

\*\*\*\*DRAFT\*\*\*\*

Web-based Tools for Training Medical Physicists Internationally

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Arthur Boyer, Ph.D.  
Chair: Task Group 131

[aboyer@swmail.sw.org](mailto:aboyer@swmail.sw.org)  
Adjunct Professor, Stanford University, Stanford, California  
Professor, Texas A&M University System Health Science Center  
Director, Division of Physics, Scott & White Hospital, Temple, Texas

## Preliminary Proposal

At the Annual Meeting of the American Association of Physicists in Medicine (AAPM) held in Seattle, Washington in 2005, the Asian Oceanic Subcommittee of the International Affairs Committee approved a motion to create a Task Group lead by Arthur Boyer charged with developing a program for training medical physicists in China using web-based tools. A project was subsequently endorsed by the World Congress on Medical Physics and Sustainable Development that met in Durban, South Africa October 30-November 3, 2005 to develop a web-based training program for medical physics students around the world. The project is proposed to consist of three parts and will require the dedicated service of about 40 medical physicists serving on the Task Group. The goal of the Task Group is to provide a comprehensive training program for training medical physicists in radiology, nuclear medicine, and radiotherapy at no cost to the off-shore training sites. At the end of the life-time of TG-131, the goal is for processes for training developed by TG-131 to be integrated into the structure of the AAPM.

### **Part I**

- \* A set of web-based training tools will be developed similar to the tools that have already been created under NCI grant CA89718 "Web-Based Computer-Aided Instruction for Medical Dosimetrists".
- \* The content will be entered into a "open educational resource" (OER – <http://www.oercommons.org/>) system named MedPhysWiki (<http://www.medphyswiki.com/wiki>), a web content acquisition and teaching environment currently being hosted by The University of Iowa and made available to TG-131 as a public service. The OER system will be built using MediWiki (<http://www.mediawiki.org>) a free software package originally written for Wikipedia.
- \* The instruction material will be written first in English. The MediaWiki portal provides the ability to translate didactic material into all languages. Translation services will be executed by the global community. The English originals will be revised by trained medical physicists in North America, Europe, and other countries, to be more appropriate for training medical physicists.
- \* When fully functional, a goal will be to acquire each year approximately 50 sessions out of approximately 200 and previously acquired sessions will be revised. The revised sessions will be translated into other languages and added to the on-line delivery system available world-wide as resources for translation become available.
- \* During the development phase, the Medphyswiki MediaWiki portal delivery system will be maintained by John Bayouth at the Radiation Oncology Dept. at the University of Iowa in Iowa City, Iowa. It is anticipated that the AAPM will eventually maintain the Medphyswiki portal.
- \* The production and insertion of content into Medphyswiki will be accepted by the ABR as a Self-Directed Education Project (SDEP). A radiological physicist diplomate of the ABR holding a time-limited certification will register intend to produce an SDEP as part of their Maintenance of Certification. Upon completion of the addition of content to Medphyswiki, the diplomate will indicate to the ABR that the work can be viewed at [www.Medphyswiki.com](http://www.Medphyswiki.com) as evidence of having finished the SDEP. A holder of a time-limited certificate can accrue 15 credits per year through this process.

## **Part II**

- \* TG-131 will identify pairings of therapeutic and diagnostic radiology facilities in North America with sister facilities out of North America. Foreign language-speaking medical physicist mentor consultants from a North American facility will make trips to the off-shore sister Universities and Hospitals in target countries.
- \* The consultant mentors will work with local teachers to set up training programs for medical physicists and will lecture to local mentors and students.
- \* The trips will be about two weeks in duration. The medical physicist consultant mentors will train the local mentors on the use of the MedPhysWiki OER system.
- \* The mentors will set up training programs using the IAEA standard curriculum.
- \* The mentor will return to the United States to monitor the students' progress remotely. Live lectures and exams will be explored using available Microsoft software.
- \* The number of medical physicists participating annually will increase over the first few years of the project.
- \* Funding for the trips will be sought from nonprofit and commercial sources.

