



Office of the Chair
University Senate Council
10 Administration Building
Lexington, Kentucky 40506-0032
FAX (859) 323-1062; (859) 257-5872
<http://www.uky.edu/USC/>

25 August 2000

TO: Members, University Senate

FROM: University Senate Council

RE: AGENDA ITEM: University Senate Meeting, Monday 11 September 2000
Proposal to establish a multidisciplinary research center: Center for Sensor
Technology. If approved, the proposal will be forwarded to the administration for
appropriate action.

Proposal to establish a Center for Sensor Technology:

A multidisciplinary research center is an educational unit established for the administration of multidisciplinary programs that are primarily research in nature. Such centers may also have a clinical and/or service role. Attached is a proposal to establish a multidisciplinary research Center for Sensor Technology (CenSeT) in the College of Medicine, Medical Center. The Center will focus on the development and use of state-of-the-art sensor techniques for the studies of chemical dynamics of biological systems. Detailed information is contained in the proposal.

All affected units support the proposal. It has been reviewed and unanimously approved by the Senate's Committee on Academic Organization and Structure and is recommended to the Senate by the Senate Council.

Attachment

A Proposal to Create a Center for Sensor Technology (CenSeT)
Submitted by the College of Medicine
University of Kentucky

[1] Goals and Significance:

We propose to establish the Center for Sensor Technology (CenSeT) at the University of Kentucky. The Center will focus on the development and use of state-of-the-art sensor techniques for the studies of chemical dynamics of biological systems. This Center represents a continuation of a "Center Without Walls" that was established at the University of Colorado in 1991. It was formally known as The Rocky Mountain Center for Sensor Technology and was originally formed following a grant award from the National Science Foundation and a mandate from the program officer, Dr. Nathaniel Pitts.

Our continuing goals are to:

- (1) develop new sensor technologies and instrumentation;
- (2) train students, postdoctoral fellows, and faculty in sensor-based methodology;
- (3) formulize relationships with industry for development and production of new instrumentation; and
- (4) to serve as a technology center for the University of Kentucky and for the scientific community at large.

This is a unique opportunity for the University of Kentucky as most current NSF-supported centers of this type were formed on campuses other than those involving a medical school. Based on the previous eight years of the operation of the former Center, the new Center for Sensor Technology will likely become a world leader in the development of microsensing technology for improved understanding of biological systems and development of new methods to improve healthcare for individuals with brain disorders.

[2] Justification

A major communication pathway in biological systems involves chemical signaling. Many of these processes involve the efflux of small organic molecules and proteins that result in communication between biological organisms and a variety of cells in the central and peripheral nervous systems of man and animals. The ability to measure such signaling chemicals during the rapid signal process is a difficult process. Recently, microsensor development has spurred the development of such devices that allow for direct measures of the communication between biological systems. These methods involve microsensing devices that can measure the rapid and spatially resolved neuronal transmissions that occur between biological organisms. In particular, brain cells communicate with chemicals on rapid and diminutive spatial scales. The deficit in this communication will cause a neurological problem such as Parkinson's disease. An understanding of such chemical processes would yield to better treatments for Parkinson's disease and a greater understanding of biological communication at the level of plants, fruits, vegetables, animals signaling in the ocean, and a large cross section of other chemical signaling occurring in organisms throughout the world. A greater understanding of chemical signaling in organisms is needed for a diverse cross section of the scientific community and the public. The Center for Sensor Technology will seek to develop new sensing technologies and instrumentation for the further understanding

of chemical signaling in medical science. In particular, these new technologies will lead to better health care for individuals with brain disorders such as Parkinson's disease, Huntington's chorea, and Alzheimer's disease.

[3] Faculty Leadership:

The Director of the Center for Sensor Technology will be Dr. Greg A. Gerhardt, Professor of Anatomy and Neurobiology and former Director of the Rocky Mountain Center for Sensor Technology at the University of Colorado. He has a national and international reputation for research in the areas of Parkinson's disease, neuropharmacology, and the development of technologies for measuring neurochemical release from biological systems. In addition, Mr. Pete Huettl will be the Assistant Director of the new Center. Mr. Huettl has worked extensively on the development of sensor technologies. He has had extensive experience in biotechnology and he will bring his strengths to the development of the Center. Dr. Gerhardt will be recruiting an additional number of postdoctoral fellows, visiting faculty, and technicians to the Center for Sensor Technology at the University of Kentucky.

[4] Reporting Relationships:

The Center for Sensor Technology will be a Center reporting to Chancellor James Holsinger. The Center will work with faculty from the following academic departments: Anatomy and Neurobiology, Neurology, Biochemistry, Pharmacology, Physiology, and the Sanders-Brown Center on Aging. In its initial formulation, the Center will focus exclusively on contributions in the medical sciences and will involve faculty from the Medical Center. As the Center develops, we anticipate faculty from other departments and/or colleges will participate.

