

CREATION OF NUCLEAR MEDICAL AND IMAGING SCIENCES SECTION WITHIN THE TRANSACTIONS ON NUCLEAR SCIENCE

The February, 2002, issue of the Transactions on Nuclear Science (TNS) represented the inaugural issue of the Nuclear Medical and Imaging Sciences (NMIS) section of the Transactions on Nuclear Science (TNS). Beginning with this issue, all TNS manuscripts that cover the subject areas of nuclear medical science and nuclear imaging science will be published under separate cover three times a year (in February, June, and October). These types of papers have previously been found scattered between the regular issues of TNS and those special issues associated with papers originally presented at the Medical Imaging Conference (MIC). Some of the motivation and background for this change is described below.

The field of radiation-based medical systems has grown markedly over the years. The Nuclear Science Symposium (NSS), the MIC, and the IEEE Nuclear and Plasma Sciences Society (NPSS) have had a role in every detection method that has led to medical devices using radiation, especially imaging devices (except for X-ray film). The growth of this area is illustrated by the evolution of the NSS and MIC conferences. In the 60's, the presentations at the NSS having to do with medical devices were relatively rare and placed in sessions having to do with the detector type being used. In the 70's, the medical imaging presentations were more frequent and there were sessions devoted to medical imaging systems. During the 80's, it became obvious that the medical imaging papers were a significant part of the NSS. Finally in the 90's, the medical imaging group organized its own conference (MIC) which was held in conjunction with the NSS. In 1996, the medical imaging group became established as an elective technical committee of NPSS with its own constitution under the name Nuclear Medical and Imaging Sciences (NMIS) Technical Committee.

We have seen the impact of nuclear medical technology grow in parallel with (and as an outcome from) these changes in the NSS and MIC. The first nuclear medicine imaging systems were simply gamma-ray detectors mounted on a scanner bed with a mechanical attachment to a pen that made a dot on a piece of paper every time a gamma-ray was detected. The gamma camera then substituted electronic localization for mechanical motion. These systems eventually evolved into X-ray computed tomography (CT), positron emission tomography (PET), digital radiography and mammography, all of which are based on radiation detection systems developed by NSS participants. If you have been to the hospital recently with a problem that cannot be diagnosed with a blood test, you will see that most of the tests are performed with one or more of the above devices. This work associated with NPSS, NSS, and MIC is very important to our healthcare system and our group of scientists has been and continues to be very important to its continuing growth.

The presence of nuclear medicine papers in TNS has also mimicked this growth and evolution. Initially such papers were grouped somewhat randomly in the Transactions until they eventually progressed to become special issues related to papers presented at the MIC, along with others placed in regular issues. The number of these papers have grown to where over the last four years they have represented 20-35% of the pages published in TNS. We believe that the number of papers in these areas will continue to grow.

In order to better accommodate this growth, to provide more visibility and ease of access to TNS papers on nuclear medicine and imaging science, and to more easily allow listing in medical search engines (thereby benefiting both authors and readers), we have created this new section of TNS. In addition, if one surveys the content of all the journals in the field, it becomes obvious that the research of this type (and that is the mainstay of the MIC) is not a major part of any journal. By publishing these papers under separate cover within TNS, we hope to create a virtual journal or subjournal to fulfill the need for increased emphasis in this important area.

The topical areas addressed within the NMIS section are those which have been covered previously in TNS. In particular, they include the following:

- Radiation Detectors: detection of ionizing radiation important to medicine (including but not limited to radiation therapy, nuclear



Edward J. Hoffman
Editor, TNS-NMIS



Paul Dressendorfer
Editor, TNS

medicine, radiology, auto-radiography and detectors used to assist in surgery)

- Scintillators with potential applications in medicine (from discovery to final medical application)
- Semiconductors and other emerging materials with potential applications in medical imaging devices
- Phototubes, including PSPMTs, APDs and other photodetector technology from initial testing to their use as parts of devices
- Nuclear electronics, data acquisition system components (NIM, CAMAC, Fastbus...), control systems for complex detector configurations including hardware and software, approaches to speed up processing (ASICs, FPGA) — all as applied to nuclear imaging
- Software related to image formation, keyed to potential medical applications in nuclear medicine
- New nuclear imaging devices, and hardware/software improvements in existing devices
- Correlative imaging involving nuclear imaging systems
- PET/SPECT devices and applications
- Image restitution (related to nuclear images)
- Application spin-offs from non-medical imaging technologies (e.g. Compton telescope, high energy physics devices such as read out systems for high density detector arrays)
- High resolution imaging of radioactivity in vitro, as well as in vivo, with 3D correlations between the 2 dimensions, including imaging systems to assist in surgery
- Monte Carlo and other simulation methods for initial theoretical and ongoing calculations to assist in the development and understanding of imaging devices
- Application of synchrotron radiation in medical research
- Aspects of X-ray CT, including new detectors, radiation sources, and as part of multi-modal imaging systems (e.g. CTPET or C+SPECT).
- Physiological modeling with PET or SPECT
- Nuclear imaging for non-medical applications (e.g., nondestructive testing, contraband detection)
- Intraoperative probes
- Dosimetric issues in nuclear medical science

Initially the TNS-NMIS section will be published three times per year (in February, June, and October). As the number of manuscripts continues to grow, we expect the frequency of publication to increase also. All manuscripts will continue to be fully reviewed to the standards of TNS (and equivalent to the standards of the best journals in medical imaging).

We hope that this approach represents an improvement towards better meeting the needs of our authors and readers in the community of nuclear medicine and imaging scientists and engineers. We also welcome any input on how to further improve our service to them and to our authors and readership at large.

Edward J. Hoffman, Editor, TNS-NMIS, can be reached at the UCLA School of Medicine, 10833 Le Conte Avenue, B2-096, Los Angeles, CA 90095-6948; Phone: +1 310 825-8851; Fax: +1 310 825-4517; E-mail: ieee_ejh@mednet.ucla.edu. Paul V. Dressendorfer, Editor, TNS, can be reached at the address given in the previous article.

If you would like to contact the [IEEE Webmaster](#)
© Copyright 2002, IEEE. [Terms & Conditions](#). [Privacy & Security](#)



[return to contents](#)