



## DELAWARE STATE UNIVERSITY

OFFICE OF THE PROVOST AND VICE PRESIDENT FOR ACADEMIC AFFAIRS

June 5, 2006

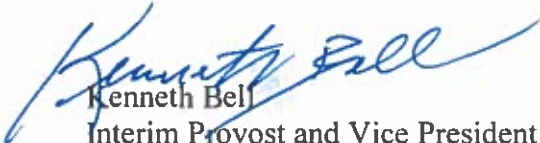
Ms. Nancy Mathews Castro  
CW CESU Program Coordinator  
Appalachian Laboratory UMCES  
301 Bradock Road  
Frostburg, MD 21532

Dear Ms. Mathews Castro:

Please find enclosed the full application for membership to the Chesapeake Watershed Ecosystem Studies Unit by Delaware State University. Delaware State University is an 1890 Land Grant institution with well-documented national and international contributions to education, research and extension in the broad areas of land use and conservation, and environmental management. The University has equally been known for its contribution to basic and applied defense and military research.

I am therefore delighted to forward for your attention our application to become a member institution of the CW CESU. Delaware State University will contribute immensely to the strength of the academic member institutions of the CW CESU. Our membership application is supported by the NRCS and the agency will write you a letter to that effect. Please do not hesitate to call my office should you need addition information about the application. I am looking forward to hearing from you.

Sincerely,

  
Kenneth Bell  
Interim Provost and Vice President  
for Academic Affairs

cc: Dr. Allen Sessoms, President  
Dr. Tommy Frederick, Assoc. Provost for Research  
Dr. Dyremple Marsh, Interim Dean, CARS  
Dr. Ambrose Anoruo, Assoc. Dean for Research, CARS

Enclosures:

United States Department of Agriculture



Natural Resources Conservation Service  
P.O. Box 2890  
Washington, D.C. 20013

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JUL 12 2006

Dr. Robert Gardner  
Director, Chesapeake Watershed CESU  
Appalachian Laboratory  
301 Braddock Road  
Frostburg, Maryland 21532

Dear Dr. Gardner:

This letter is written to express support from the Department of Agriculture, Natural Resources Conservation Service (NRCS) for the membership of Delaware State University in the Chesapeake Watershed Cooperative Ecosystems Studies Unit (CESU). They would be an excellent addition to this successful partnership. We are aware of the expertise and facilities that would enhance and support the capabilities of the CESU in delivering high quality research, technical assistance, and education. For example, the NRCS is particularly interested in developing projects that take full advantage of their abilities in aquaculture. In addition, the Herbarium, with its extensive collection, will provide valuable information to our Plant Data Center.

Again, we support their application and look forward to working with Delaware State University as a partner in the Chesapeake Watershed CESU.

Sincerely,

  
LAWRENCE E. CLARK  
Deputy Chief  
Science and Technology

cc: Sheryl H. Kunickis, NRCS National CESU Council Representative

**PROPOSAL FOR MEMBERSHIP TO THE CHESAPEAKE  
WATERSHED COOPERATIVE ECOSYSTEM STUDIES UNIT**  
by  
**DELAWARE STATE UNIVERSITY**

**1. Contact person, along with title, address, phone number, fax and e-mail address:**

Dr. Ambrose O. Anoruo  
Associate Dean for Research  
Delaware State University  
College of Agriculture and Related Sciences  
1200 N. DuPont Highway  
Dover, DE 19901-2277  
Phone Number: 302-857-6400  
Fax Number: 302-857-6402  
E-mail: aanoruo@desu.edu

**2. List of programs relevant to Federal land management, environmental and research agencies, including the degrees offered and number of graduate students in each program:**

Programs <sup>1</sup>	Degrees Offered	Number of Graduate Students <sup>2</sup>
General Agriculture	BS	
Agri-Business	BS	
Animal & Poultry Science	BS	
General Agriculture	BS	
Plant Science (agronomy, horticulture)	BS, MS	2
Natural Resource Management	BS, MS	20
Biology	BS, MS	20
Biotechnology	BS	
Chemistry	BS, MS	1
Applied Chemistry	MS	1
Computer Science	BS	
Information Technology		
Systems Engineering (DSU/UD)	BS	
Systems Development & Theory	BS	
Systems Operation	BS	
Physics	BS, MS	8
Physics/Engineering Emphasis (DSU/UD)	BS	
Airway Science		
Airway Science Management (Mgmt)	BS	
Aircraft Systems Management (Prof. Pilot)	BS	
Accounting	BS	

