August 1, 2018

TO: Members of the Board of Trustees

FROM: Craig H. Kennedy, Ph.D.
Provost and Executive Vice President for Academic Affairs

RE: Professional Masters in Intraoperative Neuromonitoring (PMIN)

RECOMMENDATION:

That the Board of Trustees approve the Professional Masters in Intraoperative Neuromonitoring.

BACKGROUND:

Students of intraoperative neuromonitoring (IONM) are trained in neuroanatomy, neurophysiology, and neuromonitoring technologies to apply neurophysiological tests during certain surgeries to provide a surgical team with an ongoing assessment of the functional integrity of the nervous system. IONM professionals acquire and communicate data collected real-time to a surgical team with the goal of reducing iatrogenic damage to the nervous system during surgery.

The Professional Master’s Program in IONM is designed to provide students with in-depth knowledge of neuroanatomy, neurophysiology, signal acquisition and analysis, and its application to the surgical environment. The program will prepare students to perform duties of a neuromonitoring professional. After completion of 100 surgical cases in the Clinical Practicum course (PNB 5104), students will be eligible to participate in the national exam for Certification in Neurophysiologic Intraoperative Monitoring (CNIM Certification) conducted by the American Board of Registration of Electroencephalographic and Evoked Potential Technologists (ABRET). There are no similar MS graduate programs in either Connecticut or the northeast region in IONM. Students in this program will be assessed graduate tuition and fees.
Request for New UConn Academic Degree Program

General Information
Name of degree program: Professional Masters in Intraoperative Neuromonitoring (PMIN)
Name of sponsoring Department: Physiology and Neurobiology (PNB)
Name of sponsoring College: College of Liberal Arts and Sciences
Campuses: Storrs
Contact persons: Joseph LoTurco, Professor and Head, PNB
Payam Andalib, Clinical Professor, PNB
Radmilla Filipovic, Assistant Professor in Residence, PNB
Type of Proposal: New
Type of Program: Professional M.S.
Anticipated Initiation Date: June 2019
Anticipated Date of First Graduation: Summer 2020
CIP Code: 26.1503 (Neurobiology and Anatomy)

Background & Description
Students of intraoperative neuromonitoring (IONM) are trained in neuroanatomy, neurophysiology, and neuromonitoring technologies to apply neurophysiological tests during certain surgeries to provide a surgical team with an ongoing assessment of the functional integrity of the nervous system. IONM professionals acquire and communicate data collected real-time to a surgical team with the goal of reducing iatrogenic damage to the nervous system during surgery.

The professional MS program in IONM at UConn will be a one year 30-35 credit professional MS program, 21 credits of coursework in Physiology and Neurobiology (PNB) and 9 credits of clinical practicum. The clinical practicum will include 100 surgical cases, a number that will qualify students to sit for the Certification in Neurophysiologic Intraoperative Monitoring (CNIM) board exam. In order to provide for the surgical experience during the MS program, a three-party affiliation agreement has been established between UConn, a major IONM service provider (Nuvasive/Safepassage), and Saint Francis Hospital and Medical Center. An additional affiliation agreement is pending with Hartford Medical Center, contingent upon establishing a masters program, and discussions are underway with UConn Health. The clinical practicum will be operated in collaboration with Nuvasive/Safepassage. Practicing IONM professionals employed by Nuvasive/Safepassage will serve as clinical mentors for students in the program. The program organization is designed to meet or exceed the accreditation requirements for IONM set by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). We will apply for accreditation in the first year of the program, and we anticipate the first class to start the second summer session of 2019.
Reasons for the Proposed Program

Approximately 750,000 surgical cases use IONM in the USA annually, and this is expected to increase as the number of surgical procedures employing IONM increases. There are approximately 3,100 active board certified CNIM professionals in the field, with an estimated need of over 200 additional certified and trained professionals each year. To help meet this need UConn established a 9-credit summer graduate certificate program in IONM in 2015. It has grown from 10 to 15 students, and applications have increased from 10 in the first year to approximately 30 for this coming summer. The current certificate program provides students with an introduction to the field of IONM and a foundation in Neuroanatomy and Neurophysiology. The certificate prepares students to enter advanced training and clinical experience, typically run by IONM service companies, but does not have advanced coursework or a clinical practicum required for students to be eligible to take the CNIM board exam in IONM offered by the American Board of Registration of Electroencephalographic and Evoked Potential Technologists (ABRET). The new professional MS in IONM will be a one-year program that will provide students with a full IONM training experience, advanced coursework in Neurophysiology, and a full clinical practicum series with 100 surgical cases that will qualify students to take the board exam.

