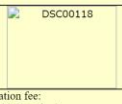

Jsmp Medical Physics Summer Seminar 2008

In Jozankei - SAPPORO

Thursday, August 21(afternoon)－Saturday, 23(noon), 2008

Registration fee:
・\32,000 (member)
・\25,000 (member student)
・\35,000 (non-member) stay and all in program included.
JRS; 医学物理士業績評価単位:10
放射線治療品質管理機構認定単位：C2-1

Hotel: 〒061-2302 札幌市南区定山渓温泉東4丁目
定山渓グランドホテル喚苑 TEL011-598-2214
http://www.grand.co.jp/top.html
千歳空港－定山渓送迎バス:
8/21（木）11:15 新千歳空港発 ； 8/23（土）13:15定山渓車庫前発
Contact us：
医学物理サマーセミナー２００８事務局 jsmp08_summer@nirs.go.jp

Day 1: Thursday August 21

14:00-14:15 Welcome and Course Overview **Shinichi Wada Ph.D.**
14:15-15:35 Radiological Physics and Dosimetry I **Masayoshi Ishikawa Ph.D.**
15:45-17:05 Radiological Physics and Dosimetry I **Masayoshi Ishikawa Ph.D.**
17:20-18:40 Nuclear Medicine/Imaging **Taiga Yamaya Ph.D.**
19:30- **Banquet**

Day 2: Friday August 22

5:30-6:30 run or walk
7:00-8:30 breakfast
9:00-10:20 Nuclear Medicine/Imaging **Taiga Yamaya Ph.D.**
10:35-11:55 Magnetic Resonance Imaging **Toru Yamamoto Ph.D.** **12:00-13:00** Lunch
13:40-15:00 Magnetic Resonance Imaging **Toru Yamamoto Ph.D.**
15:15-16:35 Health Physics/Radiation Safety **Keiichi Akahane Ph.D.**
16:50-18:10 Health Physics/Radiation Safety **Keiichi Akahane Ph.D.**
19:00-20:00 Supper
20:30-22:00 Night Session Informal Question and Answers
Chaired by Hideyuki Mizuno Ph D & Masataka Komori Ph.D.

Day 2: Friday August 22, (cont.)

Day 3: Saturday August 23

7:00-8:30 Breakfast
9:00-10:20 External Beam Radiation Therapy **Ryosuke Kohno Ph.D.**
10:35-11:55 External Beam Radiation Therapy **Ryosuke Kohno Ph.D.**
12:00 Closing remark

Medical Physics Summer Seminar 2008 in Jozankei – SAPPORO

Syllabus

Ⅰ. Radiological Physics and Dosimetry Ⅰ
Masayoshi Ishikawa Ph.D.

1. Quantities for describing the interaction of ionizing radiation with matter
(1) Kerma
(2) Absorbed dose
(3) Exposure dose
(4) Quantities and units for use in radiation protection
2. Charged-particle and radiation equilibria
(1) Radiation equilibrium
(2) Charged-particle equilibrium
(3) Transient charged-particle equilibrium

3. Cavity theory
(1) Bragg-Gray theory
(2) Spencer cavity theory
(3) Burlin cavity theory

Ⅱ Nuclear Medicine/Imaging
Taiga Yamaya Ph.D.

１．ガンマカメラの原理
（１）検出器
（２）エネルギー分解能
（３）位置演算と解像度
２．コリメータ
（１）種類
（２）感度と解像度
３．ＳＰＥＣＴ
（１）原理
（２）散乱線補正法
（３）吸収補正法
（４）吸収ラドン変換
（５）画像再構成と画像ノイズ
４．ＰＥＴ
（１）原理と特長
（２）解像度の物理的限界
（３）ＰＥＴ用検出器
（４）２次元データ収集と３次元データ収集
（５）ＰＥＴ用画像再構成
（６）ノイズ成分
５．ＰＥＴにおける最新技術
（１）ＴＯＦ－ＰＥＴ
（２）ＤＯＩ－ＰＥＴ
（３）ＯｐｅｎＰＥＴ

Ⅲ. Magnetic Resonance Imaging
Toru Yamamoto Ph.D.

