August 17, 2017

Sarah C. Mangelsdorf, Ph.D.
Provost and Vice Chancellor for Academic Affairs

William Karpus, Ph.D.
Dean of the Graduate School

Sent electronically

Re: Supplemental review of the Medical Physics MS and PhD degree programs and doctoral minor

Dear Provost Mangelsdorf and Dean Karpus:

On behalf of the School of Medicine and Public Health, I endorse the supplemental program review of the Medical Physics MS and PhD degree programs and doctoral minor, which was undertaken soon after the programs were reaccredited by CAMPEP.

After discussion at the August 16, 2017 meeting of the SMPH Academic Planning Council, APC members unanimously approved the report of the review committee, the recommendations of the committee for implementation, and the response of program leadership to the review committee's report. Those reports are attached.

The strengths of the program are many. The program has a rich history, beginning with its founding in 1958. It was the first U.S. program of its kind to receive accreditation, in 1988, and it has since been continuously accredited. Training goes well beyond accreditation requirements. Recent revisions to the core curriculum allow students to focus on specialized training. Students are well represented in governance of the program. Student progress is well assessed. The program supports diverse career goals, and career placement is outstanding. The program has an exceptional record of obtaining funding, which is often used to invest in state-of-the-art instrumentation that students use in their training. A conscientious effort has been made to educate a larger number of under-represented minority and women students.

The committee suggested areas of opportunities, and the program has responded:

1. Reduction of time devoted to a core curriculum may come at a cost of preparation of fundamentals. The program has noted that this observation by the review committee may be due to an error in the CAMPEP letter, which was rectified at a meeting of program leaders and CAMPEP. Only a small number of students who require remediation enroll in the program.
2. Protect time for clinical faculty to teach.
3. Consider eliminating or increasing enrollment in the doctoral minor, which has been awarded 12 times in the past ten years. The program does not plan to actively increase enrollment, but will continue to support the minor.
4. Develop strategies for the possibility of decreased funding.
Both the SMPH Academic Planning Council and I concur with the review committee's recommendation to continue the programs. We recommend that the next review occur in ten years.

Thank you for your consideration. If you require additional information, please do not hesitate to contact Andrea Poehling.

Sincerely,

Robert N. Golden, M.D.
Robert Turell Professor in Medical Leadership
Dean, School of Medicine and Public Health
Vice Chancellor for Medical Affairs
University of Wisconsin-Madison

Copies to:
Edward Jackson, Department of Medical Physics
JoAnn Kronberg, Department of Medical Physics
Jennifer Smilowitz, Department of Medical Physics
Deb Torgerson, Department of Medical Physics
Tomy Varghese, Department of Medical Physics
John Vetter, Department of Medical Physics
James Keck, School of Medicine and Public Health
Richard Moss, School of Medicine and Public Health
Andrea Poehling, School of Medicine and Public Health
Parmesh Ramanathan, Graduate School
Marty Gustafson, Graduate School
Emily Reynolds, Graduate School
Jocelyn Milner, Academic Planning and Institutional Research
Sarah Kuba, Academic Planning and Institutional Research

Attachments:
1) Review committee report
2) Program response
May 25, 2017

James Keck, PhD  
Associate Dean for Basic Sciences  
School of Medicine & Public Health  
4119 Health Science Learning Center  
750 Highland Avenue  
Madison, WI 53705

Dear Jim:

I received the report of the Supplemental Program Review Committee for Medical Physics MS and PhD Degree Programs (and Doctoral Minor) dated April 7, 2017. The report has been reviewed by myself and the Chair of the Graduate Committee for the program. We greatly appreciate the efforts of the committee and the thoroughness of their supplemental review and suggestions. In general, we agree with the contents of the report. However, there are two clarifications we would like to make.

First, it is stated on page three that “There are two trends appearing over recent years… The first is that matriculating students appear to be less well-grounded in the basics of medical physics (24/110 of students in the last 5-year period needed remedial physics)…” The origin of the “24/110 of students” statement by the CAMPEP Site Visit Team is unclear, and this was noted by the CAMPEP Board of Directors when it reviewed the documentation and approved our reaccreditation. We chose not to challenge the statement as the program has clear policies in place, as confirmed by CAMPEP, to address such students. Furthermore, since 2013 only four students have entered the program without having all undergraduate physics prerequisite courses required by CAMPEP for graduates who intend to pursue certification by the American Board of Radiology. Finally, it is important to note that our program has two tracks: one for students who wish to have an attestation of completion of the CAMPEP Core Curriculum and another for students who do not wish such an attestation. The minimum undergraduate physics prerequisites strictly apply to the former, but not to the latter. Therefore, a small fraction of our students have undergraduate degrees in biomedical engineering, electrical engineering, computer science, chemistry, or mathematics rather than physics or nuclear engineering. In general, we support a diverse entering class, but because of the CAMPEP requirements ensure that any student who wishes to receive the CAMPEP Track attestation have the necessary undergraduate physics prerequisite courses or complete such courses while enrolled in the program.