Management		
General Management	BS	
Information Systems	BS	
Business Economics	BS	
Human Resource Management	BS	
Business Administration	MBA	57
Mathematics		
Pure Mathematics	BS, MS	2
Applied Mathematics	BS, MS	4
Applied Maths & Mathematical Physics	Ph.D.	24
Non-Department/Programs		
Special students	MS	13
Non-matriculating/undeclared	MS	24

<sup>1</sup> Only programs that are relevant to Federal land management, environmental and research agencies are listed (2005 data).

<sup>2</sup> Number of graduate students are listed only for those programs that are relevant to Federal land management, environmental and research agencies, and offer graduate degrees (2005 data).

**3. List and brief description of faculty with expertise in disciplines and interdisciplinary work relevant to Federal land management, environmental and research agencies:**

No	Name	Degree	Degree Awarding Institution	Research Description/Interest
1	Al-Sameen Khan	Ph.D.	Univ. of Delaware	Semiconductor Materials and Devices
2	Ambrose O. Anoruo	Ph.D.	Yale University	Forestry/Plant Physiological Ecology
3	Andrew Goudy	Ph.D.	Univ. of Pittsburgh	Physical Chemistry
4	Art Tucker	Ph.D.	Rutgers University	Plant Science
5	Arthur Purdy	Ph.D.	Univ. of Delaware	Solid State Physics
6	Cyril Broderick;	Ph.D.	Univ. of New Hampshire	Plant Biology, Biotechnology
7	Dawn A. Lott	Ph.D.	Mathematics	Applied Mathematics
8	Dennis McIntosh	Ph.D.	University of Arizona	Aquaculture
9	Dewayne Fox	Ph.D.	NC State University	Fisheries Science
10	Dragolib Pokrajac	Ph.D.	Washington State Univ.	Computer Science/Applied Mathematics
11	Dyremple Marsh	Ph.D.	Univ. of Minnesota	Horticulture/Env. Science
12	Ehsan Helmy	Ph.D.	Univ. California at LA	Atomic and Nuclear Physics
13	Essaid Zerrad	Ph.D.	Univ. of Connecticut	Theoretical Physics
14	Fengsahn Liu	Ph.D.	Univ. of Delaware	Applied Mathematics
15	Gabriel Gwanmesia	Ph.D.	SUNY at Stony Brook	Geophysics, Mineral Physics
16	Gulnihal Ozbay	Ph.D.	Auburn University	Mariculture
17	Ken Maciorowski	Ph.D.	Texas A&M University	Poultry Science
18	Kevina Vulinec	Ph.D.	University of Florida	Wildlife Ecology, Tropical

				Ecology
19	Lin Zhongyan,	Ph.D.		Computer & Info. Science
20	Maria Labreveux	Ph.D.	Penn State University	Plant Sci–Agronomy, Grazing Systems
21	Mazen Shahin,	Ph.D.	Lvov State University	Mathematics
22	Michael Maciarelo	MS MS	Univ. of Maryland –ES Univ. of Delaware	Mycology Plant Science
23	Michael Reiter	Ph.D.	Univ. of Virginia	Environ. Science/Natural Resource Mgmt
24	Mingxin Guo	Ph.D.	Penn State University	Soil Science
25	Noureddine Melikechi	D.Phil.	Univ. of Sussex, England	Optical Physics, Laser Spectroscopy
26	Patrick Gleeson	Ph.D.	Univ. of Delaware	Low Temperature Physics
27	Peter DiMaria	Ph.D.	Temple University	Biochemistry
28	Randel Peiffer	Ph.D.	Penn State University	Sust. Agriculture, Plant Science
29	Richard Barczewski	Ph.D.	Univ. Maryland - CP	Animal Sci., Sust. Agriculture
30	Rob Naczi.	Ph.D.	Univ. of Michigan	Plant Science, Taxonomy; Herbarium Curator
31	Sadiq Wasfi	Ph.D.	Georgetown Univ	Inorganic Chemistry
32	Susan Yost	Ph.D.	City Univ. New York	Ecology