## **Part III**

- \* Medical physics indigenous mentors who have used the web-based training tools in targeted countries and/or students will travel to the sister academic medical centers to spend ~ 6 months studying medical physics and gaining first-hand experience in one or more technical areas covered by the web-based tools.
- \* Major academic medical centers will provide space, and access to observe procedures and equipment.
- \* The indigenous mentors will continue to use the web-based tools and will work with TG-131. Upon returning to their home country, they will serve as mentors to use the tools to train medical physicists at other facilities in their region. The original off-shore sister institution will become local training center and a big-sister institution for indigenous facilities in the region. The role of the North American facility will diminish as the off-shore facility gains experience.
- \* Vendors will be sought to fund visits between the off-shore sister facilities.
- \* In some countries there is no social infrastructure that provides recognition for the training of a medical physicist. TG-131 will work with the ABR to develop the pathway already provided by the ABR to certify medical physicists outside the United States. The goal will be for the training program developed by TG-131 to be a means by which a medical physicist who completes a documented training program with satisfactory evaluations can obtain ABR certification.

Details:

(1) Task Group Chair. The role of the Chair will be to formulate the strategy and tactical workflow for the Task Group, recruit and retain members, monitor the over-all progress of the project, and participate directly in certain subtasks of the Task Group. The Chair will be responsible for the preparation and delivery of reports on the Task Group's activities to the Asian Oceanic Affairs Subcommittee of the International Affairs Committee of the American Association of Physicists in Medicine.

(2) Advisory Board. An Advisory Board provides general oversight for the project, liaison with regional medical physics and hospital organizations, and professional societies; and renders judgement on Task Group strategic planning. Should the need arise, the counsel of the Advisory Board would be sought on any conflicts or disputes the might require resolution.

(3) Technical Staff. A Technical Staff at the University of Iowa and RadOncElearning, LLC will maintain the web site as a public service. Since a Wiki model will be used, there will be no technical assistance required for entering the content other than providing instruction and answering technical questions.

(4) Task Group Organization Structure. The task group consists of members of the American Association of Physicists in Medicine and reports to the Asian Oceanic Affairs Subcommittee. The task group has liaisons from the Chinese American Medical Physics Association. In addition to being a Task Group of the AAPM, the project is also sanctioned by the IOMP Education Committee and the American College of Medical Physics. Each subtask is the responsibility of two or more Task Group members.

The following is a listing of subtasks and task group members provisionally working on the subtask.

a. Site Matching and Practicum.

A sub-group consisting of Paul Keal, John Antolak, John Bayouth, Milton Woo, Jim Purdy, Jihong Wong, and Art Boyer will develop a document describing the program and shepherd it through the AAPM. Persons that have indicated an interest in working in specific regions are:

China: Almon Shiu

Arabic: Sam Mamsour (Egypt),

South America: Doracy Fontenla, (Argentina)

Pakistan, Bangladesh, SriLanka: Amir Huda

China: Jihong Wang (diagnostic), Charlie Ma

Accreditation: Tim Solberg (CAMPEP)

b. Recruit and Qualify Mentors. Jun Deng

c. Certification of Off-Shore Training Programs

(1) Ray Wu

(2) Adel A Mustafa.

(3) Bhaskaran K Pillai.

d. Liaison with Ministries of Health.

Ned Sternick

e. Curriculum/Syllabus.

(1) Lei Dong

(2) Jihong Wang

- (3) Amir Huda,
- (4) Mark Oldham, PhD
- (5) Timothy D. Solberg,
- (6) Shiv P. Srivastava,
- (7) Charles Mayo

f. Assemble Content.

- (1) Milton Woo
- (2) Jihong Wang
- (3) Amir Huda,
- (4) Mark Oldham, PhD
- (5) Timothy D. Solberg,
- (6) Shiv P. Srivastava,
- (7) Charles Mayo Clinical Treatment Planning
- (8) Rajeev K Badkul
- (9) Raul Gonzales

g. Assigned Readings. Michael Mills

h. Schools and Workshops. Paul Keall

i. Other Funds Development. Tim Solberg, John Bayouth, Charlie Ma

j. Web Software Development.

Eric Hendee  
John Antolak

k. Project Assessment.

l. CAMPEP SDEP development.

Descriptions of the subtasks follow.

a. Site Matching and Practicum.

- a. The two goals of this subtask are to establish a process for matching sites in North America with off-shore sites out of North America, and to develop a recommended practicum for trainees to undergo at the North American sister sites. This sub-task could be managed by the International Scientific Exchange Programs sub-committee.
  - i. The subtask group will develop qualification standards for the North American sister sites and the off-shore sister sites. A simple application form will be developed for a site to officially register its intent to participate with TG-131.
  - ii. Solicit Off-Shore Target Sites. Task Group members will identify a pool of target sites using professional contacts, the web, attendance of regional meetings, and contacts through the IAEA, WHO, and UNESCO.
  - iii. Solicit North American Sister Sites. Facilities in North America that are willing and have the resources to act as a sister site to the off-shore sites will be recruited and tracked by this subtask group.
  - iv. Site Matching. The Task Group members will manage the matching of North American training target sites with off-shore sister sites. The subtask will register commitments to the two parties to partner in the training process and will facilitate communication.
  - v. Develop practicum outline. The subtask group will develop general outlines for practical experience to be used at the North American sister

sites. Separate outlines will be drafted for Diagnostic Radiology, Nuclear Medicine, Radiation Safety, and Radiation Oncology. The subtask group will apply for CAMPEP accreditation of the practicum outlines.

