K. Fajardo  
Sen. Ron Griggs (9/22)  
Sen. Richard C. Martinez  
Sen. Mary Kay Papen

Sen. Jacob R. Candelaria  
Rep. Antonio Maestas  
Sen. Steven P. Neville  
Sen. William H. Payne  
Sen. Nancy Rodriguez  
Rep. Nick L. Salazar  
Rep. Luciano "Lucky" Varela  
Sen. Peter Wirth  
Rep. Monica Youngblood

**Guest Legislators**

Rep. Idalia Lechuga-Tena (9/22)  
Sen. William P. Soules

(Attendance dates are noted for members not present for the entire meeting.)

**Staff**

Gordon Meeks, Legislative Council Service (LCS)  
Shawna Casebier, LCS

**Guests**

The guest list is in the meeting file.

**Handouts**

Handouts and other written testimony are in the meeting file.

**Thursday, September 22**

Senator Padilla welcomed the committee to the fourth meeting of the STTC for the 2016 interim. Members of the committee and the staff were invited to introduce themselves.

**Welcome and State of the University**

Dr. Daniel Howard, Ph.D., provost and executive vice president, NMSU, welcomed the committee to NMSU and gave an update on NMSU's administrative, academic and research initiatives. He stated that, most importantly, the university is transforming itself to streamline administrative processes, reduce fragmentation and improve purchasing processes, resulting in millions of dollars in savings from a properly calibrated administration. Dr. Howard also detailed for the committee an initiative in general education to move from a focus on content to a focus on essential skills, the creation of eight "meta-majors" for undeclared/undecided students and the development of the Aggie Pathway, in which NMSU partners with the community college system to provide support and academic alternatives for students not quite ready for the university level. Dr. Howard also shared with the committee recent news, including the opening of the first-in-the-state Patent and Trademark Resource Center and the award of several grants, including one from the National Institutes of Health (NIH) for cancer research collaborations with the University of New Mexico (UNM), a National Science Foundation grant to ensure that students from all demographics are included in the science, technology, engineering and mathematics (STEM) disciplines and a \$1.2 million grant to transition to a new consortium model at the Sunspot Solar Observatory.

Questions and discussion from committee members included:

- possibilities for budget cuts at NMSU;
- administrative consolidation of higher education throughout the state;
- cancer research collaboration with UNM; and
- the benefits of the Sunspot Solar Observatory to NMSU, the state and the nation.

**STEM Initiatives in Public Schools**

Referring to the handout "Formal and Informal STEM Outreach at NMSU", representatives of NMSU's various colleges presented initiatives that NMSU is undertaking at the university, in public schools and in the community to encourage the study and application of STEM.

Dr. Karen Trujillo, Ph.D., director of K-12 outreach, College of Education, NMSU, stressed that 80% of the jobs of the future will require STEM skills. She noted that a focus on STEM education for minorities and females, who are currently underrepresented in the disciplines and make up more than one-half of New Mexico's population, presents a unique opportunity for New Mexico to prepare its population for future success.

Dr. Barbara Chamberlin, Ph.D., project director, Learning Games Lab, NMSU, shared with the committee that math and science education is funded at one-seventh the level of literacy education, although math achievement has been shown to be a better indicator of student success. She reviewed learning games and media products that have been developed by NMSU to engage students in science in addition to STEM-related programs in the community and schools, such as 4-H, the Agricultural Extension and Education Center at Memorial Middle School and Future Farmers of America, that are inspiring students to study STEM and preparing them for higher education and future careers.

Kathryn Renner Hansen, director and chief executive officer, Arrowhead Center, NMSU, explained that Innoventure is a middle school and high school program offered throughout the state that inspires youth to create scientific, technical and business solutions through innovation. With summer camp programs for middle school students and entrepreneurial programs for students in grades K-5, students at all grade levels are practicing the application of STEM skills by developing technology products and businesses that solve specific real-world problems.

Dr. Enrico Pontelli, Ph.D., interim dean, College of Arts and Sciences, NMSU, discussed the benefits of computational thinking across disciplines, outreach and support for female students in computing-related disciplines, the importance of science tools in the classroom and efforts to increase the number of people who learn about and understand smart grid technologies. Dr. Pontelli noted that success in STEM is closely related to reading and writing, and the STEM curriculum has a role in helping teachers to teach students to read and write.