1). Basic Principles
(a) Nuclear magnetic moment and spin
(b)The static magnetic field and the equilibrium distribution
(c) The Larmor frequency and the radiofrequency field
(d) The lab and rotating frames of reference
(e) Relaxation mechanisms and effects of common contrast agents
(f) The basic spin-echo sequence
(g) Contrast in spin-echo imaging
(h) Spatial encoding using linear magnetic field gradients
(i) Properties of "k-space"

2). Hardware
(a) The static magnetic field subsystem
(b) The radiofrequency field subsystem
(c) The gradient field subsystem
3). Basic Image Quality Issues
(a)Signal-to-noise ratio and contrast-to-noise ratio in MRI
(b) Resolution
4. Basic Pulse Sequences
(a) Spin-echo sequence
(b) Gradient-echo sequences
(c) Fast spin-echo sequence
(d) Inversion recovery sequences and applications
(e) Common sequence options (spatial and chemical saturation techniques)
(f) Echo planar imaging
(g) Parallel imaging
(h) MR angiography sequences
(i) Diffusion sequences
(j) Perfusion sequences
(k) Functional MRI
(l) MR spectroscopy sequences
5. Artifacts
6. Basic Safety in MRI
7. Topix
(a) MR-guided interventions
(b) MR elastograpy
(c) Molecular imaging

Ⅳ. Health Physics/Radiation Safety
Keiichi Akahane Ph.D.

1. History of Radiation Protections
1.1. History
1.2. Organizations
2. Use of Radiation
2.1. Sources
2.2. Fields
3. Biological Effects and Risks of Radiation
3.1. Biological Effects of Radiation
3.2. Stochastic Effects
3.3. Deterministic Effects
3.4. Risk Estimations of Radiation
4. Quantities and Units of Radiation Protection
4.1. Categories
4.2. Phantoms
5. Fundamental System of Radiation Protection
5.1. ICRP
5.2. Categories of Exposures
5.3. Purposes and Methods of Protection
5.4. Radiation Effects and Doses
5.5. Practice and Intervention
5.6 Justification, Optimization and Dose Limit
6. Regulations of Radiation Protection
6.1. Atomic Energy Basic Law
6.2. Law concerning Prevention of Radiation Hazards due to Radioisotopes, etc.
6.3. Medical Service Act
6.4. Occupational Safety and Health Act
6.5. National Personnel Authority Rule
6.6. Other Regulations

7. Practice of Radiation Protection and Management
7.1. Monitoring
7.2. Estimations of External Exposures
7.3. Estimations of Internal Exposures
7.4. Equipment of Measurements
7.5. Education and Training
7.6. Management
7.7. Shielding
8. Medical Radiation Protection
8.1. Characteristics
8.2. Methods of Protection
8.3. Estimations of Radiation Exposures
8.4. Pregnancy
8.5. Diagnostic Radiology
8.6. Radiotherapy
8.7. Nuclear Medicine
8.8. Others
9. ICRP 2007 Recommendation
9.1. Framework
9.2. Differences between 1990 and 2007
10. Topics

Ⅴ. External Beam Radiation Therapy
Ryosuke Kohno Ph.D.

Part 1
1. はじめに
2. 光子線と物質の相互作用
3. 放射線の強さや量
4. 光子線スペクトル
5. 逆二乗法
6. 光子線による深部線量分布
7. 放射線治療パラメータ
8. Percentage Depth Dose
9. Tissue-Air Ratio
10. Scatter-Air Ratio
11. Tissue-Phantom Ratio：TPRとTissue-Maximum Ratio：TMR
12. Scatter-Maximum Ratio：SMR
13. Off-Axis Ratioとビームプロファイル
14. 水ファントムにおける等線量分布
15. 電離箱による相対線量測定
16. MU算出
Part 2
（１）電子線
1. 水中における深部線量分布
2. 線量に関与するパラメータ
3. 電子線に対するPDD測定
4. 等線量曲線
（２）標準測定法01
1. はじめに
2. 水吸収線量校正定数ND,W
3. 標準測定法01
4. レファレンス線量計の校正
5. 高エネルギー光子線の校正点吸収線量の測定
6. 高エネルギー電子線の校正点吸収線量の測定