- vi. **Vendor Support.** The subtask group will establish liaisons with vendors in radiation oncology and radiology with the intent of the vendors funding the travel expenses of North American mentors to the off-shore sister sites and the travel expenses for students in the off-shore sites to travel to the North American facilities to do a practicum.

b. Recruit and Qualify North American Mentors.

Mentors in North America for students at off-shore target training sites will be needed during Part II of the project. During the beginning of the project, this subtask group will develop the infrastructure needed to manage a pool of individuals qualified to act as mentors in a developed site to serve a target training site. This sub-task could eventually be a subcommittee of the International Educational Activities Committee of the AAPM. The goals of this subtask are:

- i. Define Mentor Standards: A written set of standards by which the Mentors will be qualified by this subtask group will be developed.
- ii. Establish Qualification Board. The subtask group will sit as a Qualification Board to review the experience and skill sets of potential Mentors.
- iii. Set Up Qualification Procedure. The subtask group will set up procedures to carry out the qualification process. The procedures will consist of means for a potential mentor to register themselves, and to document that their training and experience meets the Mentor Standards. The mentor-applicant's home institution must be among the paired sister institutions that have made a commitment to accepting off-shore students to do a practicum. The subtask group will sit as a Qualification Board to render a verdict on the background and skill sets of the applicant.
- iv. Resolve Disputes and Respond to Inquiries. The subtask members will act as a dispute resolution panel to address any problems that arise with the mentor qualification process. They will also be identified as points of contacts for potential mentors that have questions about the process.
- v. MOC Credit. The subtask group will establish mentoring an off-shore student as an ABR Self-Directed Education Project (SDEP) earning the contributor 15 CE credits toward Maintenance of Certification.

c. Certification of Off-Shore Training Programs.

There are generally no mechanisms for certifying training programs for medical physicists in target site regions. Medical Physics Residency Training programs in the United States are certified by CAMPEP. A subtask group will work in each site region to identify potential credentialing bodies in the target site regions that would eventually certify the training of the medical physicists in that region. This will be a long-term goal but will be essential for the growth and quality of seed training programs in the target regions.

d. Liaison with Ministries of Health. The goal of this subtask is to obtain recognition of medical physics as a profession in the target site countries. The subtask group will seek means appropriate to each region to have medical physicists certified individually. This subtask group will liaison with the International Labor

Organization through the IOMP to continue to lobby for the recognition of medical physics as a profession.

e. Curriculum/Syllabus.

The Review of *Radiation Oncology Physics: A Handbook for Teachers and Students*, developed by Ervin Podgorsak for the International Atomic Energy Agency, will be used as foundation on which MedPhysWiki will be developed. About sixteen modules based on the sixteen chapters of the IAEA Handbook, will be named and placed in MedPhysWiki. Within each named module, there will be on average 9 sessions following the IAEA outline. Originally about 140 sessions will be listed in the MedPhysWiki. The instructional objectives will clarify what is to be learned in each session. The instructional objectives will be formulated for each subsection of the IAEA handbook. The instructional objectives will state what knowledge or skills the student will be expected to have attained by working through the session. Altogether more than 1000 instructional objectives will be written. This subtask group will undertake the certification of the content in MedPhysWiki by CAMPEP once the content has been assembled.

f. Assemble Content.