#### 4. A List and brief description of relevant facilities and equipment:

Facilities: Science and engineering facilities at Delaware State University (DSU) will be described as available at the end of 2005 fiscal year, and the National Science Foundation terminology will be adopted. As at the end of FY 2005, Delaware State University has:

- Dry laboratories, including computer laboratories, behavior observation laboratories, etc
- Laboratory support space, including autoclave rooms, darkrooms, equipment areas, storage areas for research equipment and supplies for research, etc
- Instructional laboratories that are also used for research
- Core laboratories that serve other laboratories
- Leased space that is used for research
- Offices for research activities
- Space used for research containing nonfixed equipment costing \$1 million or more such as MRI.
- Biosafety Levels 1 & 2 Research Animal space
- Herbarium with more than 98% collection of known flora of Delmarva Peninsular
- 34 ponds aquaculture research facility (~9 acres of water in total)
  - all ponds equipped with electrical service for aerators
  - temperature and humidity controlled feed storage facility
- 45' x 65' environmentally controlled wet lab with 5 independent systems
  - 4 recirculating systems are each equipped with micro-screen filters, bead filters, heaters (9-kw each), chillers (5-hp each) and ultraviolet sterilizers

2 recirculating systems with 9 1,000-L tanks each  
2 recirculating systems with 3 5,700-L tanks each  
18 143-L larval rearing tanks

- Hickory Hill Farm - 75 acre forage livestock research farm
- Smyrna Outreach and Research Center – 192 acre crop, demonstration farm
- Seafood Safety Laboratory
- Herb Research Center
- Applied Mathematics Research Center
- Center for Applied Optics
- Hydrogen Storage Research Center
- Forage Analysis Laboratory
- Tissue Culture Laboratory
- Three large research laboratories equipped with:
  - **Optical Tables:**  
Six optical tables (two in each lab), five of these have vibration isolation.
  - **Laser systems:**  
Argon ion laser (10-Watt),  
Tunable (700-1000 nm) Titanium:Sapphire femtosecond/picosecond laser,  
Q-switched Nd:YAG laser (250/450 mJ at 532/1064 nm),  
Low power Argon ion laser (less than 1 Watt),  
Several *cw* and pulsed Laser diodes (700-980 nm),  
Telecommunication lasers (1310 nm and 1550 nm) diode lasers,  
Two red (630 nm), one orange (545 nm) and one green helium-neon lasers
  - **Spectrophotometers and monochromators:**  
High Resolution fibered Spectrometer  
UV/VIS/NIR Spectrophotometer  
One manual monochromator.
  - **Light detection and accessories:** A variety of laser power meters and detectors for both *cw* and pulses, CCD cameras with image processing accessories, femtosecond autocorrelator and preamplifiers
  - **Optics and positioning equipment:** UV/VIS/NIR optics including high power and ultrafast laser optics, Piezoelectric 3-axis sub-micron micropositioners, Optical choppers
  - **Oscilloscopes:** Digital Communications Analyzer, 1 GHz Real-Time Oscilloscope, several general purpose oscilloscopes (500 MHz).
  - **Computers:** Three networked and internet-connected Pentium-based PCs, Hardware for automation of experiments, LabVIEW-based instrument control including motion control, Fortran and MathCAD-based numerical computations.