Second, it was noted that the Doctoral Minor is a “low-enrollment minor (12 minors awarded in the last decade)…” and “It may be time to reconsider how this option is used and perhaps consider ways to increase enrollment”. The Program only awards a Doctoral Minor if requested by a UW-Madison PhD student in another field of study. It is supported at the request of students in these other programs and is not an option for which we wish to increase enrollment. As it is sometimes requested, however, we have no plans to terminate the option unless we are requested to do so by the school or university.
Again, we appreciate the careful review by the review committee and their recommendations for improvement. Those recommendations have been relayed to the Program Faculty and will be addressed during the coming academic year.

Sincerely,

Edward F. Jackson, PhD
Professor and Chair, Department of Medical Physics
Professor, Departments of Human Oncology and Radiology
Director, Medical Physics Graduate Program
April 7th 2017

To: Richard L. Moss, Senior Associate Dean, Basic Research, Biotechnology and Graduate Studies  
From: Supplemental review committee: Caroline Alexander (Chair, GFEC representative), Sterling Johnson (Dept Medicine) and Vikas Singh (Dept Biostats and MedInfo); assisted by Andrea Poehling (SMPH administration)  
Re: Report from Supplemental Program Review Committee for Medical Physics MS and PhD degree programs (and doctoral minor)

Summary of activities and materials reviewed:
We have completed our review of the Medical Physics MS and PhD program; this was considered a supplemental review, since this program is reviewed every 5 years by the professional accreditation committee, CAMPEP (Committee on Accreditation of Medical Physics Education Programs, Inc). This review has been completed recently (Nov 15th 2016); the programs were found to be fully compliant, and indeed the report was laudatory. The accreditation is in effect through 31st Dec 2021.

Our review was processed as follows: we (the committee, with Andrea Poehling’s coordination) met to review self-study documents from Medical Physics (dated 5th July 2016; 800 pages) together with CAMPEP review on March 2nd, 2017. The documentation included a full review of the CAMPEP site visit. The committee submitted questions for further clarification to the Program Director, Dr. Edward Jackson (Professor and Chair, Medical Physics), and answers were received on March 22nd 2017. We did not identify any issues that would require further site visit interview; hence this report is prepared on the materials described above.

The CAMPEP review rates the following categories: Program goal and objectives, program structure and governance, program director, program faculty, institutional support, educational environment, scholarly activities and curriculum, each with separate sub-sections.

Program description:
There has been a Radiological Sciences training program in the Medical Physics Department for 38 consecutive years, and the research and training reputation of this Department is exceptional. Professor Edward F. Jackson has been the Director of the training program and Department Chair since 2013. The training options have undergone some streamlining and simplification, to eliminate the previous choice of three tracks (General Medical Physics, Image Science or Health Physics), in favor of the CAMPEP (which is directed towards medical application) and non-CAMPEP (directed towards research). The standards for graduation have been clarified (manuscript submission, committee formulation, annual meeting agenda, timeline for graduate career milestones, career option discussion). The Departmental faculty is renewing with the retirement of long standing faculty and recruitment of several junior faculty (3 filled, 2 open).
The primary objectives of the training program are to provide a rigorous core education in graduate-level medical physics, in-depth research training for students interested in a spectrum of related applications, and coursework applicable to becoming a qualified medical physicist. The standards represented by the training goes above and beyond the CAMPEP standard. Over the past four decades, the graduate theses from this Department comprise a remarkable collection of contributions to the advancement of medical physics. The diverse applications of this program are represented by the cross-appointments of faculty in numerous other Departments, such as Radiology, Human Oncology, Medicine, Psychiatry and Neurology. In addition to the Director, the Program leadership includes a Chair, vice Chair and Chair of Admissions; this group meets monthly to discuss arising issues together with a group of 4 student representatives.

Within the last decade, the Department has been consolidated into state-of-the-art space on the Hospital campus, at WIMR and elsewhere, around the extensive instrumentation resources. A dedicated group of faculty are committed to education and training, and also to the competitive funding of these efforts by extramural support. They are also supported by their administrative team and by the SMPH. The enrolment and graduation rates are summarized below in Table 1.

![Table 1: Medical Physics Student Outcome Data (2007-2016)](image)

**Program strengths:**

**Summary.** This has been an exceptional program since 1958, accredited since 1988, and indeed was the first program in the US to be accredited. It is one of the most highly respected programs in the field of medical physics, consistently graduating students of very high quality who are well prepared for careers in research, teaching and clinical work. It is well renowned for its scholarly activities and innovation. The program is housed in the basic science Department of Medical Physics.

**Curriculum is evolving.** The program continues to move forward and to evolve to meet student’s needs. In particular, the core curriculum has recently been reviewed to reduce the number of credit hours that are required within the core, to allow more time for advanced specialized topics.
Integration of student opinion and needs. The student body is represented by a 4-member Graduate Student Representatives body, at monthly faculty meetings, and as needed, with the Program Director/Department Chair. This generates an early alarm system for student concerns.

Implementation of ongoing assessment of student progress. Based on student feedback, the program has reacted to perceived shortcomings on career information. Starting in Fall 2016, annual reviews of progress and discussion of career options have been instituted for pre-dissertators, until the Preliminary Exam is completed successfully. This committee then evolves into the Preliminary Exam Committee (meeting annually as required since Fall 2015). Deliberations provide summary feedback on research progress and career development.