Dr. Susan Brown, Ph.D., interim associate dean of research, College of Education, NMSU, reviewed programs in grades K-16, including the MC<sup>2</sup> MathLab, the Science, Engineering, Mathematics and Aerospace Academy, the Digital Media Academy and the Creating Opportunities Using Numerical Thinking program, that were designed to get students excited about studying math and to make connections between math and other disciplines, such as art and geography. Dr. Brown also discussed STEM professional development for teachers, STEM outreach facilities and the STEM pipeline of various summer camp, cocurricular and extracurricular programs designed to encourage and inspire STEM knowledge and ways of thinking.

Dr. Patricia A. Sullivan, Ph.D., associate dean for outreach and public service, College of Engineering, NMSU, shared with the committee how NMSU is leveraging its facilities, equipment and knowledge to build STEM capacity for students in grades K-16. Dr. Trujillo concluded with future steps for STEM education in New Mexico, noting that there is a great need

to graduate more STEM teachers in the state and to coordinate with the different colleges to ensure that there are academic programs offering STEM-based degrees at all levels, in addition to supporting K-12 STEM education and the professional development of teachers.

Questions and discussion from committee members included:

- how to evaluate the success of the various programs;
- the next-generation science standards;
- the need for experts in STEM fields to be pedagogically trained;
- opportunities and barriers for retirees in STEM fields to obtain a license or certificate to teach;
- aggressive student loan forgiveness for STEM teachers staying in New Mexico;
- professional development for teachers and mentoring of schools;
- the number of STEM teachers graduating each year versus the number of STEM teachers that New Mexico needs;
- work with the Economic Development Department and Workforce Solutions Department;
- collaborations with UNM and the New Mexico Institute of Mining and Technology (NMIMT); and
- international exchange programs, cross-border collaborations and international STEM competitions.

### **Computer Science Training in Public Schools**

Elisa Cundiff of Las Cruces High School; Melody Hagaman of Centennial High School; Paige Prescott, Computer Science Teachers Association, New Mexico Chapter; and Dr. Pontelli, referring to their handout "Computer Science and High Schools A Call for Action", discussed with the committee the importance of computer science and computational thinking in educational pursuits and the workforce. Emphasizing that computer science teaches logic, problem-solving, understanding of the world and creativity, the panelists underscored the need for computer science to be an integral part of students' education and encouraged legislative action to, at a minimum, allow the option for computer science courses to count as a rigorous course for math and/or science high school graduation requirements. If computer science counted as a credit for graduation, the panelists explained, more funding would be available for successful programs, curriculum standards would be developed and more females and minorities would be encouraged to study computer science.

Questions and discussion from committee members included:

- potential committee endorsement of the proposed legislation;
- the importance of computer science knowledge at Sandia National Laboratories;
- legislation models from Idaho, Utah, Colorado, Wisconsin and New Jersey;
- collaborations with UNM, NMSU, NMIMT and the national laboratories for technical expertise;

- whether computer science should count as a credit for math, science or language arts;
- job-creation opportunities for students;
- the disparity of participation in computer science classes between male and female students and potential reasons why;
- the benefits of teaching computer science fundamentals to K-12 students and elementary school teachers;
- the fiscal impact of allowing computer science to count as a graduation credit; and
- minimum education requirements for coding careers.

### **Building a Smarter Energy Infrastructure**

Matthew Jaramillo, federal and state governmental affairs, Public Service Company of New Mexico (PNM), and Carlos Lucero, P.E., New Mexico governmental affairs, PNM, referring to their handout, "Building a Smarter Energy Infrastructure", addressed the committee on PNM's pending rate case before the Public Regulation Commission (PRC) and stated that the requested rate increase is needed for PNM to recoup its past energy investments and to continue to invest in energy infrastructures and new technologies. Mr. Jaramillo also addressed consumer protection concerns relating to the leasing and financing of private rooftop solar systems. Legislative action was requested to create a customer bill of rights that would require greater transparency and disclosure to protect consumers who are interested in financing, leasing or purchasing private solar systems and to standardize and streamline the interconnection processes for the private systems.