Curriculum & Program Outline

The Professional Master’s Program in IONM is designed to provide students with in-depth knowledge of neuroanatomy, neurophysiology, signal acquisition and analysis, and its application to the surgical environment. Students who complete the 9-credit certificate program in the summer may apply to, and with acceptance into the MS program, continue into the professional MS in IONM. In addition to coursework, students will participate in neuromonitoring surgical cases in the operating room setting. The program will prepare students to perform duties of a neuromonitoring professional. After completion of 100 surgical cases in the Clinical Practicum course (PNB 5104), students will be eligible to participate in the national exam for Certification in Neurophysiologic Intraoperative Monitoring (CNIM Certification) conducted by the American Board of Registration of Electroencephalographic and Evoked Potential Technologists (ABRET).

A minimum of 30 credits must be completed from the following list of required and elective courses:

Summer session II:
3 Required (9 credits):
PNB 5101: Anatomy and Physiology for Intraoperative Neuromonitoring, 4 cr
PNB 5102: Fundamentals of Intraoperative Neuromonitoring, 3 cr
PNB 5103: Applied Intraoperative Neuromonitoring, 2 cr
Fall term:
2 Required (5 credits):
PNB 5104: Clinical Practicum in Intraoperative Neuromonitoring: 3 cr
PNB 5105: Seminar in Intraoperative Neuromonitoring  2 cr
Electives:
PNB 3251: Biology of the Brain, 3 cr
PNB 4400: Biology of Nervous System Diseases, 3 cr
PNB 5390: Membrane Transport in Health and Disease, 3 cr
PNB 6418: Integrative Neurobiology, 3 cr
PNB 6417: Developmental Neurobiology, 3 cr
PNB 3275: Biology of Synaptic Transmission, 2 cr

Spring term:
3 Required (9 credits):
PNB 5104: Clinical Practicum in Intraoperative Neuromonitoring 3 cr
PNB 5106: Advanced Modalities in Intraoperative Neuromonitoring 4 cr
PNB 5105: Seminar in Intraoperative Neuromonitoring 2 cr
Electives:
PNB 3251: Biology of the Brain, 3 cr.
PNB 6426: Molecular and Cellular Neurobiology, 3 cr

Summer session I:
1 Required (3 credits):
PNB 5104: Clinical Practicum in Intraoperative Neuromonitoring 3 cr

26 credits from required; minimum of 4 credits from electives = 30 credits

Learning Outcomes
Over the course of the MS program, students will obtain comprehensive knowledge needed for IONM professionals. Students will gain an in-depth knowledge of Neuroanatomy and Neurophysiology in health and disease, and in acquiring and communicating neurophysiological data to a surgical team. Specific learning objectives of the curriculum include:

- Understand the purpose of IONM and common IONM tests that are performed in the operating room.
- Understand the biological basis of neurophysiological processes.
- Possess an understanding of the anatomy of the central and peripheral nervous systems and muscle.
- Possess a deep understanding of specific aspects of neuroanatomy and neurophysiology with greatest relevance to IONM.
- Possess an in-depth knowledge of the operation of instrumentation in IONM and ability to program and operate IONM machines independently.
- Possess a working familiarity with operating room rules and regulations.
• Possess skills in professional communication and knowledge of appropriate
documentation of communications in the IONM setting.
• Understand proper set-up for the IONM machines in the operating room and placement
of electrodes on the patients.
• Possess a general knowledge of common surgical procedures that employ IONM and the
neuromonitoring plan for each type.
• Learn how to troubleshoot IONM methodologies to obtain quality neurophysiological
signals, and to reduce electrical and physiological artifacts.
• Identify the “alerts” criteria for each IONM test (modality) and the appropriate way to
communicate those alerts to the surgical team.
• Apply advanced IONM tests (modalities) and know their uses.

Enrollment & Graduation Projections

The enrollment target in the professional MS program is 10-12 students per year, with a
projected graduation success rate of 90%. The IONM certificate program has had an enrollment
of between 12-15 students and a drop-out rate of 5%. We receive approximately 250 inquiries
concerning the IONM certificate program each year, and with additional marketing and
recruiting, estimate between 30-50 applications each year in the MS program. We plan to offer
20 slots for the summer certificate program starting in 2018, and 10-12 to the MS program
starting in 2019. Students who complete the 9-credit certificate program may apply to, and with
acceptance into the program, proceed into the professional MS in IONM. The limiting factor to
class size in the MS program is the number of affiliated/internship sites in hospitals where
students must participate in 100 surgical cases. We anticipate the first graduating students to
complete the one-year professional MS in 2020.