Continuing excellence in career opportunities and placement. The career opportunities chosen by graduates fall into many different categories, including Medical Physics residency programs, post-doctoral research training, industry positions and other entrepreneurial opportunities (particularly fostered by the UW D2P program). The accomplishments of previous trainees as they progress in their careers is exceptional: they are represented across the nation, and across the world, and have expertise in many diverse areas, from academia to applied diagnostics to faculty positions where they are faculty trainers themselves. Nearly 60% of graduates are employed as research physicists and/or faculty.

There has been a clearer discrimination of the “CAMPEP” track, which includes more rigorous adherence to core curriculum suitable for medical applications. The students on the non-CAMPEP track can diversify into other areas of interest. This process has been made more transparent for the student body, and helps to qualify applicants for the highly competitive Medical Physics residency positions (which this program competes for very successfully).

Exceptional funding record. This program capitalizes on extramural research funding that provides the majority of student and significant faculty support. Of particular note, the equipment is constantly renewed, recently to include a 3T PET/MR instrument, a GMP radiopharmaceutical production facility, a ViewRay MR-guided therapy system, expansion of the Treatment Planning System Lab, installation of a Varian 21EX linear accelerator and many other updates and replacements. This Department has a 10-year comprehensive research agreement with GE Healthcare, which provides access to state-of-the-art imaging equipment for basic, translational and clinical research. Although a number of faculty have retired since the previous accreditation round, many remain active, and the program is actively recruiting new faculty members.

Active efforts at matriculation of URM and female students. Dr. Wakai, the Graduate Admissions Chair attends National Society meetings for URMs, in order to raise the profile of the UW program; this has successfully recruited 3 prospective students who have offers of AOF fellowships. The statistics for the recruitment of URM candidates and women compare to peer Institutions. The program is aware of the recent decline in diversity and inclusion climate across the UW-Madison campus, and is actively participating in campus-wide meetings to consider suggestions for improvements. Departmental leadership is aware of the importance of role models for trainees, and is intent on increasing the number of faculty from minority origins.

Program weaknesses and review committee recommendations:

Accelerating advanced level learning: pluses and minuses. There are two trends appearing over recent years that are at odds. This may become an issue for the next accreditation review. The first is that matriculating students appear to be less well-grounded in the basics of medical physics (24/110 of students from the last 5-year period needed remedial physics); the other is that the graduate work covered by the coursework reflects the increasing complexity of the discipline and career options of medical physics. In order to accommodate the increasing complexity, and to generate more career options, the core curriculum is covered in fewer credits (and less time). The CAMPEP committee noted some areas of overlap between courses, and it may be particularly important to eliminate redundancy as this streamlining effort goes ahead. It may also take some strategic planning to avoid student dissatisfaction and success (more terminal MS degrees or dropouts). We would recommend that the program trainers take time to consider these changes and how best to accommodate them. Note some course evaluations averaged less than 4.0 in many categories (including key
areas such as achieving expectations, clarity and organization); perhaps this could be applied to any reorganization.

Protecting instructor time. Clinical faculty are mandatory trainers for CAMPEP certification (some program faculty should be licensed and/or board-certified medical physicists). However, time of clinicians is difficult to schedule effectively into the coursework, due to clinic work and other responsibilities. The SMPH may be able to protect more time for this essential training activity.

Doctoral Minor. This is a low-enrolment minor (12 minors awarded in the last decade), which has been awarded to students from other programs who have a mentor in Medical Physics. It may time to reconsider how this option is used and perhaps consider ways to increase enrolment.

Overcoming the flat-line funding (or worse) from Federal and local sources. Funding for training, recruitment, retention and research has become tight, both from the University of Wisconsin and Federal sources, so there may need to be consideration of some proactive additional strategies to maintain the Department’s status on the forefront of new discovery and faculty and curriculum development.

In summary, our committee recommends that the Medical Physics graduate program continues, and that the next program review occurs in coordination with the CAMPEP review in 10 years.

Sincerely

Caroline Alexander, Professor of Oncology
Sterling Johnson, Professor of Medicine
Vikas Singh, Associate Professor of Biostatistics
Master’s Apps, Admits, Enrolls

Applicants, Admits and New Enrollments

Period
Fall Term

Division
All

School/College
All

Degree Level
All

Academic Major
Medical Physics MS

Named Option
All

Gender
All

Diversity
All

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This visualization was created by the Graduate School. Questions should be directed to Peter Kinsley, peter.kinsley@wisc.edu.
Total Enrollment - Diversity

Enrollment

This visualization was created by the Graduate School. Questions should be directed to Peter Kinsley, peter.kinsley@wisc.edu.
Ph.D. Funding

Students with an Appointment of 33% or Higher
Ph.D. Time to Degree (Total time as a Graduate Student)

PhD Time-to-Degree Metrics, Peer Comparison

Select UW-Madison Program
Medical Physics
Select Time-to-Degree Metric
Time at UW-Madison as a Graduate Student

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