Questions and discussion from committee members included:

- problems with rooftop solar system financing, lease and purchase power agreements;
- the need for required disclosures, such as those required for credit cards, for rooftop solar installation financing;
- PNM's progress on meeting the renewable energy portfolio standards set by the legislature;
- the PRC's rule that rooftop solar panels may only be installed to meet, at maximum, 120 percent of the user's average peak use;
- community solar systems;
- solar installation on public or government buildings;
- PNM's investment in energy infrastructure;
- smart meters;
- electrocution of cats by power lines;
- electricity rates in New Mexico compared with neighboring states; and
- PNM's rate increase application.

### **Tour of NMSU Chiller Plant**

The committee toured NMSU's Central Utility Plant, a utility production center providing steam, electricity and chilled water for the NMSU main campus.

## **Friday, September 23**

The meeting's second day reconvened at 9:04 a.m.

### **NMSU Research Initiatives**

Sudha K. Murthy, director, Office of Research and Development, NMSU, referring to her handout "NMSU Research Overview", opened the discussion with an overview of NMSU's research profile and strengths, its award of various grants and its collaborations with other universities, national laboratories and institutions outside of the state. For the latest relevant successes, Ms. Murthy shared with the committee NMSU's award of the 2016 National Science Foundation Major Research Instrumentation Program Award of a high-resolution orbitrap fusion mass spectrometer for multidisciplinary research in the state, which will have applications in the energy, environmental and biosciences fields. She also detailed a premier award from the NIH for a collaborative effort between NMSU and UNM for a drug discovery project focused on the design and development of new synthetic compounds that target estrogen-related physiology and disease, particularly breast cancer.

Dr. Satyajayant "Jay" Misra, associate professor, Department of Computer Science, NMSU, described NMSU's recent interdisciplinary research initiatives. Highlighting initiatives in smart grids and energy management, cyber-security and cyber-defense, and data science and data analytics, Dr. Misra demonstrated how collaborations among various NMSU colleges, national laboratories and private enterprise enable excellent interdisciplinary research and training for students, sustain NMSU as a hub for expertise in the fields and address important problems faced by a technologically advanced modern society.

Henry M. Cathey, Jr., deputy director, Physical Science Laboratory (PSL), NMSU, recounted that the PSL was created in 1946 to support the United States Department of War with rocket technology and has grown today to have expertise in aerospace, the modern electronic battlefield, intelligence community solutions and information sciences and security systems. Mr. Cathey demonstrated that the PSL's strengths lie not only in its research, education and training capabilities, but also in its unique ability to utilize over 15,000 square miles of uncongested airspace with varied terrain and excellent year-round flying conditions.

Dr. R.T. James McAteer, associate professor, NMSU, referring to the Sunspot Solar Observatory, explained to the committee why it is important for the sun to be studied, its role in humans' understanding of the universe and its impacts on man-made infrastructure. He stated that the Sunspot Solar Observatory is not only important to New Mexico as a productive scientific laboratory, but also as a go-to scientific tourist destination and a driver of economic stability. He explained that jobs at the observatory are currently paid for through a National Science Foundation grant, but that these positions will be transferred to other observatories in Hawaii and Colorado. NMSU intends to take over the operations of the observatory and run it less expensively and more efficiently.

Blane M. Sanchez, program manager, New Mexico Water Resources Research Institute (WRRI), discussed with the committee statewide water assessment efforts. He stated that a model of the state's water budget is available online, and this model, supported by new science, helps develop model scenarios for water resource planning on river basin, county, regional and statewide scales. The WRRI is also actively involved in supporting students, faculty research and peer-reviewed technical reports and keeping the New Mexico water community informed through conferences and workshops. Mr. Sanchez indicated that funding would be requested from the state to maintain the WRRI's contribution to the understanding of water issues.

Questions and discussion from committee members included:

- the need for greater publicity of NMSU's research;
- unmanned aviation vehicles;
- NMSU's research successes and grant awards;
- meetings with municipalities and government entities regarding the use of new technologies;
- government laboratory clearance for students;
- solar flare data dissemination;
- the status of the Office of the Attorney General's Consumer Protection Fund; and
- the efficient and economical operation of the Sunspot Solar Observatory.