Financial Resources

The Program will be self-supporting from tuition dollars collected in both the certificate
program and in professional MS program. The current tuition reimbursement rate of 85% for
these programs will be sufficient for all operational and instructional expenses and no additional
funds are being requested from the College or University. Courses will be taught by tenure-track
or long-term-contract in residence faculty, or appointed Clinical Faculty. The Clinical
Practicums (PNB 5104) will be supervised by a faculty member and mentored by IONM/CNIM
certified clinical instructional staff (mentors) working in area hospitals. These mentors will
receive an honorarium.

Facilities/Equipment/Library/Special Resources

This program will be housed in the PNB Department with offices in Torrey Life
Sciences, and a teaching lab currently in Beach Hall (rooms 343 a, b, c, 335). An Academic Plan
Tier II award of $100,000 provided the seed money to purchases equipment for the IONM
program. Equipment and resources for the program includes 10 laptops with installed Cadwell
software for signal analysis and acquisition, and models and software for instruction in Neuroanatomy.

**Program Administration**

Personnel roles are determined by recommendation of “Standards and guidelines for the accreditation of educational programs in neurodiagnostic technology,” published in Neurodiagnostic Technology in 2017.

**1. Program Directors**

Radmila Filipovic, PhD, Academic Program Director.
Payam Andalib, PhD, CNIM, Clinical Program Director.

The program directors will be responsible for:

- Administration, organization, and supervision of the program
- Long-range planning, continuous quality review and improvement of the educational program.
- Tracking outcomes of the program and utilization of appropriate systems to ensure the effectiveness of the program.
- Admissions of students into the program
- Advising students throughout program
- Analysis of the program growth, quality, progress, and job placement of the former student in IONM industry. Exit surveys will be given to students and analyzed by Qualtrics Survey software.

Besides duties above, the Clinical Program Director is responsible for:

- The coordination of the add-on(s) for which the academic program director does not hold the appropriate credential. Dr. Andalib is certified in intraoperative neuromonitoring and holds CNIM since 2009. Dr. Andalib will ensure the students will receive appropriate interaction with their mentors and physicians during the clinical practicums (internships) that are part of the Master’s program (course PNB 5104 which will be offered 3 times during the Master’s program).

The program director(s) should have a minimum of 5 years clinical and/or teaching experience; and should possess expertise and experience in leadership, organization, and teaching.

**2. Curriculum Coordinator**

- Dr. Andalib will serve as the curriculum coordinator of the program as well and in coordination with Dr. Filipovic will work on admitting and selection of the students into the program. Moreover, the curriculum coordinator will assist in the selection of qualified clinical instructional staff (mentors) for the program.
- Entry and exit surveys will be provided to students at the beginning and at the end of the program using the Qualtrics Survey software. We are currently using this software to analyze quality and outcome of Graduate Certificate Program in Intraoperative Neuromonitoring.
- Successful students will be interviewed by SafePassage/NuVasive or will be connected with other IONM companies or in-house IONM programs. We will keep in touch with all students and follow their job placement and progress in companies.

The Curriculum Coordinator should have teaching experience in related fields including teaching in clinical practice areas in neurodiagnostic technology.

3. **Medical Director and Associate Medical Director(s)**
   - The medical director of the program (to be named) will provide the input necessary to ensure that the medical components of the curriculum, both the didactic and supervised clinical practice, meet current standards of medical practice.
   - Promote the cooperation and support of practicing physicians for interaction with and instruction of students.
   - One or more associate medical director(s) will be appointed when either the medical director delegates specified responsibilities to another physician(s).
   - Medical director and associate medical directors will meet all the requirements set forth by standards and guidelines for the accreditation of educational programs in neurodiagnostic technology.

Competence may be demonstrated by evidence of participating in recent surgeries, hospital privileges for neuromonitoring, case logs and/or types of cases monitored within the last five years, authorship of scientific publications in professional IONM literature, participation in professional IONM meetings, and preparation and/or presentation of IONM workshops or lectures at professional meetings.

4. **Clinical Instructional Staff**
   - In classrooms, laboratories, and all clinical facilities where a student is assigned, there will be a qualified individual(s) clearly designated as a liaison(s) to the program to provide instruction, supervision, and timely assessments of the student’s progress in meeting program requirements.
   - The curriculum coordinator will assist in the selection of qualified clinical instructional staff for the program and assigns the students to appropriate instructors (mentors) throughout their progress within the Master’s program.

5. **Faculty**
Faculty teaching courses included in the IONM program include PNB tenure track faculty, faculty in residence and Clinical Professor.

**Similar Programs in Connecticut or Region**

There are no similar MS graduate programs in either Connecticut or the northeast region in IONM.