Additionally, DSU has advanced computing and networking facility/capability for research and instructional activities. At the end of FY 2005, DSU has the following computing and networking capacities:

- Total bandwidth of 100 megabits/second and this will be upgraded to 156-622 megabits/second at the end of FY 2006
- Total bandwidth to Abilene of 11-45 megabits/second at the end of FY 2006

- Connection speed of 100 megabits/second in FY 2005 upgraded to 1-2.5 gigabits/second connection speed at the end of FY 2006
- 99% of DSU desktop ports have hardwire connections at 100 megabits/second
- 75% and 25% of DSU desktop ports are connected to the University's network with Category 5 and 5e cables respectively
- Dark fiber connection between buildings
- 11-45 megabits/second connection between local university computer and any external computer on commodity internet or Abilene
- 100% of DSU building will be covered with wireless connection at the end of FY 2006
- Two high performance computing systems

Equipment:

- Gas Chromatograph Mass Spectrophotometer (3)
- Scanning Electron Microscope
- BD FACS Calibur Flow Cytometer
- Hyperspectral spectrometer and software
- Research-grade compound/phase microscopes
- Dissecting scopes attached to digital cameras with image processing software
- Field laptop and lab desktop computers
- Fluorometer
- Several GPS units including Trimbles
- ENVI hyperspectral image processing software
- Ion Chromatograph
- Total Carbon/Total Nitrogen analyzer
- Daisy incubator - In-Vitro digestibility
- Li-Cor 6400 gas chamber exchange analyzer
- Li-Cor light meter
- Li-Cor leaf area meter
- PMS water potential pressure chamber
- Plot harvesters
- pH and conductivity meters
- Muffle Furnace, oven driers, incubators, scales, digesting blocks, stirring plates, hot plates, filtration systems, water purification system
- Water Quality Analysis
  - 1 - HACH Spectrophotometer
  - 2 - YSI 556 Multiprobes
  - 1 - YSI Dr9000 photometer
  - 1 - YSI 55 Oxygen meter
- General Equipment
  - 2 - tractors
  - 1 - micro-mower
  - 1 - backhoe attachment for tractor
  - 1 - Kawasaki mule 4x4 Transporter
  - 2 - John Deere Gators
  - 1 - 1991 GMC 1/2 ton pick-up

- 1 - 2006 F-350 Crew Cab 4x4 Pick-up
- 2 - live hauling tanks
- 1 - portable generator/welder
- 1 - portable generator
- 2 - 100-kw back up generators (1 for each aquaculture building)
- Ford 4000 Tractor
- John Deere 2 row planter
- Buffalo 2 row planter
- Buffalo 2 row cultivator
- Buffalo 5 foot stalk chopper
- Ford 6 foot roto-tiller
- 6 foot rotary mower
- Research boats for fisheries (2)
- Digital library of more than 21,000 mass spectra of volatile constituents
- Cepheid Smart Cyclers for real-time PCR analyses (2)
- MJ thermocyclers for standard PCR (2)
- Applied Biosystems BioCad perfusion chromatograph for protein purification
- Perkin Elmer LS-50 luminescence spectrophotometer for enzyme analyses
- Sorvall RC 5C centrifuge and a Discovery 100S ultracentrifuge
- 6-ft. Labconco biosafety cabinets (2)
- 6-ft. Labconco shellfish biosafety cabinet
- Nikon TE-200 inverted microscope with camera and high powered objectives
- Nikon E600 epifluorescence microscope with TV monitor and digital camera
- Mettler analytical balances, microcentrifuges and a Beckman benchtop centrifuge
- BioRad electrophoresis equipment
- Castle autoclave
- Savant vacuum system and gel drier
- Photography equipment and Konica film developer
- Infrared Spectrometers (2)
- Perkin Elmer TGA (2)

DSU has a lot more facilities and equipment too many to enumerate here but the above list is representative of facilities and equipment DSU will offer the CESU.

**5. A list and brief description of relevant experience in research, technical assistance education linked to CESU Network objectives (such as previous grants, special projects awards and so forth):**

Delaware State University faculty members possess relevant research experiences that are important to the CW CESU Strategic Plan as well as meet the research needs of the CW CESU Federal partners. DSU faculty have previously been extensively involved in military research with the Department of Defense, and land management research with the National Park Service, Bureau of Land Management, USDA Forest Service, and Natural Resources Conservation Service. Some DSU faculty, their fields of specialization and research interests in the fields that are relevant to the CW CESU Network objectives include:



1. Anjun Biswas, Ph.D.  
 Research capability – Applied Mathematics and Theoretical Physics  
 Research: Multiple – Scale Perturbation Analysis of the Perturbed Nonlinear Schrodinger’s Equation, Dynamic systems and Optical Solutions
2. Sabrina Brougher, Ph.D.  
 Research capability – Pulmonary Biology  
 Research: Characterization of Surfactant Protein Expression in Avian Lung.
3. Gabriel D. Gwanmesia, Ph.D.  
 Research capability – Mineral Physics  
 Research: Fabrication of dense isotropic polycrystalline specimens of pyrope garnet in uniaxial split-sphere apparatus
4. Preston Hayward, Ph.D.  
 Research capability – Polymer Chemistry  
 Research: Structures and properties of associated ionic polymers, such as Nafion used in fuel cells sensors.
5. Al-Sameen Khan, Ph.D.  
 Research capability – Optical and Electronic Characterization of Group IV Semiconductor Alloys  
 Research: Proficiency in Auger spectroscopy, Photoluminescence, Electroluminescence, Hall Effect, C-V Analysis, Chemical Etching, Optical Microscopy and Scanning Electron Microscopy.
6. Lin Zhongyan, Ph.D.  
 Research capability – Partial Differential Equations, Numerical Analysis, Underwater Acoustics, Inverse Problems and Image Processing  
 Research: Mathematical Modeling of Acoustic field in Shallow Oceans with Interactive Seabeds.
7. Fengsahn Liu, Ph.D.  
 Research capability – Applied Mathematics  
 Research: Inverse Problems, Ground Penetrating Radar, Nonlinear Monotone Operators, Numerical Analysis, Wavelets, 3D Modeling, Signal Analysis and Image Processing.
8. Dawn A.Lott, Ph.D.  
 Research capability – Applied Mathematics and Mathematical Modeling  
 Research: Computational methods in Biomechanical and Biomedical Engineering and the use of infinite elements for determination of optimal closure patterns based on stress analysis mathematical modeling for tissue wounds.
9. Nouredine Melikechi, Ph.D.  
 Research capability – Applied Optics  
 Research: Laser Spectroscopy and Applied Optics

10. Jaiwant Mulik, Ph.D.  
Research capability – Computer Networking and Enumerative Combinatorics.  
Research: Scalable Video Surveillance Network Systems
11. Dragolib Pokrajac, Ph.D.  
Research capability – Data Mining, Surveillance, Motion Detection and Tracking Research:  
Evaluating reliability of motion features in surveillance videos, and motion detection based  
on Local Variation of Spatiotemporal Texture.
12. Mazen Shahin, Ph.D.  
Research capability - Functional Analysis  
Research: Nonlinear Differential Systems with Interface and Nonlinear Conditions
13. Xiquan Shi, Ph.D.  
Research capability – Numerical Mathematics and Reverse Engineering  
Research: 2D/3D Image Processing, NURBS and Splines.
14. Jiguang Son, Ph.D.  
Research capability – Finite Element Method and Computational Electromagnetic  
Research: Scattering and Inverse Problems and Parallel Computation
15. Elena D. Surovyatkina, D.Sc.  
Research capability – Applied Mathematics and Theoretical Physics  
Research: Nonlinear Dynamics, Nonlinear Analysis, Theory of fluctuations, Bifurcations and  
Critical Phenomena.
16. Bizuneh Workie, Ph.D.  
Research capability – Electrochemistry  
Research: Electrochemical procedure to test catalytic activity of platinum supported on  
carbon; Hydrogenation of olefins using palladium nano-particles prepared with pulse  
electrochemical deposition; electrochemical synthesis and Mossbauer spectroscopic study  
samarium/iron film; electrodeposition of metal alloys and mixed oxides from the  
tetranuclear heteropolymetallic complexes.
17. Xianggen Xiz, Ph.D.  
Research capability – Communication Systems  
Research: Equalization and coding SAR and ISAR, imaging and filterbanks, wavelets, time  
frequency analysis and other signal and image processing.
18. Essaid Zerrad, Ph.D.  
Research capability – Mathematical Physics and atomic collisions  
Research: Ionization of atoms or ions by electrons impact with special focus on extension of  
the Hartree Fock self-consistent-field (SCFO approach to scattering systems).