- i. Following the syllabus and instructional objectives, this subtask group will oversee the acquisition of content for the didactic learning delivered by the tools. Some content can be drawn from the Web-Based Training for Medical Dosimetrists with permission from the original authors and a modicum of further editing. However, the bulk of the material will need to be written at a level suitable for training medical physicists. The Wiki model will be constrained so that only approved authors can add content. The subtask group will develop criteria that must be met by potential content contributors. The subtask group will then act as a screening board to approve content authors. A “Gate-Keeper” will be assigned to each Module (Chapter of the IAEA Handbook). Application to submit content will be emailed to a member of the subtask group serving as a Gate-Keeper for the Module selected by a potential contributor. Approval by the Gate-Keeper will be sufficient for approval but veto by any one member will block approval. Once approved, a content contributor will be given a password that will allow them to edit MedPhysWiki.
- ii. The subtask group will pursue other sources of didactic training material. Sources of such material suitable for training in the scope of diagnostic radiology are available in the EMERALD project at Kings College, London authored by Slavik Tabakov and in the web site authored by Perry Sprawls. The Summer Schools of the American Association of Physicists in Medicine and the authors who contributed content to the Summer Schools will be a potential source of content.
- iii. The Task Group will address the copyright issues for text and graphics to be used on the open access MedPhysWiki. One potential solution is to require that the contributing author use a Creative Commons License agreement (<http://creativecommons.org/about/licenses/meet-the-licenses>) that allows the content to be used in the open content environment. Graphics will be

uploaded to a MedPhysWiki Graphics Commons. A subtask of the Task Group is to formulate a policy for copyright issues for graphics.

- iv. The subtask group will facilitate the application for earning the contributor 15 CE credits toward Maintenance of Certification ABR Self-Directed Education Project (SDEP) for each session authored.
- v. The goal will be to assemble the content in the third year of the project.

g. Assigned Readings.

The web-based didactics will be augmented by assigned readings. Cost-free assigned readings will be drawn from the Journal of Applied Clinical Medical Physics. The subtask group will seek other sources of assigned readings with permission from the sources. Assigned readings will be associated with each of the sessions of MedPhysWiki following the IAEA outline. Members of the task group will select the assignments and enter them into MedPhysWiki.

h. Schools and Workshops. Students in the Part III phase of the project will travel to their North American sister site and will attend schools and workshops available at that time and place.

- i. Identify schools and workshops that will be accessible through ESTRO, AAPM, COMP, and other resources.
- ii. Identify and make available funding sources to support the attendance of the students to the schools and workshops.
- iii. Manage the application for funding for specific students.

i. Other Funds Development.

In order to write plug-ins for the open-source Wiki web software, funds will be needed to purchase the services of web programmers. The goal of this subtask is to develop funding sources.

- i. Government Organizations. Potential sources at the NCI, the NSF, and other government agencies in the United States will be identified and grant proposals written and submitted. Similar government sources will be pursued in Europe. Funding will be sought from Ministries of Health in the target regions. Funds will also be sought from international organizations such as the IAEA, the WHO, and UNESCO.
- ii. NGO sources. Potential funding from such organizations as The Gates Foundation will be explored by the Task Group. In addition, the equipment vendors will be approached to seek funding that will help provide trained medical physicists in support of their most rapidly expanding markets.
- iii. Facilitate Grant and Fund Transfers to AAPM. The staff at the AAPM will serve as the repository for funding given in support of this project. The AAPM will keep the necessary balance sheets and will distribute monies for web services, travel, and other activities.
- iv. Fund Infrastructure Development. Off-shore training sites will occasionally need improved internet resources in order to use the tools. Means will be sought by this subtask group to identify and use funds for this purpose.
- v. Reports to Parent Organizations. At appropriate intervals, this subtask group will prepare financial reports to be presented to the Advisory Board, the IOMP, the AAPM, and the EFOMP at appropriate venues.

j. Web Software Development.

The content will be assembled and delivered using MediaWiki, a derivative of Wikipedia. The MedPhysWiki will be maintained by the University of Iowa initially and provided to TG-131 as a public service. In the long term, TG-131 will seek server support from the AAPM. The Wiki software is open source. As such, components can be developed to enhance the use of the Wiki software in a learning environment. This subtask group will recommend the development of new components. Funding for development will be acquired by solicitations as described for subtask group i. approved by the AAPM.

k. Project Assessments.

The performance of the project will be assessed using the following metrics.

- i. Number of Sister Sites. The number of facilities in North America and the number of sister facilities off-shore will be tracked and documented in the TG-131 Annual Report.
- ii. Number of Students On-Line. The number of students participating annually will be tracked and documented in the TG-131 Annual Report.
- iii. Number of Contributing Authors. The number of authors entering content with the Wiki tools will be tracked and documented in the TG-131 Annual Report.
- iv. External Review. This subtask group will prepare an annual review for the Advisory Board. Members of the Board will conduct an annual external review of the project. The goal of the review will be a list of ways the project strategy can be improved. It will be the goal of this subtask group to implement the recommendations of the Advisory Board.