

Innovation

- It is about finding a new way of doing something
- Differs from invention
 - **Innovation** refers to the use of a better and, as a result, novel idea or method
 - **Invention** refers more directly to the creation of the idea or method itself

Genesis of the Symposium

- Working Group on Future Research and Academic Medical Physics (FUTURE)
 - Part of Research Committee
 - Part of Science Council
 - Co-Chairs:



Thomas Bortfeld



Robert Jeraj

Concerns Expressed by FUTURE WG and by Many Others

- Increasingly inadequate emphasis on research
- Reduced research funding at the federal level
- Increasing emphasis (at the expense of R&D and innovation)
 - On quarterly stock price by industry
 - On margins at academic medical institutions
 - On professional activities within professional and scientific societies
- Limitations of current education and training programs to attract and produce innovators and inventors of the future

Concerns About the Long Term Consequences for Our Field

- Diminished innovation and creativity
- Diminished appreciation by allied fields
- Loss of leadership / competitiveness internationally

Among the FUTURE's Action Items to Address Concerns

To Raise Awareness About the Importance of Innovation and R&D



Gig Mageras
Chair

Vendor Relations and Product Usability Subcommittee Charge / Mission



Sugata Tripathi
Vice Chair

To facilitate an active dialogue with the AAPM membership to determine specific issues of concern regarding vendors' hardware and/or software design and the ease of performing commonly recommended performance evaluations

Main focus to-date: Safety and Usability

→ Research & Development

Partnership Between FUTURE and Vendor Relations and Product Usability SC

Proposal for a joint workshops / symposia on challenges and benefits of technologies emerging from research in medical physics and related disciplines

Goals of Workshops/Symposia

- **Raise awareness about the importance of R&D and innovation**
- **Identify and quantify financial benefits of (past, present and future) R&D**
 - Increased revenues
 - Job and salaries
 - ...
- **Identify and quantify clinical benefits of (past, present and future) R&D**
 - Toxicity reduction, QOL improvement
 - Local control and survival improvements
 - ...

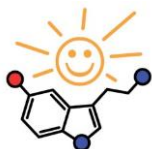
This Symposium – Each of the speakers will

- **Share his views on the importance of innovation and R&D**
- **Share personal perspectives – examples of innovation**
- **Make recommendations / convey a message**

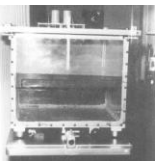
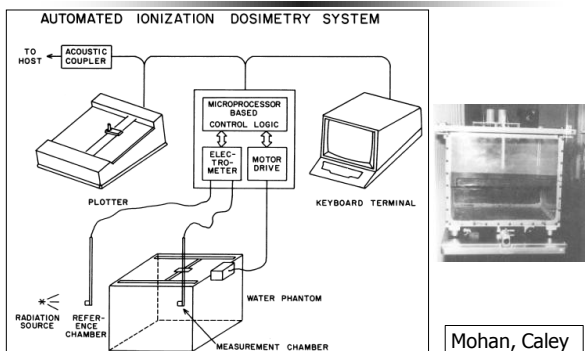
Personal Perspectives

Drivers of Innovation

- Dreams / imagination / passion
- Necessity
- Boredom, laziness, impatience
- Prior innovations & inventions
- The thrill of discovery

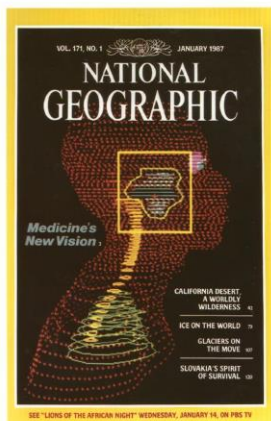


The Very First Computerized Dose Distribution Measurement System (Early 70's)



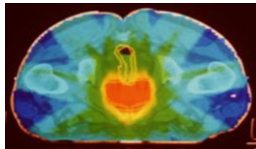
Mohan, Caley

CT's in 1970s
 ↓
 3DCRT & MLC (1980's)

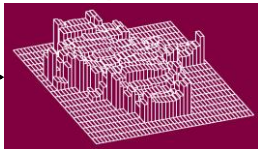


IMRT & DMLC (Circa 1995)

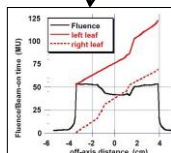
The "Photon Bragg Peak"



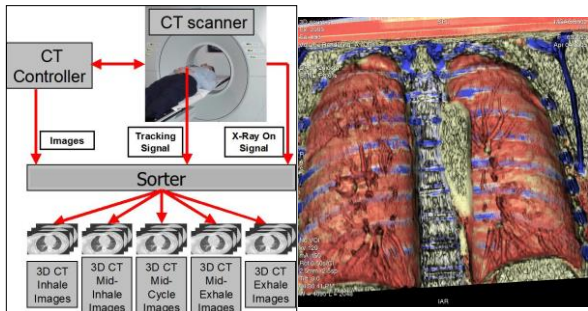
Intensity Distribution



Sliding Window Delivery With Dynamic MLC



4D CT and Respiratory Motion Management (Late 1990's and 2000's)



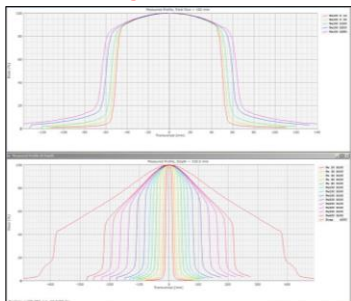
Keall

Balter

Ridding of Fetish with Flat Fields

In this day and age of intensity modulation, who needs flattening filter

- High dose rates
- Cleaner beams
- Reduced shielding
- Reduced secondary cancers
-



Vassiliev, et al

Particle Therapy A New Frontier

Message

- Innovation, research and development has benefitted us (and radiologists, radiation oncologists and hospital administrators) and, most importantly, our patients
- It is essential for the long-term welfare of our and other related professions as well as patients
- Individually, as groups or as a profession we can be most effective and best recognized for our achievements when we appropriately balance day-to-day clinical service with R&D

Message

- It is important to raise awareness of these issues among members and leaders of AAPM and co-professions (radiology and radiation oncology), administrators and academic and industry leaders
- They and we all need to think in terms of long term investments along with quarterly margins or stock prices
- AAPM should adopt policies, take concrete steps and lobby other entities to enable and encourage R&D and innovation

Plea to AAPM Membership and Leadership

- Raise the stature of R&D in the Strategic Plan equal to that of clinical services
- Facilitate and encourage entry of non-medical physics scientists and engineers into our field
- Lobby academic institutions, industry, NIH and other governmental agencies to allocate larger budgets to R&D in medical physics

Thanks