19. Guoping Zhang, Ph.D.  
Research capability – Applied Mathematics and Mathematical Physics  
Research: Synthetic Aperture Radar, Digital Signal and Image Processing, Nonlinear Analysis.
20. Michael Reiter, Ph.D.  
Research capability – Natural resource management and Environmental Science  
Research: Coastal resource management, human impacts on natural systems, risk assessment and planning, aquatic ecology; integrated conceptual modeling, phycology (stream, freshwater), limnology, multidisciplinary methodologies for resource management, service learning programs.
21. Dewayne Fox, Ph.D.  
Research capability - Fisheries Science  
Research: Diadromous and estuarine/marine fisheries ecology and management
22. Gulnihal Ozbay, Ph.D.  
Research capability – Mariculture  
Research: Water quality driven toxicity in harmful algae, shellfish-algae dynamics, nutrient management, water quality, aquaculture with regards to water quality management, aquatic ecology.
23. Dennis McIntosh, Ph.D.  
Research capability – Aquaculture  
Research: Ways to decrease environmental impact of aquaculture through effluent management/mitigation; water quality, baitfish aquaculture production, alternative aquaculture production, aquaculture design/engineering, low-salinity production of marine species, fisheries restoration/stocking, education/outreach.
24. Kevina Vulinec, Ph.D.  
Research capability - Wildlife Ecology, Tropical Ecology  
Research: Biodiversity and anthropogenic change in tropical ecosystems; Secondary seed dispersal by dung beetles; Ungulate seed dispersal in temperate and tropical ecosystems; Bat activity patterns and habitat requirements.
25. Art Tucker, Ph.D.  
Research capability - Plant Science and Essential Oils of Plants  
Research: Plants of flavor, fragrance, and medicine, especially Africa and Latin America; Identification of "potpourri" ingredients on the U.S. market and preparation of a Lucid Key; The Evaluation of Potential Oil and Fragrance Crops and Techniques for Delmarva farmers
26. Randel Peiffer, Ph.D.  
Research capability - Sustainable Agriculture, Plant Science  
Research: Forage management and utilization, crop ecology and crop physiology

27. Cyril Broderick, Ph.D.  
 Research capability - Plant Biology, Biotechnology  
 Research: Physiology and biochemistry of plant processes that lead to improved whole plants, increased yields, and improved quality in the variety of products that plants produce.
28. Maria Labreveux, Ph.D.  
 Research capability - Plant Science – Agronomy, Grazing Systems  
 Research: Agro-ecology of grazing systems with special focus on ecophysiology of grass forage species, and mixed ruminant grazing systems
29. Mingxin Guo, Ph.D.  
 Research capability - Soil and water quality chemistry.  
 Research: Environmental fate and transport of agrochemicals in soils and water; Biogeochemistry of trace elements in soil and aquatic systems; Dissolved organic matter characterization and solid-water interfacial phenomena; Soil-based recycling of organic wastes; Soil remediation and land reclamation.
30. Ken Maciorowski, Ph.D.  
 Research capability - Poultry Science and Management  
 Research: Demonstration of biological best management practices that reduce nitrogen and phosphorus loading of the Chesapeake Bay; US-Romanian avian influenza research and action program for the containment of catastrophic disease in poultry
31. Richard Barczewski, Ph.D.  
 Research capacity - Animal Science, Sustainable Agriculture  
 Research: Integrated Pest Management of Insect Pests of Alfalfa; Animal Behavior
32. Mr. Michael Maciarello, MS  
 Research capability – Mycology, Plant Science  
 Research: Survey of the Volatile Oil Constituents of Aromatic Herbs, Medicinal Plants, and Ethic Herbs; Evolving Numerical Series From the Sum of Constituent Digits in the Higher Powers of 3; The mushrooms of Delmarva.
33. Susan Yost, Ph.D.  
 Research capability - Plant Ecology  
 Research: Population biology of native plant species; Invasive plant species; Urban forest restoration; Vegetation survey
34. Rob Naczi, Ph.D.  
 Research capability - Plant Science, Taxonomy  
 Research: Tropical Agriculture, Ecosystems, and Conservation in Belize; Claude E. Phillips Herbarium; Systematics of Sedges (Cyperaceae: Carex); Systematics of Western Hemisphere Pitcher Plants (Sarraceniaceae); Electron Microscopy
35. Ambrose O. Anoruo, Ph.D.  
 Research capability – Plant physiological ecology, Tree physiology, Environ. Science