[5] Staff and Facilities Requirements:

At this time, the Center for Sensor Technology will be classified as a NSF style "Center Without Walls." The space for the administration and laboratory needs of the Center will reside in the Magnetic Resonance Spectroscopy and Imaging Center (MRSIC) at the Chandler Medical Center. The administrative space will be on the first floor, housing Dr. Gerhardt, Mr. Huettl, and his administrative staff. The laboratories of the Center for Sensor Technology will reside in the basement of the MRSIC. Postdoctoral fellows, graduate students, visiting faculty, and technical staff will all reside in this space. At the present time, there is approximately 600 net square footage of space for the administrative needs of the Center. In addition, approximately 2500 square feet is designated for the functions of the Center in conjunction with Dr. Gerhardt and his laboratory. The space is being renovated using funds that have been designated for CenSeT space.

[6] Equipment or Instrumentation Needs:

At present, Dr. Gerhardt's current lab and his start-up funds received from the University of Kentucky, Chandler Medical Center will provide enough specialized equipment to support the initial phase of CenSeT operation. In addition, the MRI facilities of the MRSIC ensure the capabilities of the Center and support the instrumentation needs for CenSeT. Acquisition of new equipment will occur in future years through additional extramural grant support and possible equipment funds from intramural equipment applications.

[7] Proposed Operating Costs:

The costs of the Center will be funded from the start-up funds received for Dr. Gerhardt and the existing NSF and NIH support for Dr. Gerhardt. The following is a list of the current grant support for Dr. Gerhardt that will be transferred to the University of Kentucky:

NIA, R01 AG06434. "Age-Induced Changes in Monoamine Presynaptic Function" (Dr. Greg Gerhardt, P.I. [20% effort, no salary support]). Current year costs \$158,478; total project requested costs \$841,381; duration 12/11971 1 t30102.

NSF, DBI 9730899 "Ceramic Based Multi-Site Electrode for Electrochemical and Electrophysiological Recording", [10% effort]. First year costs \$109,000; total project requested direct costs \$218,000; duration 4115198-4114/00.

NIMH, 1 R01 MH58414 UNitric Oxide and Cholinergic Mechanisms in Schizophrenian, [20% effort]. Requested first year costs \$165,874; total project requested costs \$1,177,093; duration 1211/98-11/30103.

NIMH, 1K02 MH01245 (RSDA Level II). "Dopamine Dynamics in Animal Models of Dopamine Depletion.. Dr. Greg Gerhardt, P.I. [100% salary support only]. Current year costs \$76,338; total project costs \$358,686; duration 4/1/95 3/31/2000. This work involves studies of dopamine diffusion and dopamine release in animal models of movement disorders.

NIH, 1 R01 NS35642 "GDNF-Induced Recovery in Parkinsonian Monkeys. (Dr. Don Gash, Univ. of Kentucky, P.I.; Dr. Greg Gerhardt, Senior Investigator [5% effort]. Current year direct costs \$163,286; total project direct costs \$509,712; duration 911196-6130199 NIH, 1P01 AG13494 UAgging Central Dopaminergic Systems in Primates". (Dr. Don Gash, Univ. of Kentucky, P.I.; Dr. Greg Gerhardt, Project 2 P.I. [10% effort].

Current year costs \$121,270; total project costs \$3,965,591; duration 2/18/971/31/2002.

NIH, "Use of Chronoamperometry to Measure Extracellular 5-HT" (Dr. Alan Frazer, P.I.), Dr. Greg Gerhardt, Co-investigator [5% effort]. Requested first year costs \$192,118; total project requested costs \$504,604; duration 12/1/9711/30/00.

Department of the Navy (DOD), "Trophic Support of Ventral Mesencephalic Grafts", Dr. Ann-Charlotte Granholm, P.I., Dr. Greg Gerhardt, Co-P.I. [10% effort]. Requested first year direct costs \$224,795; total project requested direct costs \$1,193,468; duration 4/1199-3131104.

[8] Potential for Generating Extramural Funds:

The Center for Sensor Technology, in its current configuration, has been in operation since 1991 and receives funding from the National Science Foundation on a yearly basis. In addition, Dr. Gerhardt has acquired funding from a variety of NIH agencies. It is anticipated that Dr. Gerhardt will continue to seek and receive funds from NIH and NSF to support this Center. In addition, the newly created Center at the University of Kentucky should qualify for a National Science and Technology Center STC grant. Such funding, which would be in conjunction with support from industry, would allow for support at the \$2 million per year level for direct costs for ten years. In addition, the technologies developed by Dr. Gerhardt and his Center have a high probability of being

commercialized by certain outside companies or by Dr. Gerhart's own spin-off company known as Quanteon, Inc. Dr. Gerhardt currently holds one patent on this technology. Revenues received for the development of technologies through Quanteon, Inc. would also add funding to the Center for Sensor Technology.

[9] Other Benefits of the Center:

The Center for Sensor Technology will greatly enhance interactions among faculty, postdoctoral fellows, medical students, graduate students and undergraduate students regarding the focused development of modern sensing technologies in medical sciences. The Center will improve communications regarding new advances, on-going and proposed studies, and opportunities for collaborations with other institutions and industries. The Center will be visible to the citizens of the Commonwealth of Kentucky and will highlight the growing community of researchers at the University of Kentucky who are working on the development of biotechnology. The development of high profile biotechnologies such as sensor techniques will also improve prospects of donations for endowed chairs and professorships that further enhance the development of the Medical Center at the University of Kentucky.

Note: If approved the proposal will be forwarded to the Administration for appropriate action

CenSeT.doc

US Agenda Item: Center for Sensor Technology