### **Approval of Minutes**

The minutes of the STTC meeting of August 22-23, 2016 were recommended to be approved by unanimous voice vote of members present, which did not constitute a voting quorum.

### **Technology Commercialization and Economic Development Initiatives**

Working through their handout, "Economic Engagement Related to Work Plan Items 2, 3, 5, 6, 13", Dr. Kevin Boberg, Ph.D., vice president for economic development, NMSU, Terry Lombard, director of intellectual property and technology transfer, NMSU, Dr. Misra, Dr. Sullivan and Wayne L. Savage, executive director, Arrowhead Park, NMSU, addressed the committee regarding NMSU's economic engagement efforts and approach.

Beginning the discussion by addressing national trends relating to increased technology transfer, Ms. Lombard noted that: a proactive approach is needed to reach out to private companies to partner with the university to utilize its research capacities; potential commercialization of research efforts incentivizes researchers; and the partnerships contribute to the mutual benefit and growth of the university and industry. Utilizing a three-phased approach of research and disclosure; evaluation and protection; and commercialization and licensing, NMSU works with its Office of Vice President for Economic Development, research deans, venture capitalists and licensing agents to get industry involved in its research efforts.

Dr. Misra reviewed the technology needs of small businesses and noted that small businesses in the Las Cruces area are uniquely underserved in technology support, workforce support, economic policy and state and local government support. He said that the Arrowhead Center serves as a great asset to these small businesses in providing assistance with technology incubation, patenting processes, identification of funding sources and subject matter expertise, in addition to assisting with creation of the workforce by educating and graduating well-rounded students.

Next, Dr. Sullivan discussed developments in science, technology and telecommunications and highlighted grant programs, such as the National Science Foundation's participation grant to assist students transferring into the engineering curriculum and its Pathways to Innovation program that helps institutions transform the experience of their undergraduate engineering students to incorporate innovation and entrepreneurship into their studies. She stated that these programs, and others hosted by NMSU, utilize a multidisciplinary approach to create a "real world environment" for students to learn best practices and be prepared for the business world.

Mr. Savage then described Arrowhead Park at NMSU and the cluster approach to economic growth that has been used in this master-planned community. Mr. Savage described Arrowhead Park, which is 95 percent funded by the private sector, as a mixed-use space that includes a health technology cluster anchored by NMSU, the Burrell College of Osetopathic Medicine and five tenant partners. It is a creative campus that is not only a physical location but also a concept to assist industry to grow in the world of digital media. Considered a successful public-private development model, average salaries at Arrowhead Park are well-above the average for the region. Dr. Boberg concluded the discussion by noting that collaboration, coordination, congruity and conjunction are the principles upon which NMSU has undertaken its economic engagement initiatives for the future.

Questions and discussion from committee members included:

- the use of NMSU resources, such as the wind tunnel, by private industry;
- the incentivization of private-sector work;
- the job-creation potential of NMSU's research initiatives;
- the goal of education to educate and prepare students for the workforce;
- statewide collaboration regarding the New Mexico Experimental Program to Stimulate Competitive Research; and
- graduate student requirements to design start-up ventures before graduating.

### **Information Technology Spreadsheet Report**

Darryl Ackley, secretary, Department of Information Technology (DOIT), demonstrated for the committee the DOIT's new web-based project management portfolio ([www.doit.state.nm.us/project\\_dashboards.html](http://www.doit.state.nm.us/project_dashboards.html)). Developed as a means to more efficiently present project updates to the committee, the web portal provides the status of all projects in the



four phases of initiation, planning, implementation and closeout, including budget updates, concerns or risks encountered and the status of the project schedule, which are all updated in near real time.

Questions and discussion from committee members included:

- project status notifications to project managers;
- the meaning of colors and symbols used in the project management portfolio;
- the consistency of project information provided to the DOIT by other departments;
- quality control of the project information before it is uploaded to the web portfolio;
- the use of transparency to incentivize agencies to be diligent in project management;
- the feasibility of an alert system to notify project managers and executive leadership on project deficiencies or problems; and
- outreach efforts by the DOIT to train agencies on how to use the project management portfolio.

### **Adjournment**

There being no further business before the committee, the fourth meeting of the STTC for the 2016 interim adjourned at 11:48 a.m.