Research: Habitat and ecosystem restoration, plant nutrient uptake and translocation, phytoremediation, forest and watershed management

36. Dyremple Marsh, Ph.D.

Research capability – Horticulture, Environmental Science

Research capability: Nitrogen fixation and availability; nitrogen (nitrate) loading

**6. A list and description of current formal and informal relationships with Federal land management, environmental and research agencies**

Delaware State University has a variety of formal and informal relationships with federal agencies engaged in land management, environmental science and research. Some of these relationships include;

No.	Agency	Brief Description
1.	DOD - Army	Ref. No. W911WX-05-CO115: A project to support the US Army Research needs to transmit video information from unmanned aerial vehicle to a ground station. The work involves encoding, compression, and decoding.
2.	DOD – Air Force	Agreement No. FA9550-05-1-0377: Generalized Hartree-Fock to Collisional Ionization
3.	DOD	Agreement No. 48563-RT-ISP: Ionization of Ionic Atomic Targets by Electron Impact
4.	DOD - Army	Ref. No. W81XWH-06-1-0260: An 800 K detection and diagnosis of early ovarian cancer using novel sensitive optical technology
5.	DOD – Army	DAAD19-03-1-0375: Multidisciplinary research to solve applied mathematics problems in the military.
6.	DOD	A 4 million dollar collaboration between DOD and the Applied Mathematics Research Center at DSU
7.	DOE/DOT	A 3.2 million dollar collaboration between DOE/DOT and the Hydrogen Research Center at DSU
8.	USDA - NRCS	<p>Ref. No. 68-21J2-5-21: Collaboration to support Delaware State University to develop and disseminate Delaware specific techniques related to grazing land conservation.</p> <p>There is also another partnership between DSU and NRCS to restore bat habitats at the Smyrna Agricultural Outreach and Research Center, DE. The work is funded by the NRCS.</p>

9.	USDI - National Park Service	<p>Study # ASIS-00031; Permit# ASIS-2005-SCI-0008: Collaboration between Delaware State University (DSU) and the National Park Service to study if feral horses are dispersing or predating seeds of dune plants and other vegetation on Assateague Island National Seashore.</p> <p>There is a separate collaboration between DSU and the National Park Service in a multi-disciplinary team approach to assess the potential for biological control of gypsy moth in a project entitled "Improving Gypchek: Field Evaluations of LdMNPV Produced In Vitro Virus"</p>
10.	USDA - CSREES	<p>DSU has 21 different collaborative projects in agriculture and watershed management between it and the USDA-CSREES through Capacity Building projects.</p>
11.	NOAA	<p>DSU has seven (7) different collaborative efforts with the National Oceanic and Atmospheric Administration for work ranging from coastal and marine habitats management to studies of the American eel and mycobacteriosis control in the Chesapeake Bay stripe bass.</p>
12.	USDA – Forest Service	<p>DSU has collaboration between it and four different USDA-Forest Service labs in a multi-disciplinary team approach to assess the potential for biological control of gypsy moth in a project entitled "Improving Gypchek: Field Evaluations of LdMNPV Produced In Vitro Virus"</p>
13.	USDA – ARS	<p>DSU collaborates with three different USDA-ARS labs in a multi-disciplinary team approach to assess the potential for biological control of gypsy moth in a project entitled "Improving Gypchek: Field Evaluations of LdMNPV Produced In Vitro Virus"</p> <p>A recent collaborative effort exists between DSU and the USDA-ARS Beneficial Insects Introduction Research Unit on the IPM of insect pests of alfalfa.</p> <p>Also, DSU is site for the USDA-ARS Center of Excellence in Sea Food Safety. Two USDA-ARS scientists are permanently stationed at DSU to run the USDA Sea Food Safety laboratory.</p>
14.	USDA - AMS	<p>The Agricultural Marketing Service of the USDA has a liaison permanently stationed at DSU.</p>

16.	USDA - APHIS	Ref. No. 05-8210-0468-CA: Collaboration between DSU and USDA-APHIS to identify and authenticate potpourri ingredients on the U.S. market and also to prepare the Lucid Key.

**7. A description of services to be provided to the participating Federal agencies and Federal employee(s) by the university.**

Delaware State University, by its charter as a Historically Black 1890 Land Grant Institution, and by its location and programs, will provide services which do not only supplement the services offered to the participating Federal agencies and employees by the University members of CW CESU but will also open new service delivery to the Federal agencies and training opportunities for Federal employees.

The City of Dover is site for one of the largest DOD Air Force bases in the United States. The reputation of the Airway Science curriculum at DSU is known throughout the country. The Department of Airway Science at DSU is largely populated by the US Air Force personnel. This is a unique niche of service DSU plans to continue to offer to the DOD as a member of CW CESU.

DSU will also offer unique watershed and land management expertise to the CW CESU participating Federal agencies engaged in conservation and land management. DSU's hyperspectral imaging and ENVI software offer the Federal partners the opportunity to look at large scale land use, conservation and ecosystem restoration east of the Chesapeake Bay. Additionally, Dr. Michael Reiter of the College of Agriculture and Related Sciences at Delaware State University has developed an all encompassing ecosystem model which embodies valuable ecosystem components (VEC) that are adversely impacted by land use, and environmental stress and perturbation drivers including societal, socioeconomic and political issues generating the drivers. This unique land management tool will be available to the participating Federal land conservation and management agencies.

As I have already stated above, DSU is a Historically Black Land Grant University with tripartite charter of education, research and extension. DSU therefore will occupy the CW CESU niche to reach the society's under-served and under-represented members of our population. This is a unique niche no current CW CESU institution occupies or offers the Federal partners. The land Grant charter makes DSU unique for this service to the Federal partners on behalf of CW CESU.

Additionally, DSU's non-traditional graduate programs attract a lot of Federal employees, especially the under-represented group, who attend evening and night classes for graduate degrees. Also, DSU will continue to collaborate with the Federal partners in land use, conservation, management and agricultural research east of the Chesapeake Bay especially in Delmarva.

**8. A description of actual assessed overhead rate (not to exceed 15%) to be charged and cost items to which the rate is applicable for activities conducted through the CESU, including research, technical assistance and educational services.**

DSU charges overhead at the rate of 55% of salaries and wages only. However funding agency stipulation overrides the University rate and this will apply to the CW CESU 15% maximum charge for overhead. It is important to point out here that 55% of salaries and wages always equals 8% -10% of total direct project cost and this is less than the maximum rate CW CESU allows.

Another important point to know is many USDA projects are not charged any overhead by DSU rather a 5% state audit fee is assessed.

**9. A description of administrative support, including the ability (and administrative charges, if any) to transfer, subcontract and receive funds between CESU partners and through the national CESU Network.**

DSU has a Sponsored Programs Office and no fee is charged by the office to perform its duties. The same applies to the University Contract Office. All DSU administrators who will be engaged in the administrative phase of the CESU have Administrative Assistants and no fees will be charged specifically for administrative support services.

**10. Staff, faculty time, educational services and other commitments the university wishes to offer the CESU, including the amount, kind, dollar value and duration of assistantship, work-study funds, clerical support, and so forth.**

It is somewhat difficult to foresee or predetermine staff, faculty time, educational services and other commitments the university wishes to offer the CESU, including the amount, kind, dollar value and duration of assistantship, work-study funds, and clerical support CESU would need and for the university to go ahead and offer them up front. It is however necessary to clearly state that DSU will offer all services within its reach to the CESU any time the need arises. These services include personnel services (staff and faculty services and time), equipment, space, assistantship, and work-study opportunities. The duration of these services will be as agreed by all the CW CESU partners including DSU.